*Research article*

# The impact of taxation on firm performance and risk: Evidence from Greece

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**Abstract:** In this paper, I examine the relationship of taxation with performance and risk with the usage of a sample of 76 non-financial companies traded on the Athens Stock Exchange. The period covered by my study spans from 2018 to 2022, while correlation and panel data analysis is conducted. Both financial performance and stock return are considered, while risk concerns the volatility of the companies' share prices. The explanatory variables used concern figures reported both in the balance sheet and the profit and loss statement and include net deferred tax, deferred tax asset, deferred tax liability, total tax expense/revenue, income tax, and deferred tax expense/revenue. The empirical results reveal a positive relationship of financial performance with net deferred tax, total tax expense/revenue, income tax and deferred tax expense/revenue. Moreover, deferred tax asset is found to affect financial performance in a negative fashion, while deferred tax liability bears a positive influence on financial performance. The opposite relationships with deferred tax asset and deferred tax liability are detected in the case of stock return and risk. Finally, evidence of a negative relationship of total tax and income tax with stock risk is obtained.

## 1. Introduction

In this study, I assess the relationship between the tax figures on the balance sheet and the profit and loss statement of a company and its financial performance, stock return, and risk. The tax components considered in my analysis mainly concern deferred taxation, but taxes on corporate income are also taken into account.

As noted by Görlitz and Dobler (2021), deferred taxes reflect probable deductions from future income tax and help the users of the published financial statements assess the financial position of a company. According to the definition provided by the International Accounting Standard 12—Income Taxes, a deferred tax liability is the amount of income tax that is payable in future periods but results from current taxable "temporary differences".

Temporary differences refer to differences between the book carrying value of an asset or liability on the statement of financial position and its tax base, i.e., the amount attributed to that asset or liability for tax purposes. Temporary differences can result in either future tax charges (taxable temporary differences) or tax deductions (deductible temporary differences). Taxable temporary differences are those for which tax will be charged when the asset or liability is recovered or settled in the future, respectively. Deductible temporary differences are those that will result in tax deductions or savings when the asset or liability is recovered or settled sometime in the future.

According to PwC, the differences observed between the book carrying value and the related tax base of assets and liabilities derive from the different objectives between financial reporting standards and income tax legislation.[1] The aim of the general-purpose financial statements is to communicate financial information about an entity that can be useful to investors, lenders, and other stakeholders. On the other hand, tax regimes are mainly focused on the collection of taxes by a government.

More importantly, deferred taxation regards differences between the applicable standards for financial reporting and the relevant income tax law that affect only the timing of an asset's or a liability's recovery or settlement. However, a deferred tax asset or liability is not recorded for costs or revenues that are permanently excluded from a local income tax base, leading to the so-called "permanent differences" in the accounting model for deferred taxation.

The fundamental objective of the deferred tax accounting model is to provide a complete measure of a company's net earnings by allowing the current and future tax consequences to be recorded in the same reporting period as the book profit or loss is generated. However, according to Brouwer and Naarding (2018), financial accounting for deferred taxes is subject to uncertainty and managerial judgment, mostly due to certain complexities and ambiguities often found in tax legislation.

Despite complexities and ambiguities, deferred taxation captures and conveys information that can be useful in evaluating an enterprise and the quality of its earnings management. In this study, I assess whether deferred taxes, along with income taxation, can be useful in explaining the financial performance, stock return and risk of a company. I do this using a sample 76 companies traded on the Athens Stock Exchange in Greece. The study period spans from 2018 to 2022.

A correlation is applied along with panel data analysis. In this analysis, financial performance is measured as the annual return on assets (ROA) and the return on equity (ROE). Stock return is

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[1] Refer to: https://www.pwc.com/us/en/services/tax/library/demystifying-deferred-tax-accounting.html.

computed as the average percentage return of the traded shares based on daily closing prices. Relevant annual returns are also calculated. Risk is measured as the standard deviation of daily stock returns. The independent variables used in my analysis include net deferred tax, deferred tax assets, deferred tax liabilities, total tax expense/revenue, income tax, and deferred tax expense/revenue.

