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Analysis of Financial Statements - Comparative Study of Pediatric Hospitals of the 1st Regional Health Authority, during the period 2010-2021

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Abstract

In the period 2010-2021, Greece faced a challenging period, having to cope with numerous economic problems (due to the financial crisis) and in managing health care challenges posed by the coronavirus (due to the COVID-19 pandemic). The negative effects of the economic crisis prompted the government to introduce strict austerity measures, which led to a reduction in public spending and funding. The healthcare sector was also affected, as healthcare facilities were confronted with various new challenges that made proper management of existing resources essential. Therefore, improving the efficiency of hospitals became an essential prerequisite for their smooth operation and the continuous provision of high-quality healthcare services. Analyzing financial data from a healthcare facility's financial statements, examining its efficiency (using financial ratios and trend indicators) along with analysis of their expenses, are methods that can help overcome the challenges preventing its economic growth and sustainability. In this context, through the financial analysis of the financial statements of the Pediatric hospitals of the 1st Regional Health Authority and specifically the General Pediatric Hospital (G.P.H.) "Panagiotis & Aglaia Kyriakou", the General Pediatric Hospital "Agia Sofia" and the General Pediatric Hospital of "Pentelis" for the years 2010-2021, the present study aims to examine if the economic and pandemic crisis affected their financial efficiency, activity, liquidity and capital structure and to determine the extent of this impact.

JEL Classifications: G34, G14, M41

Keywords: COVID-19 Pandemic, Economic Crisis, Financial Analysis, Healthcare Efficiency, Pediatric Hospitals

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1 Introduction

Between 2010 and 2021, Greece confronted a multitude of challenges that culminated in a profound social, economic and humanitarian crisis. The above argument is founded on the fact that the country experienced the financial crisis of 2009, which lasted nearly a decade, followed by the migration crisis of 2015, triggered by the war in Syria. In 2020, Greece was struck by the COVID-19 pandemic, while throughout this period, at various intervals, the country endured extreme weather events such as wildfires and floods. Each of these crises adversely impacted the socioeconomic and living standards of Greeks as well as the nation's healthcare sector.

The evaluation of financial data and the investigation of hospital efficiency become imperative for resource optimization and further development and sustainability of healthcare institutions. The use of financial ratios and trend indicators, along with an analysis of a healthcare unit's expenses, can provide administrators (and other stakeholders) with clear insights into the areas where the organization is underperforming, enabling targeted interventions to mitigate existing problems.

The current study aims to conduct a financial analysis of the financial statements of three pediatric hospitals under the jurisdiction of the 1st Regional Health Authority (RHA). Specifically, the study focuses on "Panagiotis & Aglaia Kyriakou" Children's Hospital, "Agia Sofia" Children's Hospital, and "Pentelis" Children's Hospital. Emphasis is placed on the 2009 economic crisis, along with the government's policies which affected the operation of hospitals, as well as on the pandemic crisis of 2020.

The primary goal of the study is to provide insights aimed at improving the efficiency of healthcare services, ensuring their sustainability and fostering future development by using financial ratios, trend indicators, and an analysis of their overall expenditures.

2 Impacts of the Economic and Pandemic Crises

2.1 Economic Crisis

Greece's economy faced a severe crisis before the 2008 global financial meltdown. Escalating public debt, fiscal deficits, and flawed government policies led to an unprecedented debt crisis, making it impossible to secure loans at reasonable rates (Niakas, 2014). Misrepresentation of fiscal data, including revising the GDP deficit from 6% to 15.7%, caused a downgrade of Greece's economy (Miltiadis & Bogiazidis, 2021). The threat of bankruptcy forced the government to seek international assistance.

The European Union (EU) and International Monetary Fund (IMF) provided three bailout packages: €110 billion in 2010, €130 billion in 2012, and €86 billion in 2015 (Argitis et al., 2017). These bailouts came with memoranda imposing austerity measures that deeply affected living standards of the population. Tax increases, wage and pension cuts and a public sector hiring freeze, were implemented to curb spending (Miltiadis & Bogiazidis, 2021). Healthcare expenditures fell by 34% (from €23.2 billion to €15.3 billion) between 2009 and 2015, with public hospital funding cut by 50% (€5 billion) (Kaitelidou et al., 2016).

Reforms included strengthening primary healthcare, introducing Closed Consolidated

Medical Bills (KEN/DRGs) and adopting pharmaceutical policies like electronic prescribing (Bakola et al., 2018). Law 3918/2011 established the National Organization for Health Care Services (EOPYY) to unify insurance funds and reduce costs through supplier negotiations, but outcomes fell short (Niakas, 2014).

Additional measures included raising individuals' contributions to pharmaceutical costs, promoting generics, and implementing claw-back and rebate mechanisms for healthcare providers and pharmaceutical companies (Bakola et al., 2018).

2.2 Pandemic Crisis

The COVID-19 pandemic, which began in 2019 in Wuhan, China, not only caused the loss of millions of lives, but also created profound social, humanitarian, and economic challenges across nations worldwide. The pandemic crisis reached Greece in March 2020, becoming yet another severe blow to an economy already debilitated of austerity measures for years, while further straining the country's healthcare system (Tsitsani, 2021).

To curb the virus, many countries implemented strict measures such as lockdowns, social isolation, and business suspensions. These measures led to income losses for healthcare professionals, with non-urgent surgeries postponed and telemedicine widely adopted (Satiani& Davis, 2020).

The lack of preparedness of healthcare systems contributed to the pandemic's uncontrolled spread, marked by shortages of consumables, pharmaceuticals, and protective equipment. Rising healthcare costs were driven by understaffing due to prior budget cuts and higher Intensive Care Units (ICU) expenses (Tsitsani, 2021). Consequently, healthcare systems faced increased payroll expenses for overtime work, diagnostic tests, additional protective equipment, and isolation room construction (Sullivan-Marx, 2020).

Globally, the pandemic's economic cost in 2020 was $2 trillion, with healthcare costs exceeding €3,000 per patient in many countries, while global economic growth declined by roughly 8% (Lee et al., 2023; Zunyou et al., 2020). Additionally, during the first half of 2020, approximately $5 billion was allocated by public entities and organizations to research programs aimed at combating COVID-19. By 2021, public health expenditure accounted for an average of 73% in OECD countries, while out-of-pocket health expenses represented nearly one-fifth of all healthcare spending. By 2022, average per capita healthcare spending reached approximately $5,000 (OECD, 2023).

In Greece, total healthcare spending rose from 8.20% of GDP in 2019 to 9.52% in 2020, then slightly declined to 9.18% in 2021 (ELSTAT, 2024). Public healthcare funding increased from €9.246 billion in 2019 to €10.358 billion in 2021, while private funding rose from €5.729 billion to €6.248 billion over the same period. Factors driving these increases included pandemic-related health impacts, income reductions, rising private costs, and unequal healthcare resource distribution (Zavras & Chletsos, 2023).

2.3 Hypotheses

Taking all the above into consideration, our investigation prioritizes the definition of the problem, which is articulated through the following questions:

a) What was the impact on the financial health, efficiency and operation of the pediatric hospitals of the 1st Regional Health Authority, during the economic crisis and the Covid-19 pandemic?

b) How could expenditure be allocated while delivering quality health services?

c) Which factors could contribute the most to enhancing pediatric hospitals' financial health, sustainability and efficiency?

3 Methodology

The current research is a comparative analysis of the efficiency of three pediatric hospitals ("P. & A. Kyriakou", "Agia Sofia" and "Pentelis"), over an eleven-year period (2010-2021) during which Greece faced significant crises. The inclusion of the hospitals was made due to their comprehensive databases and the availability of detailed records on financial data and expenditures, enabling robust analysis. Such selection also addresses a gap in the literature, as relatively few studies have focused on institutions in the pediatric sector in Greece. The timeframe was chosen to encompass two critical events: the economic crisis and the Covid-19 pandemic. Therefore, the study's objective was to evaluate the impact of these crises on the efficiency of the selected pediatric hospitals, providing a scientific foundation for efficient utilization of healthcare resources. Although the intention was to include data from 2022 and 2023, to provide a comprehensive view of the entire period during which the pandemic lasted, the lack of published data by the time the study was completed made it impossible. To ensure the validity of the analysis, well-established financial ratios supported by empirical research were chosen to measure the hospitals' performance. The selection of specific ratios was guided by their relevance and significance in capturing key aspects of hospital performance as well as providing quantifiable and comparable insights into operational efficiency, liquidity, profitability and financial sustainability. The data used to calculate the financial ratios were collected from the published financial statements of the hospitals, available on the official website of the Ministry of Digital Governance (diavgeia.gr). A comprehensive search was conducted using the standard research tool from the checklist, with additional filters applied, including the keywords "Balance Sheet" and "Financial Statements," along with the relevant fiscal year. In years when no published records were available, data from the previous or subsequent year's financial statements were used instead. It is important to note that due to discrepancies (in specific years) in the numbers of certain items in the published financial statements of hospitals from one year to the next (for a given year), standard practice was adopted, selecting the data from the most recently published balance sheet for that specific year. Moreover, the study focused on identifying trends based on their balance sheet items throughout the selected period, while also examining their expenditures to identify patterns highlighting inefficiencies or areas of financial strain, with emphasis on the years

of economic and pandemic crisis. The collection of expense data was carried out by expense categories and specifically:

a) Purchases of raw and auxiliary materials, including expenditure on pharmaceuticals, medical supplies, orthopedic materials, etc.

b) Purchases of consumables, including expenses for gases, fuels, and other related costs.

c) Service expenses and obligations, including expenditures on payroll, utilities, security, and other related costs.

The hospital expenditure data was obtained from the web-based application ESY.net/B.I. forms of the Ministry of Health for the period 2012-2021, excluding the years 2010 and 2011 due to the lack of published records.

The final stage, following the data collection, involved calculating financial ratios and trend indicators, along with creating tables and charts, using Microsoft Excel.

4 Financial Analysis

Financial analysis is an essential tool that facilitates the examination of an organization's financial data and measures its overall financial performance, supporting critical decision-making by management (Papadeas, 2015). Stakeholders can gain valuable insights into a company's capital structure, investments, and financial outcomes over a fiscal year, using published financial statements. To facilitate interpretation, various financial ratios can be used. These ratios provide comparative metrics, that aid in evaluating an organization's financial health, efficiency, and sustainability (Papadeas, 2015).

4.1 Activity Ratios

Activity ratios are particularly valuable as they provide clear and measurable indicators, for managing and utilizing an economic entity's assets. Specifically, they aim to measure productivity and efficiently leverage an organization's assets and resources to generate sales. Furthermore, activity ratios enable an organization to convert assets into liquid assets, allowing management to implement appropriate policies (Financial Analysis of Accounting Statements, 2008).

4.1.1 Inventory Turnover Ratio and Average Inventory Period

The Inventory Turnover Ratio evaluates an organization's liquidity and inventory management efficiency, measuring how often inventory is sold and replenished within a fiscal period. It is calculated by dividing the Cost of Goods Sold by Average Inventory. A higher ratio indicates faster inventory turnover, reduced costs, and improved efficiency (Apostolou, 2015; Papadeas, 2015). The Average Inventory Period, crucial for healthcare facilities, reflects the time required to sell or utilize inventory and is determined by dividing 365 days by the Inventory Turnover Ratio.

Table 1 and Diagram 1, present the Inventory Turnover Ratios, for the hospitals examined from 2010 to 2021, along with annual and hospital-specific averages. Additionally, Table 2

(Diagram 2) provides essential data regarding the Average Inventory Period for these healthcare units. The section concludes with a summary analysis of the findings.

Table 1: Inventory turnover ratio

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	30.89	49.28	44.80	41.66
2011	26.89	50.69	33.94	37.17
2012	29.71	42.85	33.70	35.42
2013	26.62	35.37	35.51	32.50
2014	31.52	48.95	36.39	38.95
2015	38.44	52.51	33.45	41.47
2016	37.62	54.28	29.18	40.36
2017	26.31	55.13	32.82	38.08
2018	22.61	60.59	35.56	39.59
2019	22.23	51.52	26.80	33.51
2020	25.49	42.61	33.82	33.97
2021	26.89	40.75	38.39	35.34
Average	28.77	48.71	34.53	37.34

Diagram 1: Inventory turnover ratio

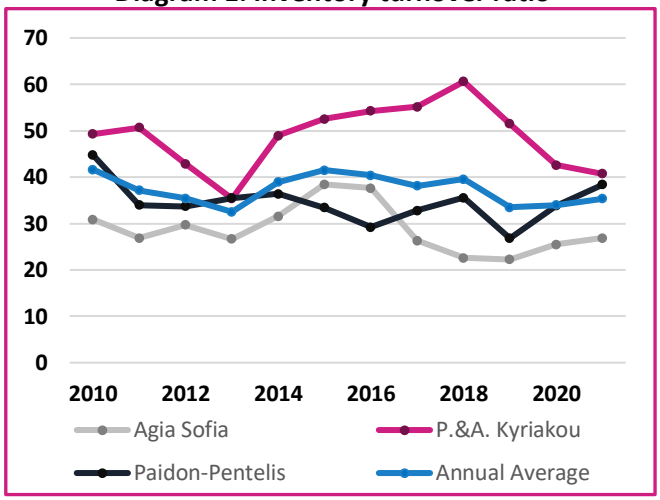
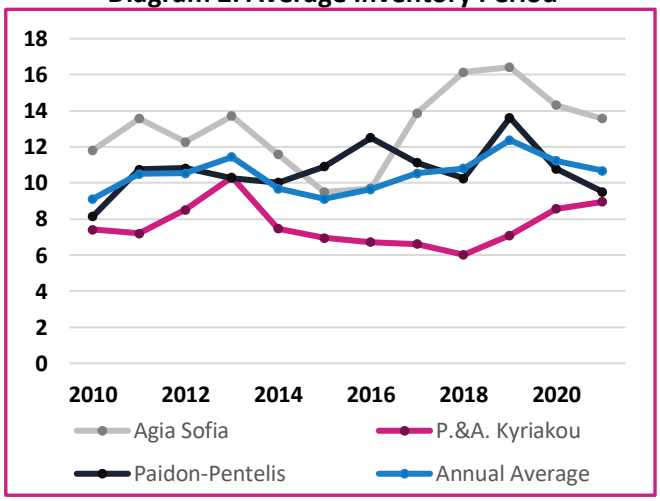


Table 2: Average Inventory Period

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	11.82	7.41	8.15	9.12
2011	13.58	7.20	10.75	10.51
2012	12.28	8.52	10.83	10.54
2013	13.71	10.32	10.28	11.44
2014	11.58	7.46	10.03	9.69
2015	9.50	6.95	10.91	9.12
2016	9.70	6.72	12.51	9.65
2017	13.87	6.62	11.12	10.54
2018	16.14	6.02	10.26	10.81
2019	16.42	7.09	13.62	12.38
2020	14.32	8.57	10.79	11.23
2021	13.58	8.96	9.51	10.68
Average	13.04	7.65	10.73	10.48

Diagram 2: Average Inventory Period



The inventory value of hospitals is relatively low compared to other components of current assets due to their unique nature. This observation is evident from the data in Table 1 (and Diagram 1), as well as Table 2 (and Diagram 2), which show an average inventory turnover period of just 10.48 days across the hospitals. This indicates that hospitals replenish their inventories approximately 34 times per year. The highest Inventory Turnover Ratio (60.59) was recorded by the G.P.H. "P. & A. Kyriakou" in 2018, when it took only about six days to deplete its inventory while delivering healthcare services.

Moreover, "P. & A. Kyriakou" consistently exhibited the highest efficiency in inventory management during the period, except in 2013. In contrast, the G.P.H. "Agia Sofia" recorded the lowest ratio in 2019 (22.23) and consistently had the least efficient inventory turnover, aside from 2015 and 2016, signifying a longer inventory retention period.

4.1.2 Total Assets Turnover Ratio

The Total Assets Turnover Ratio measures how efficiently a company uses its assets to generate sales, calculated by dividing Net Sales by Average Total Assets. A higher ratio indicates efficient asset utilization, while a lower ratio suggests inefficiency, potentially highlighting overinvestment in assets (Rajagukguk & Siagian, 2021).

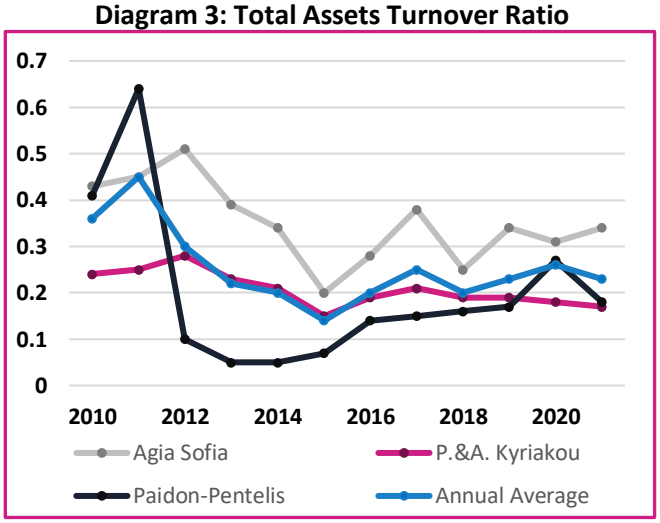
Analysis of the Assets Turnover Ratio, as illustrated in Table 3 and Diagram 3, reveals notable trends. For G.P.H. "Agia Sofia", the ratio fluctuates over the years, reaching a low of 0.20 in 2015 and a high of 0.51 in 2012. Similarly, G.P.H."P. & A. Kyriakou" shows an upward trend until 2012, followed by a decline, reaching its lowest value in 2015. These declines during the economic crisis may reflect delayed reimbursements from the National Organization For Health Care Services (EOPYY).

In contrast, G.P.H. "Pentelis" displays the greatest variability, ranging from 0.64 in 2011 - the highest across hospitals and years- to 0.05 in 2013, the lowest recorded. Comparing the three hospitals, G.P.H. "Agia Sofia" demonstrates the highest ratio in most years, indicating more efficient asset utilization. Conversely, G.P.H. "Pentelis" consistently shows the lowest ratio, reflecting lower efficiency in leveraging fixed assets.

Table 3: Total Assets Turnover Ratio

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	0.43	0.24	0.41	0.36
2011	0.45	0.25	0.64	0.45
2012	0.51	0.28	0.10	0.30
2013	0.39	0.23	0.05	0.22
2014	0.34	0.21	0.05	0.20
2015	0.20	0.15	0.07	0.14
2016	0.28	0.19	0.14	0.20
2017	0.38	0.21	0.15	0.25
2018	0.25	0.19	0.16	0.20
2019	0.34	0.19	0.17	0.23
2020	0.31	0.18	0.27	0.26
2021	0.34	0.17	0.18	0.23
Average	0.35	0.21	0.20	0.25

Diagram 3: Total Assets Turnover Ratio



4.1.3 Receivables Turnover Ratio and Average Collection Period

The Receivables Turnover Ratio (RT) evaluates the pace at which a business collects payments from its customers during a fiscal year, reflecting how often it converts sales into cash (Harrison et al., 2018). The ratio is calculated by dividing Net Sales by Average Accounts Receivable. It provides insights into the company's credit policy and its effectiveness in collecting receivables (Apostolou, 2015). A high RT ratio indicates efficient receivables management and a reduced likelihood of increased debts, whereas a low ratio suggests delays in payment collection, potential liquidity issues, or lenient credit policies (Papadeas, 2015).

Similarly, the Average Collection Period, obtained by dividing 365 days by the RT ratio,

indicates the time required to collect receivables. This metric represents the average duration needed to convert receivables into cash, offering insight into the company's efficiency in managing its credit cycle.

Tables 4 and 5 (Diagrams 4 and 5 respectively), display the RT values and the Average Collection Period for the hospitals analyzed from 2010 to 2021. The analysis below interprets these data and trends.

Table 4: Receivables Turnover Ratio

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	0.81	0.87	1,00	0.89
2011	0.86	0.86	1.62	1.12
2012	0.72	0.83	0.98	0.84
2013	0.53	0.59	0.55	0.56
2014	0.46	0.45	0.46	0.46
2015	0.28	0.27	0.29	0.28
2016	0.43	0.35	0.31	0.36
2017	0.68	0.47	0.41	0.52
2018	0.36	0.39	0.38	0.38
2019	0.47	0.39	0.39	0.42
2020	0.48	0.36	0.70	0.51
2021	0.49	0.29	0.38	0.38
Average	0.55	0.51	0.62	0.56

Diagram 4: Receivables Turnover Ratio

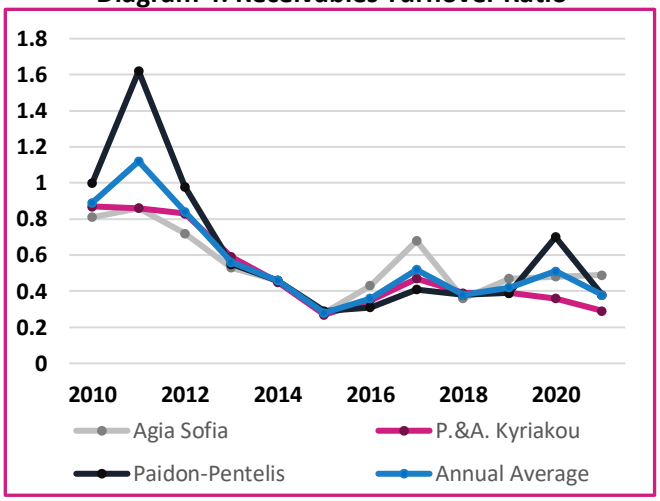
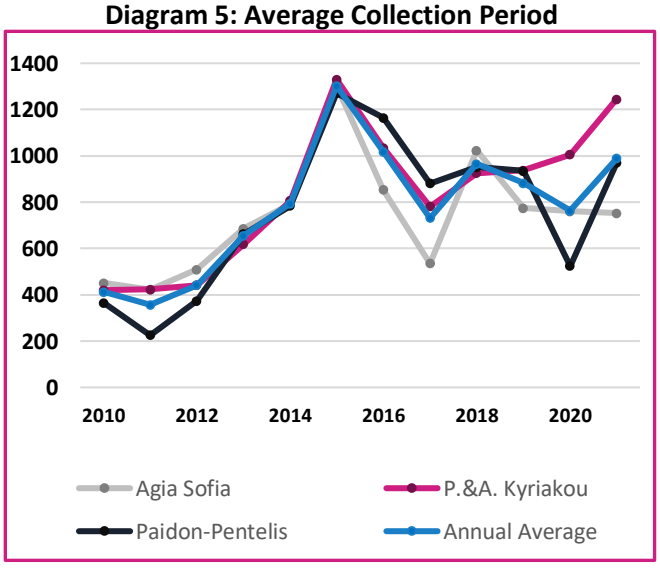


Table 5: Average Collection Period

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	451	420	366	412
2011	422	423	225	357
2012	509	442	373	441
2013	686	619	662	656
2014	791	806	785	794
2015	1303	1331	1271	1302
2016	854	1035	1164	1018
2017	535	781	881	732
2018	1023	925	951	966
2019	774	938	935	882
2020	761	1005	524	763
2021	752	1245	970	989
Average	739	831	759	776

Diagram 5: Average Collection Period



As shown in Tables 4 and 5 (Diagrams 4 and 5 respectively) hospitals display similar variation patterns over the years. Specifically, during 2010–2011, two out of the three pediatric hospitals show an increasing trend, with "Pentelis" Children's Hospital reaching the period's peak value in 2011 (1.62 or 225 days), indicating faster receivables collection, compared to the others.

From 2012 to 2015, all hospitals exhibit a declining trend in their RT, with the lowest value recorded by G.P.H. "P. & A. Kyriakou" in 2015 (0.27 or 1,331 days). During 2016–2017,

there is a recovery in the RT, followed by another decline in 2018.