The empirical results show that financial performance is positively related to net deferred tax, deferred tax liability, total tax expense/revenue, income tax, and deferred tax expense/revenue. On the contrary, financial performance is negatively related to deferred tax assets. When it comes to stock return, the relationship with net deferred tax and total tax expense/revenue is not statistically significant. However, the relationship with the balance sheet tax components is significant. In particular, stock return is positively and negatively related to deferred tax asset and deferred tax liability, respectively. This is also the case for stock risk. Finally, risk is found to be related to total tax and income tax in a negative way. I note that my results remain robust when the lagged values of the dependent variables are included in the control factors of the regression models.

Based on my knowledge, this is one of the few studies to investigate the relationship of financial performance, stock return, and stock risk with deferred and income taxes using data from the Greek stock market. A relevant study is that of Samara (2014), who assessed the information content of deferred taxation for the stock prices of the Greek listed companies during 2005–2013. The results of Samara showed that deferred taxes convey information that is relevant to investors as loss making firms possess tax items that can be relevant for future performance. Moreover, the stock prices of the Greek companies are negatively related to deferred tax liability. The latter finding is also verified by my results.

I am also aware of the study by Kyriazopoulos et al. (2019) who focus on the four Greek systemic banks over the period 2014–2018 and investigate the impact on their profitability and capital adequacy by delayed taxation. The findings show that delayed taxes is of special relevance to Greek banks, as they can affect their operational framework and their potential for participation in the development of the Greek economy.

Moreover, despite the recent ten-year severe economic crisis, Greece is a meaningful case for research given its leading position in the Balkan territory and its crucial presence in the Mediterranean region. Based on that, my study can act as a basis for relevant future studies with data from other countries in the neighborhood. By comparing my results to findings concerning other countries in the region, one can have a more general view about the tax management and the performance of firms operating in the southeastern part of Europe. Finally, my results can be a useful practical selection tool for investors trying to detect companies with the strongest indicators of financial performance, which can probably reward them with higher stock returns, lower stock risk and, possibly, more generous dividend payouts.

The remainder of the paper is outlined as follows: The next section discusses the major findings of the literature on the relationship of financial performance, stock return and risk with taxes. Section 3 describes the methodological approach and the sample of my study. Section 4 offers an analysis of the sample's deferred and income tax figures. Section 5 presents the empirical findings of my study. Conclusions are offered in section 6.

## 2.    Literature review

The relationship of financial performance, stock return, and risk with deferred taxes has been examined by several studies. The main question examined is whether deferred taxation conveys any valuable information to investors. In this respect, Amir and Sougiannis (1999) report that deferred taxes from carryforwards and stock prices are strongly related to each other in a positive way. This strong positive relationship implies that carryforwards are valued as assets. In the same context, Amir et al. (2001) examine whether deferred tax expenses and liability are valued similar to operating earnings and assets. The answer offered by the authors is that deferred taxes are valued less than earnings and the book value of assets. However, deferred taxes can add value because they reflect the deferral of tax payments.

Baumann and Shaw (2016) investigate whether current and noncurrent deferred tax asset and liability are positively and negatively related, respectively, to stock prices. The authors employ a sample of publicly traded firms in the United States over a period spanning from 1994 to 2014. Both current and noncurrent deferred tax assets are found to be positively related to stock prices, with the estimate for current deferred tax asset being significantly greater than that for noncurrent deferred tax asset. On the other hand, noncurrent deferred tax liability is not associated with stock prices. The opposite is the case for current deferred tax liability. Chaney and Jeter (1994), Citron (2001), Chang et al. (2009), and Harumova (2017) also report a significant relation between deferred tax asset and stock prices.

With respect to risk, Chandra and Ro (1997) examine how deferred taxation is perceived by the market when assessing the risk of the traded stocks. The risk metrics considered are systematic risk, i.e., market beta, and total risk calculated as the standard deviation of stock returns. The authors document strong evidence of a negative relationship between deferred taxation and the two risk measures. This negative relation remain robust when selected firm characteristics, that is, accounting beta, capital expenditure, size, growth, financial leverage, and operating return variability, are used as control variables. In addition, the contribution of deferred taxation to the debt-equity ratio is also negatively related to systematic and total risk. Opposite findings are provided by Lukawitz et al. (1990).

Amir et al. (1997) seek to identify the significance for the valuations conducted by investors of individual deferred tax components such as restructuring charges, depreciation and employee benefits. Based on the findings, deferred tax asset relating to restructuring charges have larger valuation merit than deferred tax asset resulting from employee benefits. On the other hand, the significance of deferred tax liability relating to depreciation has nil valuation merit. The authors conclude that investors do not perceive deferred tax liabilities as real liabilities. However, they see deferred tax asset relating to restructuring charges as true asset.