At the end of the period (2019–2021), G.P.H. "Agia Sofia" shows a slight increase in its RT from 0.47 (774 days) to 0.49 (752 days). "Pentelis" Children's Hospital, however, nearly doubles its RT in 2020 (from 0.39 to 0.70), before dropping to 0.38 (969 days) in 2021. Conversely, G.P.H. "P. & A. Kyriakou" consistently decreases its RT ratio during the same period, from 0.39 to 0.29, showing a declining efficiency in receivables collection.

4.1.4 Trade Creditors to Purchases Ratio and Average Payment Period

The Trade Creditors to Purchases Ratio assesses how effectively a company covers its current liabilities, calculated by dividing Cost of Goods Sold (COGS) by average short-term obligations. A lower ratio suggests longer credit periods from creditors, reflecting the entity's credit policy (Financial Analysis of Accounting Statements, 2008).

Similarly, the Average Payment Period (APP) is derived by dividing the number of days in a year (365), by the Trade Creditors to Purchases Ratio, expressing the time (in days) required, to settle a company's obligations. Table 6 and Diagram 6 illustrate the Trade Creditors to Purchases Ratio values for children's hospitals during 2010–2021, with corresponding yearly averages per hospital, while Table 7 and Diagram 7 display data of the Average Payment Period, and a summary of these findings follows.

As shown in Table 6 (Diagram 6) and Table 7 (Diagram 7) the average Trade Creditors to Purchases Ratio generally presents an increasing trend over the years. It rises from 1.64 in 2010 to 4.36 in 2014. After a dip in 2015, it increases again from 4.22 in 2016 to 6.58 in 2019, marking a 55.92% rise, before declining in the last two years.

Table 6: Trade Creditors to Purchases Ratio

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	1.15	1.72	2.04	1.64
2011	2.24	2.28	2.81	2.44
2012	2.1	2.74	3.84	2.89
2013	2.02	3.07	4.69	3.26
2014	3.26	3.79	6.05	4.36
2015	2.53	3.44	5.24	3.74
2016	2.73	4.56	5.37	4.22
2017	4.03	5.32	7.71	5.69
2018	3.50	5.50	9.38	6.13
2019	3.80	5.33	10.61	6.58
2020	4.53	4.49	5.36	4.80
2021	3.44	3.40	4.74	3.86
Average	2.94	3.80	5.65	4.13

Diagram 6: Trade Creditors to Purchases Ratio

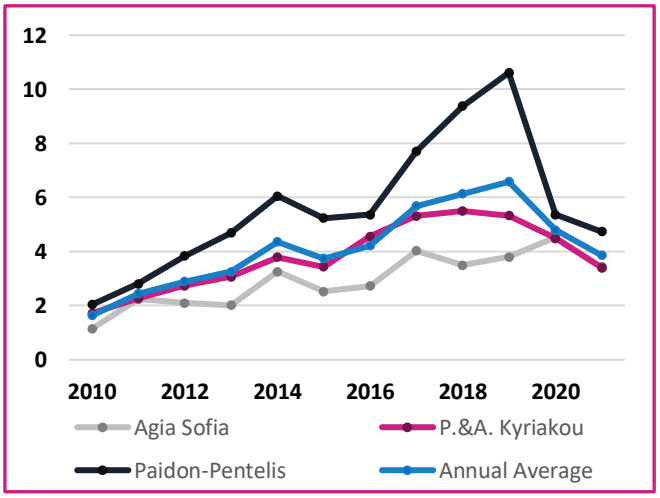
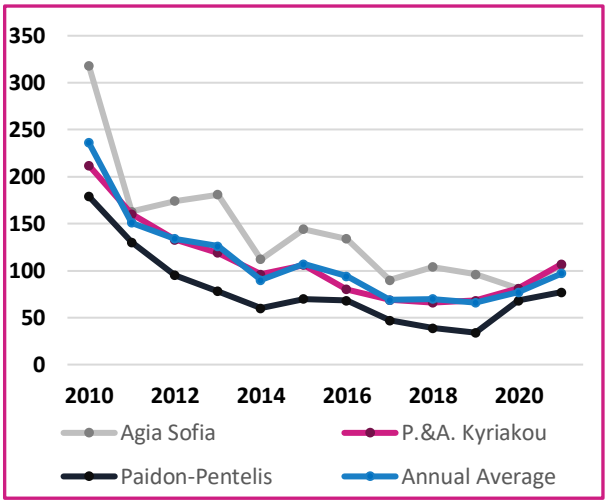


Table 7: Average Payment Period

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	318	212	179	236
2011	163	160	130	151
2012	174	133	95	134
2013	181	119	78	126
2014	112	96	60	90
2015	144	106	70	107
2016	134	80	68	94
2017	90	69	47	69
2018	104	66	39	70
2019	96	68	34	66
2020	81	81	68	77
2021	106	107	77	97
Average	142	108	79	110

Diagram 7: Average Payment Period



Individually, "Pentelis" Children's Hospital consistently exhibits the highest Trade Creditors to Purchases Ratio values compared to the other two hospitals, while "Agia Sofia" shows the lowest values over time, except in the last year, when the lowest value is recorded by "P. & A. Kyriakou."

The comparison of the two ratios across hospitals reveals that Trade Creditors to Purchases Ratio values, exceed Receivables Turnover Ratio values throughout the period. Specifically, "Agia Sofia" settles its obligations in approximately 4.5 months (142 days), but collects its receivables in an average of 2.02 years (739 days). Similarly, "P. & A. Kyriakou" pays its creditors in about 3.5 months (108 days), but collects its receivables in 2.2 years (831 days). Lastly, "Pentelis" Children's Hospital pays its obligations in less than 90 days (79 days on average) but collects its receivables in an average of 2.07 years (759 days).

This discrepancy highlights potential cash flow challenges, necessitating significant liquidity reserves to cover obligations. Balance sheet data indicate that these hospitals have primarily relied on equity, which has gradually increased since 2012. For "Agia Sofia", this equity growth stems from shareholder contributions, while the other two hospitals rely mostly on special reserves. Additionally, government subsidies remain a critical funding source for all reviewed institutions.

These findings underscore the urgent need to revise financial policies to speed up receivables collection, aiming to minimize delays and improve financial efficiency.

4.2 Liquidity ratios

Liquidity ratios are critical metrics for assessing an entity's ability to meet its short-term obligations, by examining the relationship between certain current assets and current liabilities (Tournas, 2015). A company's liquidity is of fundamental importance and can be defined as its capacity to make payments to address immediate financial needs (Bigel,

2022).

When an entity faces financial difficulties, investors typically demand higher returns and stronger collateral, to provide loans. If a company lacks liquid assets or encounters temporary liquidity challenges, its very survival may be at stake as investors are likely to reject any borrowing proposals (Fridson & Alvarez, 2002). As numerous studies suggest, liquidity can positively impact an organization's profitability (Rajagukguk & Siagian, 2021).

4.2.1 Current Ratio / General Liquidity Ratio

The Current Ratio evaluates an entity's ability to meet short-term obligations using current assets like cash, receivables, and inventories (Harrison et al., 2018). Calculated as Current Assets divided by Current Liabilities, a ratio above one indicates financial health, while a ratio below one signals liquidity challenges (Apostolou, 2015; Fridson & Alvarez, 2002). Generally, a ratio of 2:1 (current assets double current liabilities) is deemed satisfactory, providing a robust safety margin for creditors (Apostolou, 2015).

However, the ratio's limitations include its inability to assess asset composition; liquid assets like cash are more readily available than inventories. Furthermore, actual liquidation may fall short even when the ratio exceeds one (Angelopoulos & Georgopoulos, 2022).

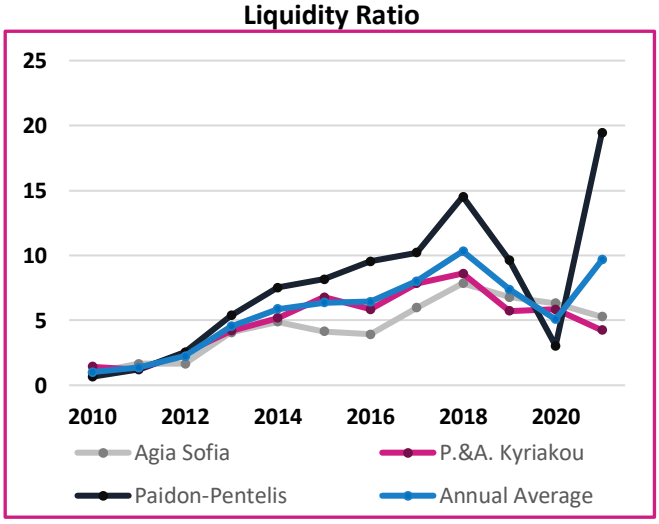
As shown by the data in Table 8 and Diagram 8, the Current Ratio exceeds one throughout the period for all hospitals, except in the first year for "Agia Sofia" and "Pentelis" Children's Hospital. An upward trend is observed across all healthcare units until 2018, with the average ratio rising from 1.02 in 2010 (which is the lowest value) to 10.32 in 2018 (which is the highest value). In the following two years (2019–2020), the ratio decreases in two out of the three hospitals, while "P. & A. Kyriakou" records a slight increase during the same period (from 5.71 to 5.85).

In the final year (2021), "Pentelis" Children's Hospital rebounds, recording not only the highest ratio of the period but also the highest among the hospitals examined (19.46), while the other healthcare units show further declines.

Table 8: Current Ratio or General Liquidity Ratio

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	0.97	1.42	0.66	1.02
2011	1.65	1.20	1.23	1.36
2012	1.65	2.52	2.54	2.24
2013	4.08	4.20	5.38	4.55
2014	4.88	5.17	7.52	5.86
2015	4.15	6.78	8.17	6.37
2016	3.91	5.84	9.53	6.43
2017	5.97	7.85	10.20	8.01
2018	7.85	8.61	14.51	10.32
2019	6.78	5.71	9.61	7.37
2020	6.32	5.85	3.04	5.07
2021	5.27	4.25	19.46	9.66
Average	4.46	4.98	7.65	5.69

Diagram 8: Current Ratio or General Liquidity Ratio



4.2.2 Acid-test/ Quick ratio

The Quick Ratio measures the relationship between liquid assets and current liabilities, assessing the extent to which liquid assets can cover short-term obligations. This ratio examines a company's ability to promptly convert its current assets into cash. It is calculated as (Current Assets- Inventory) ÷ Current Liabilities (Angelopoulos & Georgopoulos, 2022).

It is considered a more precise measure of liquidity compared to the Current Ratio because it excludes Inventory, which is often more challenging to liquidate rapidly (Babasaheb, 2015). Some analysts discount Inventory entirely, considering its value negligible due to risks of obsolescence, damage, or reduced customer demand (Bigel, 2022). Ideally, it should range between 0.25 and 1.

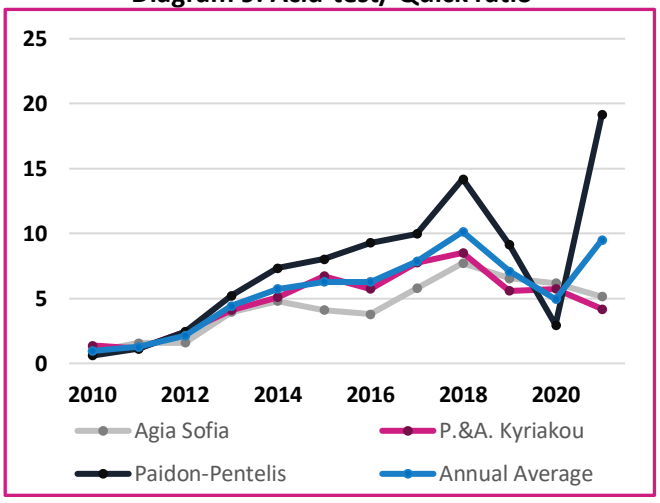
Regarding the Quick Ratio values (Table 9 and Diagram 9), all three hospitals exhibit a trend similar to that of the Current Ratio (Table 8 and Diagram 8), with minimal differences over the period, due to their labor-intensive nature. Notably, all hospitals demonstrate adequate liquidity throughout the period, as the ratio exceeds one, except for the first year for "Agia Sofia" and "Pentelis" Children's Hospital, where it falls to 0.90 and 0.60, respectively. This occurs despite all three institutions reporting relatively low inventory levels.