Chytis (2015) also tries to identify the sources of deferred taxes with a sample of the largest financial and non-financial companies traded on the Athens Stock Exchange during 2005–2012. According to the findings, deferred tax assets derive mainly from employee benefits, while deferred tax liabilities arise mostly from differences in the book and tax base of properties, plants, and equipment. The latter differences are attributed to the different rates used for the deprecation of tangible and intangible assets under accounting standards and tax legislation. Moreover, the latter contradicts the findings of Dotan (2003), who reports that depreciation and similar components have no value whatsoever for deferred tax purposes.

In the same context, Halim et al. (2015) note that deferred tax assets in the banking sector of Turkey result mainly from the "severance payment rights" while the "valuation of financial assets" is leading factor for deferred tax liabilities. Vučković-Milutinović and Lukić (2013) also identify property, plant and equipment, and provisions as some of the key sources of deferred taxation for the Sebian companies. However, the analysts in Sebia do not usually perceive deferred taxes as being important for the evaluation of a firm's financial performance. Lukić (2018) evaluates the impact of deferred taxes on the performance of trading companies, paying special focus on the Sebian enterprises. The empirical results show that deferred taxes are a significant factor for the performance of the commercial companies in developed economies. This is the case for the Sebian trade companies too.

Using data from Nigerian companies, Olaoye and Bamisaya (2018) evaluate the impact of deferred tax assets and liabilities on performance, which is measured as profit after tax, earnings per share, ROA and ROE. The authors find that deferred taxation has a negative impact on the performance of the firms under study.

In contrast to the findings above, Nwaorgu et al. (2019) report that deferred taxes have a significantly positive relationship with the profitability of the listed agricultural Nigerian enterprises over the period 2011–2017. Similar evidence on a positive relationship between deferred taxes and financial performance of the Nigerian banks is provided by Sabina and Chimere (2023) and Ikwa and Jones (2022). On the other hand, Touyo and Adeusi (2018) reveal that income tax has a negative and statistically significant impact on the return on assets of the listed manufacturing companies in Nigeria. Similar evidence is provided by Rohaya et al. (2010), Gadzo et al. (2013), Kherbachi (2019), and Eneisik et al. (2023).

Kawor and Kportorgbi (2014) explore the relation between tax planning and the market performance of 22 non-financial companies listed in the Ghana Stock Exchange over the twelve-year period 2000–2021. The empirical findings show that maintaining low corporate income tax rates reduces the tendency of companies to engage in intensive tax planning action. In addition, the analysis finds that tax planning has a neutral influence on firms' performance.

Khuong et al. (2020) examine the link between corporate tax avoidance and financial performance with a sample of Vietnamese listed firms over the period 2010–2016. The results accentuate a mixed relation between corporate tax avoidance and firm performance in Vietnam.

Fajarwati et al. (2020) examine whether deferred tax assets and current tax expense affect the management of earnings using a sample of manufacturing companies listed in the Indonesia Stock Exchange during the period 2016–2018. The empirical analysis reveals that deferred tax assets have relationship with earnings management. This is also the case for current tax expense.

Kimouche (2022) assesses the impact of deferred taxation on the quality of earnings reported by 40 Algerian companies from 2013 to 2019. The author employs persistence and predictive ability as proxies for the quality of earnings. Based on the empirical results, the examined Algerian firms present a strong level of persistence but a weak level of predictive ability. On the other hand, deferred taxation does not affect the persistence of earnings nor their predictive ability.

Damayanti (2022) investigates the effect of deferred tax and tax to book ratio on the financial performance of 26 manufacturing companies in the food and beverages sector listed in the Indonesia Stock Exchange during the period 2017–2021. The results indicate that deferred taxes have an effect

on the financial performance of the examined companies. On the other hand, the tax to book ratio seems not to have an impact on the financial performance of the Indonesian manufacturing firms.

Nofrivul et al. (2022) examine the relationship of tax planning and deferred taxation with earnings management. The authors use data of 36 Indonesian listed manufacturing companies during the period 2013–2020. The empirical analysis shows that tax planning cause no effect on earnings management, but deferred tax expense does affect the probability of the companies applying earnings management.

Finally, Busra et al. (2023) study the effect of deferred taxation and tax-to-book ratio on the performance of 10 Indonesian Sharia commercial banks over the period 2014–2020. The results of this study show that the deferred tax variable has a negative and significant effect on financial performance expressed by return on assets. This negative effect is considered as the burden of deferred tax experienced by the Sharia commercial banks in Indonesia. On the other hand, the tax-to-book ratio does not affect the financial performance of the examined banks.

## 3. Research methodology

The variables that will be used in my analysis are defined in this section. The methodology that will be applied in assessing the association of deferred and income taxes with performance and risk of the Greek publicly traded companies over the period 2018–2022 is described in this section too.

### 3.1. Definition of variables

Two types of financial or firm performance are used in my analysis, namely, ROA and ROE. Return on assets is computed as the fraction of profit before tax (PBT) to total assets at the end of each year over the study period. ROE is calculated as the ratio of PBT to total equity at year end. Two kinds of stock performance are used too. The first one concerns daily return, which is calculated in percentage terms with daily close prices of the shares traded on the Athens Stock Exchange. Close prices are found on capital.gr. The second type refers to the annual percentage stock return. The standard deviation of daily returns is used as a measure of risk.

Moreover, I use tax items found on the published annual balance sheets or the profit and loss statements of each firm examined. The balance sheet items concern deferred tax asset, deferred tax liability, and net deferred tax, i.e., deferred tax asset minus deferred tax liability. The profit and loss tax components regard income taxes calculated on the taxable corporate income, which differs from the accounting profit before tax, deferred tax expense/revenue, and total tax expense/revenue, namely, the sum of income tax and deferred tax expense/revenue.[2]

### 3.2. Correlation analysis

In the first step, I apply simple correlation analysis of the key variables considered in my study. The correlation coefficient of Pearson is used. The variables that are taken into consideration are ROA,

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[2] Financial statements have been collected manually from the website of each firm in the sample.

ROE, daily and annual stock return, stock risk, deferred tax assets, deferred tax liabilities, net deferred tax, income tax, deferred tax expense/revenue, and total tax expense/revenue.[3]

The main benefit of correlation analysis is that it helps identify which variables I should investigate further, and it allows for rapid hypothesis testing. This type of analysis mainly focuses on whether a relation exists between variables. The magnitude and the sign of that relation is also evaluated by correlation analysis. However, correlation does not entail causation. That means that correlation analysis identities and evaluates a relationship between two variables, but a positive correlation does not automatically mean that one variable affects the other. This type of correlation only reflects a linear correlation of variables and ignores non-linear types of relationships or correlations.

## 3.3. Econometric analysis of performance and risk

### 3.3.1.    Econometric analysis with aggregate tax components

First, a single-factor panel regression model is applied to examine the relationship between financial performance, stock return and stock risk and net deferred tax on the balance sheet side and total tax expense/revenue on the profit and loss statement side:

$$Y = \beta_0 + \beta_1 X + u \tag{1}$$

where Y is the dependent variable of the model and stands alternatively for i) financial performance, ii) stock return, and iii) stock risk. X is the independent factor and stands for i) net deferred tax and ii) total tax expense/revenue.

Based on the findings of the literature, I expect significant estimates for the independent variables of model (1). However, given that the findings about the impact of net deferred taxation are not unanimous in the literature, the slopes of net deferred tax for financial performance, stock return, and risk could be either positive or negative.

To check the robustness of the results provided by model (1), I apply an additional model, which includes the one-year lagged values of the dependent variables as an explanatory factor of performance and risk. I do so to assess the persistence in annual performance and risk and whether the impact of taxes on performance and risk vanishes when the lagged values of dependent variables are considered.

The alternative model used is the following:

$$Y = \beta_0 + \beta_1 Y_{t-1} + \beta_2 X + u \tag{2}$$

where Y and X are defined as above and $Y_{t-1}$ refers to the one-year lagged values of the dependent variables.

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[3] The six tax components are scaled by total assets by the end of each year during the study period.