Comparing the ratios across hospitals reveals that "Pentelis" Children's Hospital outperforms the other two for most of the period, except in 2010, 2011, and 2020.

Table 9: Acid-test/ Quick ratio

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	0.90	1.38	0.60	0.96
2011	1.56	1.15	1.12	1.28
2012	1.60	2.43	2.43	2.15
2013	3.96	4.11	5.21	4.43
2014	4.79	5.10	7.35	5.75
2015	4.10	6.72	8.03	6.28
2016	3.79	5.73	9.28	6.27
2017	5.79	7.77	9.98	7.85
2018	7.72	8.51	14.19	10.14
2019	6.55	5.60	9.15	7.10
2020	6.18	5.74	2.96	4.96
2021	5.15	4.18	19.16	9.50
Average	4.34	4.87	7.45	5.56

Diagram 9: Acid-test/ Quick ratio



4.2.3 Cash Ratio

The Cash Ratio is a particularly useful measure, due to its simplicity of calculation and the clear insights it provides regarding a company's liquidity. Additionally, it offers valuable information about the extent to which cash reserves can cover overdue obligations (Apostolou, 2015). It is calculated by dividing Cash and Cash Equivalents, by Current

Liabilities.

A key limitation of this ratio lies in its practical application, due to businesses typically maintaining low cash levels, prioritizing available funds for settling current liabilities (Papadeas, 2015).

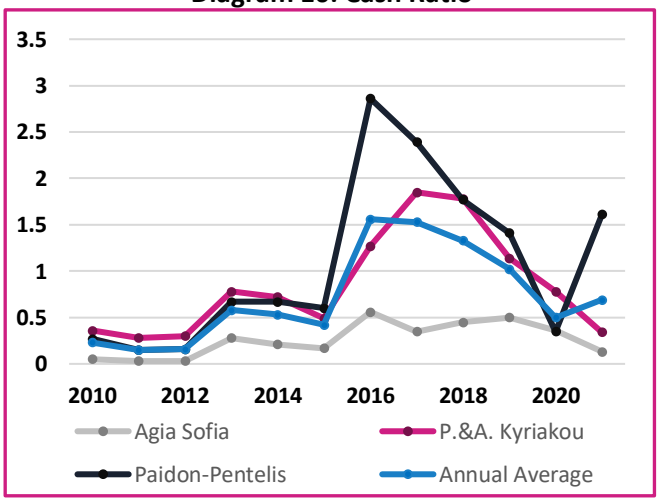
Table 10 and Diagram 10 display the data of Cash Ratio for the three hospitals, over the period 2010 to 2021. It is evident that G.P.H. "Agia Sofia", faces challenges in meeting its current liabilities, as the ratio remains below one throughout the period, with an average value of 0.26. A similar trend is observed for G.P.H. "P. & A. Kyriakou", where the ratio also falls below one for most of the period, except for the years 2016 and 2019. Although its average ratio is higher than that of G.P.H. "Agia Sofia", it remains below the threshold of one.

Lastly, the Cash Ratio for G.P.H. "Pentelis" (while also below one for most of the period) shows stronger performance in 2016 and 2017, raising its average to 1.08. This suggests a relatively better ability to meet short-term liabilities, compared to the other two hospitals.

Table 10: Cash Ratio

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	0.05	0.36	0.27	0.23
2011	0.03	0.28	0.15	0.15
2012	0.03	0.30	0.16	0.16
2013	0.28	0.78	0.67	0.58
2014	0.21	0.72	0.67	0.53
2015	0.17	0.49	0.60	0.42
2016	0.56	1.27	2.86	1.56
2017	0.35	1.85	2.39	1.53
2018	0.45	1.78	1.77	1.33
2019	0.50	1.14	1.41	1.02
2020	0.36	0.78	0.35	0.50
2021	0.13	0.34	1.61	0.69
Average	0.26	0.84	1.08	0.73

Diagram 10: Cash Ratio



4.3 Profitability Ratios

Profitability and financial resilience are critical factors in assessing the investment value of a business. For this purpose, profitability ratios are employed to determine whether an investment in a company has been profitable (Angelopoulos & Georgopoulos, 2022). These ratios enable management to gain a clear understanding of the effectiveness of the company's operations, which contribute to its smooth functioning (Tourna, 2015).

They focus mostly on a company's profitability in relation to its assets and in relation to its equity (Angelopoulos & Georgopoulos, 2022). In other words, they examine the ability of an organization to generate profits through the efficient utilization of its assets. Sustained profitability over time can increase a company's shareholder value and consequently, its dividend payouts (Tourna, 2015).

The following analysis focuses on four key profitability ratios: a) Gross Profit Margin, b) Net Profit Margin, c) Return on Equity (ROE), and) Return on Capital Employed (ROCE).

4.3.1 Gross Profit Margin

The Gross Profit Margin Ratio measures profitability and operational efficiency, calculated as Gross Profit divided by Net Sales (Angelopoulos & Georgopoulos, 2022). It reflects the percentage of profits after deducting the cost of goods sold, with a high ratio indicating efficient cost management or successful pricing strategies (Apostolou, 2015). Variations arise from changes in selling prices or production costs. This metric is crucial for forecasting profitability, managing inventory valuation, and cost control (Tourna, 2015).

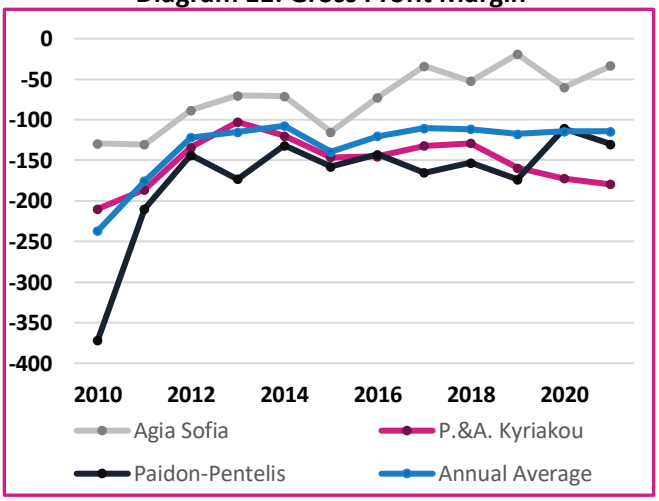
Table 11 and Diagram 11 display data of the Gross Profit Margin of the hospitals for the years 2010-2021, revealing consistently negative values. This indicates inefficiency in covering operating costs, even during years with operational profits.

Specifically, the General Pediatric Hospital (G.P.H.) of "Pentelis", recorded the lowest ratio during the selected period and among all healthcare units examined, with -371.40% in 2010 and an average of -171.90%. Conversely, the G.P.H. of "Agia Sofia" posted the highest percentage during the period, reaching -19.13% in 2019, and maintained the highest values of the ratio across the years. Lastly, the General Pediatric Hospital "P. & A. Kyriakou" displayed values close to the average of the hospitals, exhibiting a relatively stable trajectory over the period, except for the last two years.

Table 11: Gross Profit Margin (Note: numbers in parenthesis indicate negative values)

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	(129.42)	(209.74)	(371.40)	(236.85)
2011	(130.55)	(186.13)	(209.89)	(175.52)
2012	(88.27)	(134.03)	(143.51)	(121.94)
2013	(69.98)	(102.68)	(173.05)	(115.24)
2014	(70.81)	(119.88)	(131.61)	(107.44)
2015	(115.29)	(146.17)	(157.55)	(139.67)
2016	(72.48)	(145.02)	(142.90)	(120.14)
2017	(33.93)	(132.25)	(165.33)	(110.50)
2018	(52.55)	(128.99)	(152.90)	(111.48)
2019	(19.13)	(159.44)	(173.66)	(117.41)
2020	(59.75)	(172.29)	(110.90)	(114.31)
2021	(33.38)	(179.36)	(130.14)	(114.29)
Average	(72.96)	(151.33)	(171.90)	(132.07)

Diagram 11: Gross Profit Margin



4.3.2 Net Profit Margin

The Net Profit Margin Ratio is another key metric for evaluating a company's financial health, offering shareholders a clear picture of its profitability potential. This ratio measures the percentage of net profit remaining after covering all expenses (operating expenses, interest, depreciation) and taxes, in relation to total sales. It is calculated by dividing Net Profit by Net Sales (Angelopoulos & Georgopoulos, 2022).

Moreover, this ratio indicates a company's resilience during adverse economic conditions,

such as increased competition or reduced demand. Generally, the rise in a company's profitability corresponds to an increase in the Net Profit Margin Ratio (Apostolou, 2015). However, while a high ratio is considered favorable, its interpretation should not focus solely on sales. Other factors, such as economic conditions, debt burden, and industry-specific competitiveness, must also be considered (Tourna, 2015).

Finally, for a comprehensive view of a company's profitability, the Net Profit Margin Ratio should be compared with the Gross Profit Margin Ratio (Apostolou, 2015).

Analyzing the data presented in Table 12 and Diagram 12 (which display the Net Profit Margin of the hospitals examined) reveals divergent trends and significant fluctuations in the ratio's values. It is noteworthy that throughout most of the period examined, at least one hospital exhibits a negative ratio, reflecting net operational losses.

More specifically, the G.P.H. "Pentelis" has the highest average ratio over the period (15.60%) and the highest value (75.34% in 2011). Additionally, from the start of the period until 2015, this hospital consistently exhibits higher ratio values compared to the other two hospitals. However, this trend reverses in the subsequent years, as either two (in 2016 and 2019) or at least one hospital displays a higher Net Profit Margin Ratio than G.P.H. of "Pentelis"(except for 2018, when it reaches 24.47%).

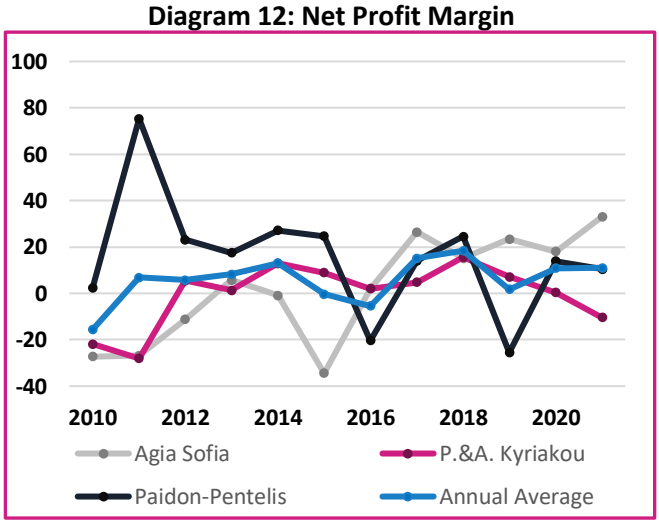
The G.P.H. "Agia Sofia" shows an upward trend with considerable fluctuations, with the ratio increasing from -27.31% in 2010 to 33.09% in 2021, showing its lowest value (-34.48%) in 2015.

Lastly, the G.P.H. "P. & A. Kyriakou" exhibits the lowest average ratio values during the period compared to the other two hospitals (-0.16%), with its highest value (15.59%) recorded in 2018 and the lowest (-28.09%) in 2011.