### 3.3.2. Econometric analysis with individual tax components

In the second step, I examine the impact on performance and risk by the individual deferred tax components on the balance sheet side, namely, deferred tax assets, and deferred tax liabilities, as well as by the individual profit and loss tax items, i.e., income tax and deferred tax expense/revenue. The model applied with deferred tax items is shown in the following equations:

$$Y = \beta_0 + \beta_1 DTA + \beta_2 DTL + u \tag{3}$$

where Y is defined as above, DTA refers to deferred tax asset and DTL concerns deferred tax liability. Based on the findings by Samara (2014) and Harumova (2017), deferred tax asset should be negatively related to financial performance, while deferred tax liability should be positively related to performance. Based on Baumann and Shaw (2016), the opposite relationship is expected for stock returns. The impact of DTA and DTL on stock risk could be either negative or positive.

Similar to model (1), I apply an alternative version of model (3) with the lagged values of dependent variables in the explanatory factors of performance and risk. This model is shown in the flowing equation:

$$Y = \beta_0 + \beta_1 Y_{t-1} + \beta_2 DTA + \beta_3 DTL + u \tag{4}$$

where all variables are defined as above.

The model I apply with the tax components included in the statement of profit and loss is shown in the following equation:

$$Y = \beta_0 + \beta_1 IncTax + \beta_2 DefTax + u \tag{5}$$

where Y is defined as above, IncTax regards tax on taxable corporate income and DefTax refers to deferred tax expense/revenue.

Based on the findings of the literature (e.g., Touyo and Adeusi, 2018, Rohaya et al., 2010, Gadzo et al., 2013, Kherbachi, 2019, and Eneisik et al., 2023), the coefficient of income tax relating to performance should be negative and significant. Based on the findings of Penman (2001) and Phillips et al. (2003), the relationship of deferred tax expense with financial performance is expected to be negative too. If financial performance and stock returns are on the same page, similar negative impacts can be expected for stock returns. On the other hand, taxation could be perceived as a factor that increases the risk of a stock investment as it indicates cash outflows from a company. If this assumption is true, the coefficient of income tax relating to stock risk will be negative. The sign of deferred tax expense/revenue depends on whether and how investors take this tax element into consideration when trading with stock shares.

As in models (1) and (3), I run an additional version of model (5) with the lagged values of dependent variables in the explanatory factors. This model is shown in the flowing equation:

$$Y = \beta_0 + \beta_1 Y_{t-1} + \beta_2 IncTax + \beta_3 DefTax + u \tag{6}$$

where all variables are defined as above.

## 3.4. Sample

My sample includes 76 companies that were traded on the Athens Stock Exchange during a period spanning from 2018 to 2022. The sectors considered are leasing, real estate, aviation, metals, industrial machinery, building and other materials, diversified industries, publication and printing, home and corporate supplies, tobacco, energy, computers and software, construction, retail trade, hoteling, plastics, industrial suppliers, personal care, clothing, telecommunications, travel and tourism, gambling, water supply, entertainment, transportation and logistics, healthcare, and food and beverage. The sample does not include firms from the financial sector. I choose to exclude financial companies from my sample due to the accounting peculiarities of these companies compared to commercial and industrial companies.[4] In addition, based on Fama and French (1992), financial firms are usually examined separately from non-financial companies because the high leverage that is normal for these firms probably does not have the same meaning as for non-financial firms, where high leverage more likely indicates distress.

Table 1 provides information on key accounting figures of the examined firms. Data are presented in average terms and include total assets, equity, equity to assets ratio, total liabilities, revenue from sales (turnover), earnings before interest, tax, depreciation and amortization (EBITDA), and profit before tax (PBT). Data are presented in five clusters, which have been prepared by descending the average assets of the examined companies over the study period, and for the entire sample. The data reported in Table 1 have been collected manually from the published annual financial statements.[5]

At the balance sheet level, average assets amount to 555 million euros, with the largest company in the sample presenting average assets of 13.5 billion euros. Average equity approximates 224 million euros. The minimum and maximum equity figures amount to −30 million and 3.8 billion euros, respectively. Compared to total assets, equity figures are lower than half of total assets. In fact, the average equity to assets ratio in the sample is 45.95%. This percentage shows that the average Greek company relies quite heavily on external resources for financing its operations. Going further, average total liabilities amount to 330 million euros with the maximum total liabilities figure being equal to 9.6 billion euros.

At the profit and loss statement level, the average turnover is 353 million euros. The highest total turnover is 7.5 billion euros while the lowest turnover figure is nil. In regard to profitability, the sample's average EBITDA amounts to 39.6 million euros. The worst EBITDA in the sample is −6.1 million euros, while the best EBITDA is 719.7 million euros. Furthermore, the average PBT in the sample amounts to about 21 million euros. The range between the minimum and maximum PBT figures is quite wide, approximating 1 billion euros. The lowest PBT is equal to −424 million euros and the maximum PBT amounts to 568 million euros. At the sample level, 20 out of 76 (26%) firms present negative average profitability over the period under study (not shown in Table 1).

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[4] For instance, deposits are included in the assets of commercial and industrial companies, while deposits from customers are included in the liabilities of banks. The opposite is the case for loans.

[5] In my analysis, I take into consideration the financial statements of the Parent company, and not those of the group.

**Table 1.** Accounting data.

|  | Assets | Equity | Equity/Assets | Liabilities | Turnover | EBITDA | PBT |
|---|---|---|---|---|---|---|---|
|  | Cluster 1: Top Size Companies | | | | | | |
| Average | 2,425,739,838 | 952,247,925 | 44.81 | 1,473,491,913 | 1,410,696,191 | 176,650,082 | 92,381,913 |
| Min | 403,969,200 | 84,772,400 | 20.91 | 89,417,400 | 15,630,400 | −6,104,400 | −424,286,800 |
| Max | 13,456,652,400 | 3,825,956,600 | 85.78 | 9,630,695,800 | 7,495,863,600 | 719,740,000 | 568,060,000 |
| Count | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
|  | Cluster 2: Second Top Size Companies | | | | | | |
| Average | 229,495,270 | 118,889,986 | 54.04 | 110,605,284 | 256,350,683 | 13,860,729 | 8,223,016 |
| Min | 130,393,689 | −29,850,800 | −11.42 | 4,819,528 | 0 | −1,890,705 | −18,190,200 |
| Max | 315,119,216 | 257,174,600 | 96.12 | 321,403,800 | 2,160,504,461 | 34,106,200 | 40,008,237 |
| Count | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
|  | Cluster 3: Medium Size Companies | | | | | | |
| Average | 93,209,902 | 43,094,775 | 45.94 | 50,115,127 | 94,124,406 | 6,407,272 | 4,519,197 |
| Min | 63,376,920 | 3,597,729 | 2.83 | 7,070,600 | 0 | −1,954,180 | −6,809,234 |
| Max | 130,176,192 | 97,038,000 | 93.55 | 121,842,707 | 722,481,322 | 18,560,043 | 14,118,773 |
| Count | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
|  | Cluster 4: Second Bottom Size Companies | | | | | | |
| Average | 42,216,000 | 16,546,763 | 40.79 | 25,669,237 | 19,379,456 | 2,625,437 | 1,278,619 |
| Min | 31,001,879 | −4,839,549 | −8.40 | 5,728,231 | 0 | −780,571 | −1,713,173 |
| Max | 57,228,943 | 30,485,920 | 84.16 | 62,068,492 | 44,326,268 | 6,135,644 | 4,870,959 |
| Count | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
|  | Cluster 5: Bottom Size Companies | | | | | | |
| Average | 20,861,377 | 8,092,653 | 44.30 | 12,768,724 | 11,421,363 | 959,032 | −19,810 |
| Min | 8,041,167 | −12,211,734 | −48.20 | 2,341,148 | 0 | −3,500,023 | −5,993,132 |
| Max | 30,917,030 | 18,396,723 | 82.15 | 39,155,230 | 22,609,650 | 4,496,939 | 3,320,296 |
| Count | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
|  | Total Sample | | | | | | |
| Average | 555,180,226 | 224,883,871 | 45.95 | 330,296,355 | 353,828,985 | 39,585,491 | 20,996,371 |
| Min | 8,041,167 | −29,850,800 | −48.20 | 2,341,148 | 0 | −6,104,400 | −424,286,800 |
| Max | 13,456,652,400 | 3,825,956,600 | 96.12 | 9,630,695,800 | 7,495,863,600 | 719,740,000 | 568,060,000 |
| Count | 76 | 76 | 76 | 76 | 76 | 76 | 76 |

Note: This table presents accounting data of the Greek listed companies over the period 2018-2022. Data are presented in average terms and include total assets, equity, equity to assets ratio, total liabilities, revenue from sales (turnover), earnings before interest, tax, depreciation and amortization (EBITDA), and profit before tax. Data are presented in five clusters, which have been prepared by descending the average assets of companies over the study period, and for the entire sample.