Table 12: Net Profit Margin (Note: numbers in parenthesis indicate negative values)

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis	Annual Average
2010	(27.31)	(21.94)	2.25	(15.67)
2011	(26.88)	(28.09)	75.34	6.79
2012	(11.29)	5.50	23.19	5.80
2013	5.74	1.25	17.47	8.16
2014	(0.83)	12.98	27.19	13.11
2015	(34.48)	8.93	24.65	(0.30)
2016	2.02	2.05	(20.30)	(5.41)
2017	26.40	4.77	14.04	15.07
2018	15.13	15.59	24.47	18.40
2019	23.37	7.17	(25.52)	1.67
2020	18.06	0.36	13.93	10.79
2021	33.09	(10.46)	10.44	11.02
Average	1.92	(0.16)	15.60	5.79

Diagram 12: Net Profit Margin



4.3.3 Return on Equity Ratio (ROE)

The Return on Equity (ROE) ratio evaluates how effectively a company uses shareholders' equity to generate profits (Apostolou, 2015). It is calculated by dividing net profit by total equity, providing insights into the company's ability to achieve profit maximization. A high ROE is particularly favorable for labor-intensive businesses, indicating strong profitability with low equity use. For accurate interpretation, industry performance, asset capitalization, and business nature must also be considered (Apostolou, 2015).

Analysis of the data from Table 13 and Diagram 13 (which displays ROE for a 10-year period), reveals that the ROE values for the examined hospitals are negative in certain fiscal years due to net losses. Specifically, at "Agia Sofia" General Pedriatic Hospital, the equity was negative in 2010, prompting shareholders to contribute additional funds the following year, resulting in a significant increase in equity (from -41,946,638.27€ to 28,356,706€). As a result, no ROE value is available for 2010, since two negative figures mathematically result in a positive outcome, distorting interpretation. Following administrative measures, the hospital's ROE improved progressively from 2011 onwards, though it experienced declines in specific years (notably 2015, 2018, and 2020).

Meanwhile, "Paidon-Pendelis" Children's Hospital recorded the highest average ROE during the selected period, compared to the other hospitals. After a substantial increase from 19.43% to 94% in 2011, its ROE hovered near zero for the remainder of the period, with negative values observed in 2016 and 2019 (-3.30% and -4.96%, respectively).

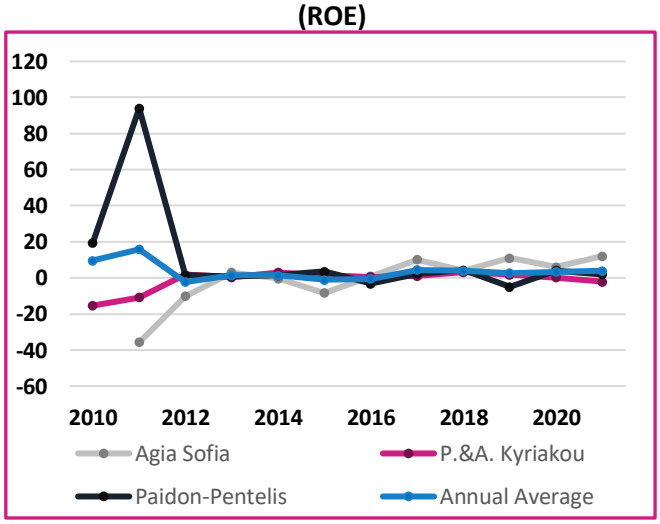
Conversely, "P. & A. Kyriakou" General Pedriatic Hospital exhibited the lowest average ROE of -1.28%. During the initial two years (2010 and 2011), negative values of -15.39% and -10.93% were recorded due to annual net losses. Although improvement was observed up to 2018, the trend reversed toward the end of the period, culminating in a negative ROE of -2.07% in 2021.

Table 13: Return on Equity Ratio (ROE)

(Symbol "*" indicates impossible calculation due to negative values in both numerator and denominator)

Year	Agia Sofia	P. & A. Kyriakou	Paidon-Pentelis	Annual Average
2010	(*)	(15.39)	19.43	9.63
2011	(35.74)	(10.93)	94.00	15.78
2012	(10.11)	1.73	1.33	(2.35)
2013	3.03	0.33	0.84	1.40
2014	(0.30)	2.92	1.42	1.35
2015	(8.41)	1.51	3.55	(1.12)
2016	0.92	0.51	(3.30)	(0.62)
2017	10.04	1.05	2.20	4.43
2018	4.03	3.17	4.18	3.79
2019	11.02	1.69	(4.96)	2.58
2020	6.06	0.07	3.97	3.37
2021	12.03	(2.07)	1.84	3.93
Average	(0.68)	(1.28)	10.37	3.51

Diagram 13: Return on Equity Ratio (ROE)



4.3.4 Return on Capital Employed Ratio (ROCE)

The Return on Capital Employed (ROCE) ratio bears similarities to the Return on Equity (ROE) ratio, with the key distinction being that the denominator accounts for the Total Capital Employed. In this context, Total Capital Employed is calculated as the sum of Other Long-Term Liabilities and Total Equity. This ratio provides a clear indication of how effectively an entity utilizes its capital -both equity and debt- to generate profits (Vikas, 2019). It is noteworthy that a company's borrowing cost, or interest rate, must be lower than its ROCE, otherwise debt servicing could result in financial losses (Vikas, 2019).

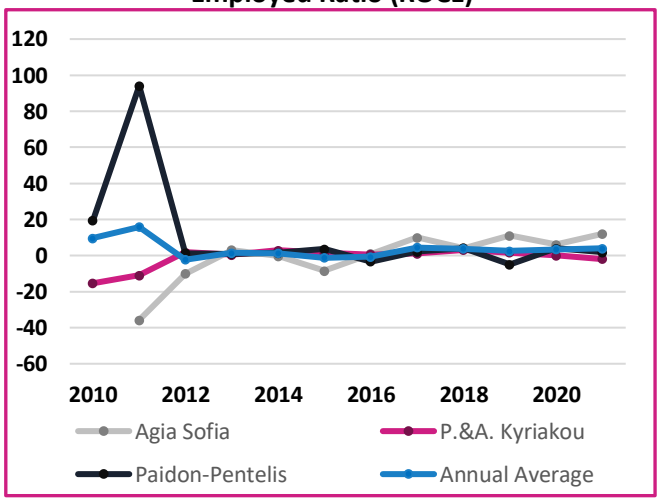
Analyzing Table 14 (and Diagram 14), which illustrates the ROCE of the three hospitals over time, reveals no need for further examination. The values align closely with those of the ROE ratio (Table 13), and Diagram 14 essentially mirrors Diagram 13. This is due to the absence of long-term liabilities for "Agia Sofia" and "Pendelis" Children's Hospital throughout the entire period. However, for "P. & A. Kyriakou" Children's Hospital, differences emerge from 2014 onward, as this hospital's financial statements indicate amounts in the relevant category. Specifically, the balance increased from €2,103,408.63 in 2014 to €2,159,946.79 in 2021.

Table 14: Return on Capital Employed Ratio

(Symbol "*" indicates impossible calculation due to negative values in both numerator and denominator)

Year	Agia Sofia	P. & A. Kyriakou	Paidon-Pentelis	Annual Average
2010	(*)	(15.39)	19.43	9.63
2011	(35.74)	(10.93)	94.00	15.78
2012	(10.11)	1.73	1.33	(2.35)
2013	3.03	0.33	0.84	1.40
2014	(0.30)	2.84	1.42	1.32
2015	(8.41)	1.46	3.55	(1.13)
2016	0.92	0.49	(3.30)	(0.63)
2017	10.04	1.02	2.20	4.42
2018	4.03	3.08	4.18	3.76
2019	11.02	1.64	(4.96)	2.57
2020	6.06	0.07	3.97	3.36
2021	12.03	(2.01)	1.84	3.95
Average	(0.68)	(1.31)	10.37	3.51

Diagram 14: Return on Capital Employed Ratio (ROCE)



4.4 Financial structure and viability ratios

The long-term sustainability of an enterprise depends on its capital structure specifically on how it finances its investments and operations (Angelopoulos & Georgopoulos, 2022). The following analysis focuses on two key indicators and specifically: a) Ratio of Owner's Equity to Total Liabilities and b) Ratio of Current Assets to Total Liabilities.

4.4.1Ratio of Owner's Equity to Total Liabilities

The Ratio of Owner's Equity to Total Liabilities measures the balance between equity and debt in a business. It is calculated by dividing Total Equity by Total Liabilities. A ratio above

one indicates equity-funded operations, enhancing creditor security, while a ratio below one indicates dependence on debt, increasing financial risk and reducing creditor assurance (Financial Analysis of Accounting Statements, 2008).

Continuing the analysis, Table 15 (and the corresponding Diagram 15) presents the Ratio of Owner's Equity to Total Liabilities data for the three hospitals, over the period 2010 to 2021. In general, it is worth noting that the hospitals "Agia Sofia" and "P. & A. Kyriakou" exhibit an upward trend that tapers off, toward the end of the period, while "Paidon-Pentelis" demonstrates considerable fluctuations over the same period.

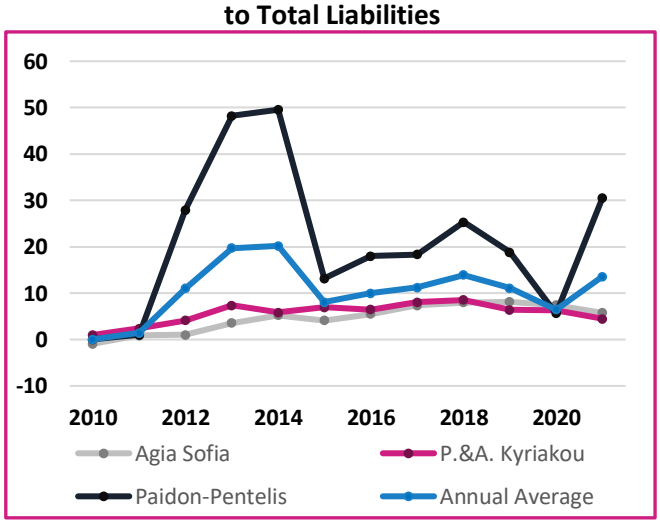
More specifically, General Pedriaric Hospital of "Agia Sofia", starting with a negative ratio (-0.92) in 2010, shows an upward trajectory in the following years, reaching its peak value of 8.12 in 2019, before declining to 5.76 by the end of the period. A similar pattern is observed for "P. & A. Kyriakou", which begins with a ratio of one in 2010 (the lowest value of the period), rises to 8.51 in 2018 (the highest value of the period), and then decreases to 4.44 in the final year.

Finally, despite the notable fluctuations during the examined period, G.P.H. of "Pendelis" records the highest values in most years compared to the other two hospitals, with a maximum value of 49.55 in 2014 and a minimum of 0.06 in 2010. Examining the average ratio for the period for each hospital reveals that all three significantly exceed one, highlighting that the administrators of these healthcare units contribute substantially more capital than that provided by creditors.

Table 15: Ratio of Owner's Equity to Total Liabilities

Year	Agia Sofia	P. & A. Kyriakou	Paidon-Pentelis	Annual Average
2010	(0.92)	1.00	0.06	0.05
2011	0.89	2.38	1.00	1.42
2012	1.04	4.15	27.90	11.03
2013	3.57	7.37	48.25	19.73
2014	5.21	5.83	49.55	20.20
2015	4.09	6.96	13.14	8.06
2016	5.49	6.47	18.02	9.99
2017	7.37	8.04	18.30	11.23
2018	7.97	8.51	25.33	13.94
2019	8.12	6.37	18.83	11.11
2020	7.45	6.30	5.60	6.45
2021	5.76	4.44	30.56	13.59
Average	4.67	5.65	21.38	10.57

Diagram 15: Ratio of Owner's Equity to Total Liabilities



4.4.2 Ratio of Current Assets to Total Liabilities

The present indicator reflects the level of liquidity available to a company meeting its long-term obligations. Its calculation requires dividing Current Assets by Total Liabilities. Operational and extraordinary losses may negatively affect this indicator. A high value, provided there are no losses resulting from the liquidation of circulating assets, indicates a company's ability to meet its long-term obligations using its existing capital (Financial

Analysis of Accounting Statements, 2008).

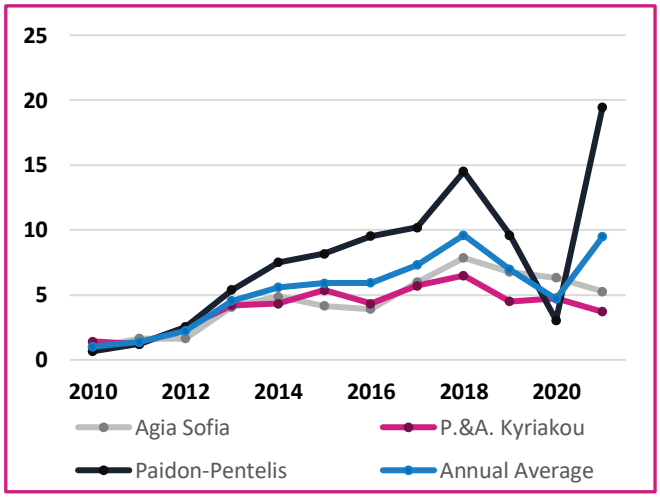
Before delving into any analysis regarding the examined indicator (Table 16 and Diagram 16), it should be noted that the "Pentelis" Children's Hospital exhibits values identical to those of the Current Ratio, as it has no long-term liabilities during the reviewed period. A similar conclusion applies to the values of the "Agia Sofia" General Pediatric Hospital, despite a small amount recorded under the "Other Long-Term Liabilities" balance sheet item in 2010, totaling €1,423.37.

Observations regarding the indicator's values are relevant only for the "P. & A. Kyriakou" General Pediatric Hospital (2014–2021), as it is the only hospital with figures under the "Long-Term Liabilities" balance sheet item. The trend, however, aligns closely with that depicted in Diagram 8 (and correspondingly in Table 8), which displays the data for the Current Ratio. From the examination of the indicator's values during these years, the hospital can service its obligations using current working capital. Notably, the indicator reached its maximum value in 2018 (6.49) and its minimum in 2014 (3.72).

Table 16: Ratio of Current Assets to Total Liabilities

Year	Agia Sofia	P. & A. Kyriakou	Paidon-Pentelis	Annual Average
2010	0.97	1.42	0.66	1.02
2011	1.65	1.20	1.23	1.36
2012	1.65	2.52	2.54	2.24
2013	4.08	4.20	5.38	4.55
2014	4.88	4.33	7.52	5.58
2015	4.15	5.36	8.17	5.90
2016	3.91	4.34	9.53	5.93
2017	5.97	5.72	10.20	7.30
2018	7.85	6.49	14.51	9.61
2019	6.78	4.50	9.61	6.96
2020	6.32	4.75	3.04	4.70
2021	5.27	3.72	19.46	9.48
Average	4.46	4.05	7.65	5.39

Diagram 16: Ratio of Current Assets to Total Liabilities



5 Trend Indicators

5.1 Trend Indicators for Income Statement and Balance Sheet Items

The analysis of the Balance Sheet and Income Statement of pediatric hospitals for the period 2010–2021 focuses on selected financial elements: Net Sales, Cost of Goods and Services, Gross Profit, and Net Income. These elements are presented as index-based values, with 2010 set as the base year (index one hundred), facilitating clear and accessible trend analysis. Insights from Tables 17 to 25 provide valuable conclusions about the financial performance of these units.

At the "Agia Sofia" General Pediatric Hospital, both upward and downward trends can be observed in the Balance Sheet and Income Statement throughout the examined period. Net Sales exhibited fluctuations, reaching their lowest point in 2015 (81.87%) and peaking

in 2021 (164.21%).

The Cost of Goods and Services item showed a gradual decline until 2016. From 2017 and for a two-year period, it appears to stabilize at consistent levels (ranging from €63,722,150.29 to €64,678,150.48). By 2021, costs appear to have returned to nearly the same levels as those at the beginning of the examined period.

Regarding Net Income, the base year started with a negative result. Thus, the negative indices indicate a transition from losses to profits compared to the base year. Overall, Net Income demonstrated an upward trend with notable year-to-year variations. After a steady improvement until 2013, two consecutive years of decline followed, before increasing again towards the end of the period. The highest value was recorded in 2021 (€20,746,815.11), likely driven by the COVID-19 pandemic, which increased demand for specific services. This analysis highlights the dynamic financial performance of the hospital, shaped by external factors and operational adjustments.

Table 17: Income Statement

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Net Sales	100.00%	98.79%	115.89%	108.15%	108.85%	81.87%	95.43%	124.63%	110.66%	142.21%	121.86%	164.21%
Cost of Goods and Services	100.00%	99.27%	95.11%	80.13%	81.04%	76.83%	71.75%	72.75%	73.58%	73.85%	84.86%	95.47%
Gross Income	100.00%	99.65%	79.05%	58.48%	59.56%	72.93%	53.45%	32.67%	44.93%	21.02%	56.26%	42.35%
Net balance for the fiscal year	100.00%	97.22%	47.92%	(22.72%)	3.31%	103.37%	(7.08%)	(120.48%)	(61.33%)	(121.67%)	(80.60%)	(198.99%)
Retained Earnings	100.00%	112.49%	118.82%	116.19%	116.62%	130.29%	129.36%	113.43%	105.32%	89.27%	78.66%	52.36%

From the balance sheet's Total Assets data, and specifically from the "Total Fixed Assets" item in the balance sheet (Table 18), it is generally worth noting that a declining trend in the rate index is observed, with the lowest value of 24.36% recorded in 2019. The pandemic does not appear to have adversely affected the hospital's operations in this aspect, as only minimal investments in infrastructure remained minimal in the latter years of the study. In contrast, the "Total Current Assets" item in the balance sheet generally shows an upward trend despite significant fluctuations, reaching a peak of 353.77% in 2021, the highest value recorded during the period.

Table 18: Balance Sheet (Total Assets)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Fixed Assets	100.00%	95.82%	73.32%	71.79%	62.17%	70.50%	58.85%	45.94%	34.10%	24.36%	28.42%	28.79%
Inventory	100.00%	84.48%	75.44%	74.98%	53.49%	46.38%	48.90%	89.28%	73.32%	92.69%	73.63%	103.78%
Accounts receivable	100.00%	125.96%	193.87%	208.41%	258.40%	319.55%	122.29%	239.07%	374.40%	222.21%	280.51%	389.06%

Cash and Cash Equivalents	100.00%	35.16%	55.81%	249.40%	183.70%	210.03%	332.01%	240.10%	361.37%	284.16%	272.06%	157.18%
Total Current Assets	100.00%	117.66%	176.94%	200.19%	238.15%	292.00%	128.14%	227.35%	350.00%	215.46%	263.77%	353.77%
Total Assets	100.00%	68.39%	106.06%	106.37%	141.54%	165.91%	100.67%	148.61%	185.35%	136.76%	162.03%	208.13%

Similarly, from the balance sheet's Total Liabilities data (Table 19), an increase in Total Equity is observed, indicating a steady improvement in the hospital's net position. This enhancement is attributed to increased private investment in the healthcare facility, facilitated by supplementary contributions from shareholders. In contrast, the "Total Liabilities" in the balance sheet demonstrates a gradual decline over the study period, with the exception of the last two years, which show a slight increase. The lowest point was reached in 2019 at 30.94%, primarily driven by a reduction in the unit's short-term liabilities to suppliers.

Table 19: Balance Sheet (Total Liabilities)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Equity	100.00%	(67.60%)	(117.81%)	(186.13%)	(270.09%)	(305.35%)	(191.21%)	(298.14%)	(377.82%)	(274.47%)	(330.78%)	(411.08%)
Total Liabilities	100.00%	69.30%	104.16%	47.71%	47.49%	68.43%	31.92%	37.05%	43.41%	30.94%	40.65%	65.33%
Total Liabilities and Equity	100.00%	68.39%	106.06%	106.37%	141.54%	165.91%	100.67%	148.61%	185.35%	136.76%	162.03%	208.13%

The financial data for G.P.H. of "P. & A. Kyriakou" reveal both upward and downward trends over time, reflecting the hospital's phases of growth, challenges, and recovery.

From the Income Statement (Table 20), fluctuations in Net Sales are evident throughout the period. In 2011, a slight decline was observed compared to the previous year, followed by a significant increase in 2012, reaching the peak of the period at 114.55%.

The Cost of Goods and Services declined until 2013, reaching 71.03%, possibly due to improved efficiency or lower raw material costs. However, from 2014 onward, costs gradually rose, increasing from 75.27% in 2014 to 85.76% in 2021, approaching the initial levels by the end of the period.

The Gross Operating Profit reflected these trends. After three consecutive years of decline, hitting a low of 53.14% in 2013, a recovery was observed until 2016, due to successful management initiatives. However, in 2017, the profit dropped again to 61.78%, before resuming an upward trajectory, reaching 81.32% in 2021.

Net Income exhibited significant fluctuations over the years. The lowest value was recorded in 2011 (127.62%), while the highest occurred in 2018 (-72.24%). The negative percentage indicates a reversal from losses to profits compared to the base year.

This financial analysis underscores the hospital's resilience and ability to adapt, with periods of recovery driven by targeted management strategies and external influences such as market conditions.

Examining the trend indicators for the asset accounts of "P. & A. Kyriakou" Hospital (Table 21) provides valuable insights. For instance, the "Total Fixed Assets" account shows a steady decline over the years, reaching 77.69% in 2018. This was followed by two consecutive years of growth before dropping again to 81.33% in 2021. The downward trend suggests a reduction in fixed assets, reflecting efforts to renew and optimize the hospital's resources. The gradual nature of this decline indicates a measured approach to asset management.

Table 20: Income Statement

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Net Sales	100.00%	99.66%	114.55%	108.54%	106.02%	89.23%	98.04%	97.98%	101.66%	98.67%	93.30%	95.09%
Cost of Goods and Services	100.00%	92.06%	86.55%	71.03%	75.27%	70.92%	77.56%	73.47%	75.16%	82.64%	82.02%	85.76%
Gross Operating Income	100.00%	88.44%	73.20%	53.14%	60.60%	62.18%	67.79%	61.78%	62.52%	75.01%	76.64%	81.32%
Net balance for the fiscal year	100.00%	127.62%	(28.74%)	(6.21%)	(62.74%)	(36.32%)	(9.18%)	(21.31%)	(72.24%)	(32.26%)	(1.55%)	45.34%
Retained Earnings	100.00%	352.18%	295.49%	283.24%	(122.07%)	(70.24%)	(16.96%)	(40.43%)	(141.38%)	(62.64%)	(2.38%)	89.74%

Similarly, the trend indicators for the "Total Current Assets" account reveal an overall upward trajectory, despite fluctuations. The highest value was recorded in 2015, at 200.46%, demonstrating significant variability in the allocation and utilization of current assets over time.

Table 21: Balance Sheet (Total Assets)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Fixed Assets	100.00%	98.44%	96.75%	96.37%	88.43%	86.56%	83.39%	80.46%	77.69%	82.44%	84.25%	81.33%
Inventory	100.00%	79.07%	120.07%	77.92%	73.69%	59.48%	81.42%	50.00%	72.30%	85.88%	103.91%	103.59%
Accounts receivable	100.00%	65.85%	133.25%	131.06%	205.27%	261.94%	137.36%	163.83%	206.12%	157.88%	210.96%	254.68%
Cash and Cash Equivalents	100.00%	59.42%	51.34%	84.59%	95.36%	57.61%	112.32%	146.28%	154.30%	116.08%	93.17%	63.10%
Total Current Assets	100.00%	63.44%	108.76%	114.04%	171.82%	200.46%	129.67%	155.72%	187.28%	145.17%	176.26%	198.69%
Total Assets	100.00%	82.49%	103.33%	106.07%	124.27%	136.45%	102.35%	112.84%	125.92%	109.05%	124.24%	133.01%

Regarding the liabilities accounts of "P. & A. Kyriakou" Hospital, specifically the "Total Equity" item in balance sheet (Table 22), an upward trend has been evident over the years, with minor fluctuations. A particularly strong increase was observed between 2011 and 2015, driven by the growth in reserves. A similar, albeit less pronounced, upward trend is noted for the "Total Liabilities" balance sheet item. However, this account exhibited more frequent fluctuations over the period, reflecting variability in the hospital's overall financial obligations.