Table 2 presents performance and risk measures of the examined companies. The measures presented are ROA, ROE, average daily stock return, total annual stock return, and stock risk over the period 2018–2022. The sample's average ROA is equal to 3.14%. The minimum ROA is equal to −22.83% and the maximum ROA is equal to 15.11%. The average ROE is 7.45%, with extreme ROE scores amounting to −90.54% and 235.00%.

**Table 2.** Performance and risk measures.

|  | ROA | ROE | Daily Return | Annual Return | Risk |
|---|---|---|---|---|---|
| Cluster 1: Top Size Companies | | | | | |
| Average | 5.79 | 12.06 | 0.06 | 13.92 | 2.19 |
| Min | 3.41 | −17.24 | 0.00 | 2.81 | 1.58 |
| Max | 15.11 | 37.92 | 0.15 | 36.77 | 3.32 |
| Count | 15 | 15 | 15 | 15 | 15 |
| Cluster 2: Secod Top Size Companies | | | | | |
| Average | 3.45 | 6.86 | 0.06 | 14.29 | 2.50 |
| Min | −6.72 | −53.84 | −0.02 | −4.85 | 0.73 |
| Max | 13.73 | 79.70 | 0.23 | 60.29 | 5.46 |
| Count | 15 | 15 | 15 | 15 | 15 |
| Cluster 3: Medium Size Companies | | | | | |
| Average | 4.12 | 13.13 | 0.09 | 20.28 | 3.07 |
| Min | −10.18 | −1.48 | −0.03 | −7.20 | 1.56 |
| Max | 12.98 | 37.33 | 0.27 | 66.14 | 7.45 |
| Count | 15 | 15 | 15 | 15 | 15 |
| Cluster 4: Second Bottom Size Companies | | | | | |
| Average | 2.46 | −4.93 | 0.16 | 29.16 | 3.35 |
| Min | −5.16 | −70.12 | 0.00 | −0.04 | 2.19 |
| Max | 9.20 | 15.71 | 0.56 | 78.36 | 4.71 |
| Count | 15 | 15 | 15 | 15 | 15 |
| Cluster 5: Bottom Size Companies | | | | | |
| Average | 0.08 | 9.97 | 0.19 | 41.52 | 4.32 |
| Min | −22.83 | −90.54 | 0.06 | 2.55 | 2.27 |
| Max | 14.15 | 235.00 | 0.70 | 126.75 | 13.84 |
| Count | 16 | 16 | 16 | 16 | 16 |
| Total Sample | | | | | |
| Average | 3.14 | 7.45 | 0.11 | 24.07 | 3.10 |
| Min | −22.83 | −90.54 | −0.03 | −7.20 | 0.73 |
| Max | 15.11 | 235.00 | 0.70 | 126.75 | 13.84 |
| Count | 76 | 76 | 76 | 76 | 76 |

Note: This table presents average measures of financial performance, stock performance and stock risk of the Greek listed companies over the period 2018–2022. Financial performance is measured as the return on assets (ROA) and the return on equity (ROE). Stock performance is calculated as the average daily return and the annual total return. Risk is the standard deviation of daily returns. Data are presented in five clusters.

The sample's average daily return is 0.11%. The average annual return is equal 24.07%. The sample's minimum average annual return is −7.2% and the maximum is 127%. The average stock risk in the sample is equal to 3.10, while there is a wide range between the minimum and maximum risk figures of about 131 basis points.

At this point, I should point out that my study period includes the Covid-19 pandemic era. As a response to the pandemic, the Greek government took restrictive measures which, among others, entailed that many companies actually ceased business for many years during year 2020. These

measures resulted in significant decreases in the turnover of the Greek companies. In particular, the average turnover of the sample during 2018–2019 was 308 million euros. The average turnover for 2020 was 251 million euros. The average turnover over the recovery years 2021 and 2022 was 450 million euros. These figures verify the severe effect of Covid-19 on the Greek companies. With respect to profitability, the average profit before tax of the sample during 2018–2019 was equal to 22 million euros, while the corresponding average profit in 2020 decreased to 13 million euros. Profits before tax experienced a great boost during 2021–2022 reaching 38 million euros for the average company in the sample. Once again, the data of profitability confirm the negative impact of Covid-19 on the Greek listed corporations.[6]

## 4. Taxation data

Table 3 provides information on the six tax components considered in my analysis, namely deferred tax assets, deferred tax liabilities, net deferred tax, income tax expense, deferred tax expense/revenue, and total tax expense/revenue. The average terms of five clusters over the period 2018–2022 are presented. To prepare these clusters, I descended the average assets of firms over the study period, and for the entire sample.