Table 22: Balance Sheet (Total Liabilities)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Equity	100.00%	179.73%	256.02%	286.02%	330.18%	371.34%	275.97%	312.36%	350.76%	293.39%	333.77%	337.87%
Total Liabilities	100.00%	75.47%	61.54%	38.72%	56.54%	53.28%	42.54%	38.80%	41.12%	45.97%	52.84%	75.99%
Total Liabilities and Equity	100.00%	82.49%	103.33%	106.07%	124.27%	136.45%	102.35%	112.84%	125.92%	109.05%	124.24%	133.01%

Examining the Net Sales from the Income Statement (Table 23) of G.P.H. "Pentelis" reveals a positive trajectory in the initial years of the study period, despite the economic crisis in the country. Net Sales increased steadily until 2014, with a slight dip in 2013. From 2015 to 2019, a downward trend is observed, attributable to economic challenges or heightened competition. However, a notable revenue increase occurred in the last two years (2020 and 2021), potentially driven by the COVID-19 pandemic.

Regarding the "Cost of Goods and Services" item, a decline is evident during the early years (up to 2016), followed by stabilization over the next four years (2017–2019). By 2021, costs approached levels similar to those at the beginning of the period.

Finally, Net Income exhibited significant fluctuations in the trend index over the years. The highest value was recorded in 2011 (4,274.60%), while the lowest occurred in 2019 (-1,520.79%), reflecting the hospital's financial fluctuations during this period.

Table 23: Income Statement

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Net Sales	100.00%	127.40%	158.08%	135.08%	154.06%	130.57%	122.38%	123.38%	140.06%	133.79%	229.49%	183.25%
Cost of Goods and Services	100.00%	83.75%	81.66%	78.25%	75.69%	71.34%	63.06%	69.45%	75.14%	77.67%	102.67%	89.46%
Gross Operating Income	100.00%	72.00%	61.08%	62.94%	54.59%	55.39%	47.09%	54.92%	57.66%	62.56%	68.53%	64.21%
Net balance for the fiscal year	100.00%	4274.60%	1632.72%	1051.20%	1865.48%	1433.61%	(1106.44%)	771.33%	1526.46%	(1520.79%)	1423.87%	851.65%
Retained Earnings	100.00%	(83.16%)	21.67%	(23.37%)	(103.30%)	(164.73%)	(116.65%)	(148.33%)	(212.78%)	(148.19%)	(207.73%)	(244.21%)

From the examination of the asset accounts in Table 24 for G.P.H. "Pentelis", the "Total Fixed Assets" balance sheet's item shows a significant increase in 2012, followed by a marked decline in 2015. Thereafter, the values stabilize and remain consistent through the end of the study period.

In contrast, the "Total Current Assets" item demonstrates a generally positive trend, albeit with considerable fluctuations over the years. By 2021, the index exhibits an increase exceeding five times the base year value, reaching 558.56%. This highlights a substantial growth in current assets compared to the beginning of the period.

Table 24: Balance Sheet (Total Assets)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Fixed Assets	100.00%	89.97%	4487.92%	4462.42%	4435.57%	697.70%	671.40%	652.49%	634.14%	611.54%	592.70%	573.59%
Inventory	100.00%	98.83%	96.43%	81.13%	86.49%	85.35%	88.82%	81.69%	88.59%	144.94%	99.72%	88.08%
Accounts receivable	100.00%	169.94%	384.68%	456.64%	682.23%	880.19%	461.02%	561.88%	691.37%	486.16%	645.05%	1027.73%
Cash and Cash Equivalents	100.00%	30.67%	31.77%	80.88%	81.86%	84.00%	244.11%	210.87%	117.35%	105.94%	103.37%	112.34%
Total Current Assets	100.00%	105.64%	211.36%	265.06%	376.55%	474.33%	335.12%	370.17%	395.84%	296.12%	368.48%	558.56%
Total Assets	100.00%	107.35%	1498.07%	1513.66%	1576.75%	511.59%	416.88%	438.49%	452.64%	385.08%	501.07%	569.49%

From Table 25, the "Total Equity" item in the balance sheet exhibits a trend similar to that of the "Total Fixed Assets" (of Table 24), showing relative stability. In contrast, the hospital's "Total Liabilities" display a gradual decline over the study period, with occasional increases. The most significant rise occurred in 2020, with a 141.28% increase compared to the previous year (2019).

The fluctuations in both assets and liabilities, combined with the significant changes in revenue and financial results, suggest a dynamic period for the hospital. These variations reflect the hospital's response to increased demand for healthcare services during the challenging period of the COVID-19 pandemic.

Table 25: Balance Sheet (Total Liabilities)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Equity	100,00%	100,00%	2698,76%	2767,96%	2886,11%	887,03%	737,00%	772,43%	803,90%	674,71%	789,20%	1020,52%
Total Liabilities	100,00%	100,00%	96,91%	57,47%	58,36%	67,64%	40,99%	42,29%	31,80%	35,91%	141,28%	33,46%
Total Liabilities and Equity	100,00%	100,00%	1395,46%	1409,98%	1468,74%	476,55%	388,32%	408,46%	421,64%	358,70%	466,75%	530,48%

6 Hospital Expenditures

This section analyzes hospital expenditures for the period 2012–2021, as data for 2010 and 2011 were unavailable from the Ministry of Health. The analysis focuses on spending on pharmaceuticals, medical supplies, orthopedic and auxiliary materials, and reagents across the selected hospitals. Table 26 and Diagram 17 below present expenditures on pharmaceuticals, medical supplies, orthopedic materials, reagents, and other auxiliary materials for the three hospitals over a period of 9 years (2012-2021).

At the "Agia Sofia" General Pediatric Hospital, a gradual decrease in expenditures was observed until 2015, followed by an upward trend, peaking in 2021, likely due to the COVID-19 pandemic. Pharmaceutical costs were the primary cause of this increase, rising from €21,485,338.90 in 2012 to €28,750,645.58 in 2021.

A similar trend was seen at the "Pentelis" General Pediatric Hospital, where a slight reduction in expenditures occurred between 2014 and 2016. However, expenditures increased significantly in subsequent years, with the highest amount recorded in 2020—nearly four times higher than in 2012.

In contrast, the "P. & A. Kyriakou" General Pediatric Hospital exhibited an overall downward trend in total expenditures for pharmaceuticals and other materials, albeit with fluctuations. The lowest expenditure was recorded in 2015 (€7,096,455.81), while the highest was in 2012 (€9,941,478.29). These trends highlight the varying financial responses and pressures faced by the hospitals during the period, particularly in light of the pandemic's impact.

Table 26: Expenditures on pharmaceuticals, medical supplies, orthopedic materials, reagents, and other auxiliary materials

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis
2012	31,026,497.58	9,941,478.29	1,304,839.64
2013	26,407,142.60	8,221,524.66	1,370,191.82
2014	26,404,031.83	8,243,205.19	1,276,157.36
2015	24,181,157.53	7,096,455.81	1,072,924.80
2016	26,190,257.81	7,593,180.86	1,087,752.83
2017	29,475,186.26	7,288,883.03	1,217,224.02
2018	31,922,431.02	8,285,270.57	1,992,856.78
2019	32,699,970.54	7,795,262.06	2,046,547.90
2020	34,586,306.69	8,743,053.46	6,430,587.30
2021	36,803,829.77	8,027,073.96	3,808,611.29
Average	26,407,142.60	8,221,524.66	1,370,191.82

Diagram 17: Expenditures on pharmaceuticals, medical supplies, orthopedic materials, reagents, and other auxiliary materials

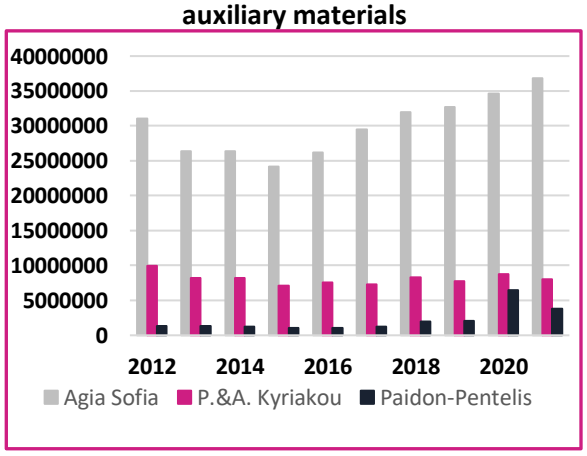


Table 27 and Diagram 18 present the expenditures on gases, fuels, and related costs across the three pediatric hospitals for the period 2012–2021. Notably, in 2012, all three hospitals reported their highest expenditures in this category, likely due to the anticipated increase in the special consumption tax on fuels (Law 4024/2011). Overall, a downward trend is observed, which may be attributed to improvements in energy efficiency (e.g., building insulation) or administrative measures aimed at reducing energy consumption and costs.

At the "Agia Sofia" General Pediatric Hospital, expenditures peaked in 2012 (€1,810,851.12)

and reached their lowest point in 2016 (€1,016,293.72), reflecting a total reduction of 43.88% during this period. Expenditures stabilized from 2017 to 2019, followed by an increase in 2020 and 2021, likely driven by the hospital's rising gross revenues (+34.75%).

For the "P. & A. Kyriakou" General Pediatric Hospital, expenditures also declined significantly until 2016, aligning with a corresponding decrease in gross revenues during the same period, except for 2016, when revenues increased by 9.88%. In subsequent years, expenditures fluctuated, with 2020 recording the highest costs since 2015. In 2021, a slight reduction was observed compared to the previous year, though expenditures remained higher than in 2017–2019.

At the "Pentelis" General Pediatric Hospital, expenditures dropped significantly until 2016, with a minor 6.84% increase in 2014. From 2017 onward, expenditures rose again, showing notable fluctuations through the end of the period. The average expenditure for this hospital was €456,050.69.

These trends illustrate the variability in hospital expenditure over time, shaped by operational changes, energy efficiency improvements, and the broader impact of the COVID-19 pandemic.

Table 27: Total expenditure on gases, fuels, and other related costs

Year	Agia Sofia	P. & A. Kyriakou	Paidon-Pentelis
2012	1,810,851.12	910,794.97	559,845.29
2013	1,756,617.50	891,562.54	471,520.53
2014	1,559,329.36	688,139.63	503,787.20
2015	1,476,698.99	558,658.96	406,235.60
2016	1,016,293.72	529,944.20	279,130.02
2017	1,439,350.49	614,274.99	512,862.36
2018	1,346,528.30	619,569.63	399,089.19
2019	1,336,265.67	542,288.77	481,405.77
2020	1,108,242.53	652,184.94	450,499.06
2021	1,581,303.85	595,540.93	496,131.92
Average	1,443,148.15	660,295.96	456,050.69

Diagram 18: Total expenditure on gases, fuels, and other related costs

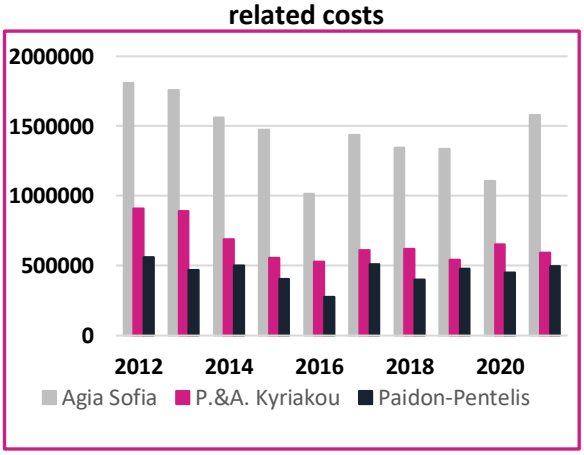


Table 28 and Diagram 19 below, display detailed payroll expenditures (including supplementary payments and salaries for auxiliary staff) and costs related to utilities, security, cleaning, and catering services for the period 2012–2021. Notably, payroll expenses for permanent staff are excluded, as these are covered by the state budget.

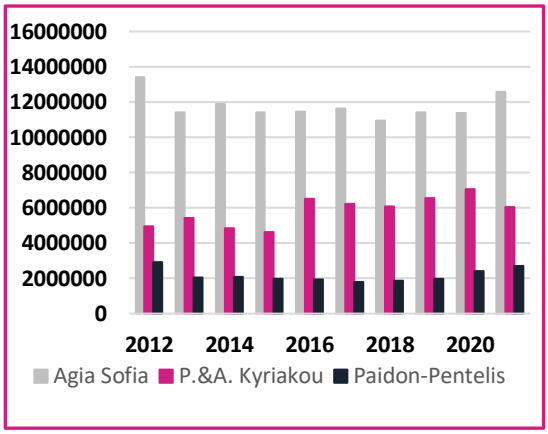
At the "Agia Sofia" General Pediatric Hospital, expenditures remained relatively stable over the study period, with minor fluctuations year-on-year. A significant decrease of approximately 14.90% was observed from 2012, the year with the highest expenditures, to 2013. However, in subsequent years, expenditures stabilized, showing a slight increase toward the end of the period. Data from Table 28 reveal that the upward trend in total expenditures was primarily driven by payroll costs for auxiliary staff, which rose by over 37% in 2021 compared to 2020 and an astounding 1237.52% compared to 2013. This dramatic increase is likely attributable to the rise in COVID-19 cases in 2021, necessitating additional staff and resources.

In contrast, cleaning expenses acted as a counterbalance, decreasing by 41.46% in 2021 compared to 2013 and by 19.73% compared to the previous year (2020). These opposing trends highlight the shifting priorities in resource allocation during the COVID-19 pandemic.

Table 28: Total expenditure on payroll, utilities, security, and other related costs

Year	Agia Sofia	P.&A. Kyriakou	Paidon-Pentelis
2012	13,429,617.71	4,954,430.77	2,901,091.18
2013	11,428,471.72	5,407,423.44	2,063,431.91
2014	11,897,687.24	4,857,563.02	2,084,001.02
2015	11,400,094.86	4,626,048.42	1,970,574.27
2016	11,435,112.35	6,518,769.48	1,954,852.10
2017	11,647,815.29	6,228,742.45	1,804,844.21
2018	10,932,122.93	6,061,863.01	1,853,709.81
2019	11,417,549.55	6,566,287.90	1,975,508.22
2020	11,382,629.02	7,046,323.35	2,416,188.27
2021	12,575,568.38	6,027,123.11	2,701,645.54
Average	11,754,666.91	5,829,457.50	2,172,584.55

Diagram 19: Total expenditure on payroll, utilities, security and other related costs



At the "P. & A. Kyriakou" General Pediatric Hospital, expenditures exhibit a general upward trend, albeit with periodic declines. For instance, a slight decrease was observed between 2014 and 2015, the latter marking the lowest expenditure level during the period. However, a significant increase of 40.91% occurred in 2016. The highest expenditure level was recorded in 2020, reaching €7,046,323.35.

This pattern can be partly attributed to fluctuations in utility costs, which declined by 40.12% in 2015 but surged by approximately 188% the following year. These changes highlight the influence of external cost factors on the overall trend.

At the "Pentelis" General Pediatric Hospital, expenditure generally declined from 2012 (€2,901,091.18) to 2017 (€1,804,844.21), the lowest level in the period. However, from 2018 to 2021, expenditure began to rise again, increasing by nearly 50% in 2020 compared to the 2017 low.

While overall expenditure control appears to have improved over time, payroll costs remain a significant challenge. This is largely due to increased healthcare demands and ongoing economic pressures, particularly during the COVID-19 pandemic.

7 Conclusions

The austerity measures imposed by successive governments, as a consequence of Greece's commitments under its memorandum agreements with creditors, led to significant cuts in healthcare expenditure. An immediate outcome of this fiscal policy was the creation of an unstable environment, directly impacting the operation and financial sustainability of healthcare facilities. With the advent of the COVID-19 pandemic, the challenges faced by public hospitals escalated, as additional medical resources and personnel became necessary, emphasizing the urgent need for healthcare facilities to adapt to the efficient utilization of their available resources.

The financial analysis of hospital financial statements is of paramount importance to ensure the continued provision of high-quality healthcare services through the

implementation of clearly defined procedures for effective expense management. The findings of this analysis underscored the importance of continuous improvement and financial flexibility for hospitals to adapt to a rapidly changing environment, such as the one shaped by the economic crisis and the COVID-19 pandemic.

Using financial ratios, hospital administrations, as well as other stakeholders, can obtain critical insights into the effectiveness of processes and decisions made during a fiscal year and over time. This study analyzed the financial statements of pediatric hospitals under the jurisdiction of the 1st Regional Health Authority of Greece for the period 2010–2021, utilizing financial ratios to investigate and derive valuable information regarding the activity, liquidity, efficiency, and capital structure of these healthcare units.

The analysis of activity ratios, particularly the Receivables Turnover Ratio and the Average Collection Period, revealed an inability of the healthcare units to collect their receivables, especially until 2015, when a consistent decline in the ratio was observed before achieving relative stabilization. This highlights the challenges hospitals faced during the economic crisis, a situation that appears to have reversed in subsequent years due to positive developments in the Greek economy. Regarding the capital structure and sustainability of the pediatric hospitals, it is generally noteworthy that all facilities possessed more equity than debt, indicating that profit generation relied primarily on their own funds rather than external borrowing, underscoring their financial resilience and sustainability.

A general conclusion that emerges from this study is that the economic crisis negatively affected the activity of hospitals (mainly until 2015), having a positive effect on their liquidity and efficiency, while their capital structure showed a fluctuating trend over the years. From 2016 until the end of the period, a steady improvement is observed in the utilization of resources by hospitals, although no definitive conclusion can be drawn for the years during the pandemic crisis (2010-2021), as they represent only a part of the overall period that ultimately lasted.

It is imperative that hospital administrators and policymakers in the healthcare sector should allocate the necessary resources to be prepared in the advent of future crises, to mitigate possible negative impact. Understanding the efficient use of resources and the effective management of hospitals can offer valuable insights into their ability to withstand challenges. It is also crucial to recognize the minimum and maximum financial capacities of hospitals in accommodating patients and the importance of proper resource management before, during, and after the onset of a potential crisis. The implementation of more adaptive management systems, strengthening financial planning and operational flexibility could provide more drastic response to crises, ensuring sustainability, more efficient resource allocation and therefore continuous access to essential services for vulnerable populations (such as children). Moreover, practices such as the prioritization of cost-effective treatments and technology utilization (e.g. telemedicine), could contribute to the reduction of operational costs, while initiatives in preventive care could reduce long-term costs associated with hospital readmissions, resulting in better overall public health outcomes, improved healthcare accessibility and reduced patient waiting times.

Therefore, hospitals should be capable of providing healthcare services regardless of the

existing dystopian conditions, being ready to address potential increased patient influx, or a rise in uninsured citizens, or shortages in medical supplies and staff. It is essential to consider the efficiency of hospitals in relation to the maximum benefit that society can gain.

References

Apostolou, A. (2015). *Analysis of Accounting and Financial Statements*. Kallipos, Open Academic Editions. Retrieved from https://repository.kallipos.gr/handle/11419/3760

Argitis, G., Koratzanis, N., & Pierros, C. (2017). *The Greek crisis: Outlook and an alternative economic policy*. Retrieved from https://www.socialistsanddemocrats.eu/sites/default/files/THE%20GREEK%20CRISIS%20-OUTLOOK%20AND%20AN%20ALTERNATIVE%20ECONOMIC%20POLICY%20iAGS%20Survey%202017.pdf

Babasaheb, A. (2015). *Financial Statements Analysis*. Knowledge Management and Research Organization.

Bakola, E., Fradelos, E., Bakola, E., & Zyga, S. (2018). Reforms and evolution of health expenditure during the economic crisis. *Archives of Hellenic Medicine*, *35*(4), 549-557.

Bigel, K. (2022). *Introduction to Financial Analysis*. Open Touro. Retrieved from https://pressbooks.pub/introductiontofinancialanalysis/

ELSTAT (2024, April 12). *Health accounts system (HAS) for 2022*. Retrieved from https://www.statistics.gr/documents/20181/6a085656-14f5-86ef-d7e3-a4391444f56c

Fridson, M., & Alvarez, F. (2002). *Financial Statement Analysis: A Practitioner's Guide* (3rd ed.). John Wiley & Sons.

Harrison, W., Horngren, C., Thomas, W., Tietz, W., & Suwardy, T. (2018). *Financial Accounting: International Financial Reporting Standards*. Pearson Education Limited.

Kaitelidou, D., Katharaki, M., Kalogeropoulou, M., Economou, C., Siskou, O., Souliotis, K., Tsavalias, K., & Liaropoulos, L. (2016). The impact of the economic crisis on the hospital sector and the efficiency of Greek public hospitals. *European Journal of Business and Social Sciences*, *4*(2), 111-125.

Lee, Y., Lee, D., Choi, Y., Kim, J. W., Lee, H., & Lee, J. Y. (2023). COVID-19 pandemic and its impact on health expenditure. *Public Health Affairs*, *7*(1), 113-128. https://doi.org/10.29339/pha.23.12

Miltiadis, C., & Bogiatidis, P. (2021). Evolution of health expenditure and reforms during the period 2009–2017. *Archives of Hellenic Medicine*, *38*(1), 108-116.

Niakas, D. (2014). The economic crisis and its impact on the Greek healthcare system. *Greek Journal of Dietetics and Nutrition*, *5*(1), 3-7.

Law 4024/2011. Pension regulations, unified payroll – grade system, labor reserve, and other provisions implementing the medium-term fiscal strategy framework 2012–2015. *Government Gazette of the Hellenic Republic* (FEK A΄ 226/27.10.2011).

OECD. (2023). *OECD Science, Technology, and Innovation Outlook 2023: Enabling transitions in times of disruption*. https://doi.org/10.1787/0b55736e-en

OECD. (2023). *Health at a Glance 2023: OECD Indicators*. https://doi.org/10.1787/7a7afb35-en

Papadeas, P. (2015). *Management Accounting*. Kallipos, Open Academic Editions. Retrieved from https://repository.kallipos.gr/handle/11419/2449

Rajagukguk, J., & Siagian, H. (2021). The effect of liquidity and total asset turnover on profitability: A research study on pharmaceutical companies in the Indonesia Stock Exchange. Ekonomis: *Journal of Economics and Business*, *5*(2), 444-448.

Satiani, B., & Davis, C. A. (2020). The financial and employment effects of coronavirus disease 2019 on physicians in the United States. *Journal of Vascular Surgery*, *72*(6), 1856-1863.

Sullivan-Marx, E. (2020). Aging in America: How COVID-19 will change care, coverage, and compassion. *Nursing Outlook*, *68*(5), 533-535. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7511850/

Tournas, E. (2015). *Financial Accounting*. Kallipos, Open Academic Editions. Retrieved from https://repository.kallipos.gr/handle/11419/946

Tsitsani, P. (2021). Epidemiological and socio-economic impacts of the COVID-19 pandemic on health systems. *Interdisciplinary Health Care*, *13*(4), 32-40.

Vikas, S. (2019). Analysis of Return on Total Assets (ROTA) and Return on Capital Employed (ROCE) of IFFCO Limited. *International Journal of Research and Analytical Reviews*, *6*(2), 746-754.

Financial analysis of accounting statements. (2008). University Notes, EAP, Athens.

Zavras, D., & Chletsos, M. (2023). The impact of the COVID-19 pandemic on catastrophic health expenditure in Greece. *National Accounting Review*, *5*(4), 338-355. https://doi.org/10.3934/NAR.2023020

Zunyou, W., & McGoogan, J. (2020). Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China. *JAMA*, *323*(13), 1239-1242.