The sample's average deferred taxes amount to 20.8 million euros. The minimum deferred tax assets figure is zero while the maximum is 1 billion euros (presented by DEH). Cluster 1 presents the highest average amount of deferred tax assets, which equals 99 million euros. In addition, the average deferred tax assets decrease constantly from cluster 1 to cluster 4. This trend can be considered indicative of a linear relation between deferred tax asset and total assets, which entails that the higher the assets of a company, the higher the magnitude of its deferred tax asset.[7]

The average deferred tax liability of the sample amount to −14.5 million euros. The highest absolute value of deferred tax liabilities is detected in cluster 1 and the lowest is found in cluster 5. Average deferred tax liabilities decrease constantly from cluster 1 to cluster 5. This pattern indicates that the higher the assets of a company, the higher the absolute value of deferred tax liability. Alternatively, the higher the assets of company, the lowest the actual magnitude of its deferred tax liability, indicating a negative relationship between assets and deferred tax liability.[8]

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[6] Similar trends are observed when financial performance measures are examined before, during and after the corona virus year (2020). For instance, average ROA was equal to 2.72 during 2018–2019. Average ROA decreased to 1.81 in 2020 and skyrocketed to 4.34 during 2021–2022.

[7] I regressed deferred tax assets on total assets. This regression provided a significant slope of 0.06. Though not being that high, this slope verifies my assumption about a positive relationship between deferred tax assets and total assets.

[8] I regressed deferred tax liabilities on total assets. The regression model provided a statistically significant slope of −0.04 verifying my inference about a significantly negative relationship between deferred tax liabilities and total assets.

**Table 3.** Taxes.

|  | DTA | DTL | NDT | Income Tax | Deferred Tax | Total Tax |
|---|---|---|---|---|---|---|
|  | Cluster 1: Top Size Companies | | | | | |
| Average | 98,978,157 | −64,900,725 | 34,077,432 | 23,844,593 | −1,540,994 | 22,303,599 |
| Min | 2,589,200 | −540,970,600 | −73,221,400 | −42,803,800 | −42,021,400 | −84,825,200 |
| Max | 1,050,756,400 | −121,000 | 509,785,800 | 157,609,800 | 17,620,000 | 151,068,000 |
| Count | 15 | 15 | 15 | 15 | 15 | 15 |
|  | Cluster 2: Secod Top Size Companies | | | | | |
| Average | 3,184,058 | −3,803,513 | −619,455 | 1,792,511 | 35,702 | 1,828,213 |
| Min | 0 | −12,332,793 | −11,325,725 | 0 | −765,048 | 26,000 |
| Max | 11,518,194 | −286,800 | 6,883,400 | 6,136,829 | 891,987 | 6,318,516 |
| Count | 15 | 15 | 15 | 15 | 15 | 15 |
|  | Cluster 3: Medium Size Companies | | | | | |
| Average | 1,584,783 | −2,447,748 | −862,965 | 782,621 | 173,270 | 955,891 |
| Min | 257,000 | −7,894,431 | −4,694,572 | −7,800 | −428,800 | 98,903 |
| Max | 3,934,529 | 0 | 3,274,600 | 2,834,400 | 518,420 | 2,405,600 |
| Count | 15 | 15 | 15 | 15 | 15 | 15 |
|  | Cluster 4: Second Bottom Size Companies | | | | | |
| Average | 832,782 | −1,628,341 | −795,559 | 301,010 | −19,254 | 281,756 |
| Min | 0 | −7,185,055 | −3,830,414 | 0 | −605,796 | −605,796 |
| Max | 3,354,641 | −111,720 | 1,083,784 | 879,816 | 252,374 | 804,334 |
| Count | 15 | 15 | 15 | 15 | 15 | 15 |
|  | Cluster 5: Bottom Size Companies | | | | | |
| Average | 834,198 | −870,955 | −41,411 | 137,591 | 41,346 | 178,938 |
| Min | 75,713 | −3,065,233 | −2,257,777 | 0 | −194,946 | −194,946 |
| Max | 3,018,887 | −791 | 3,018,095 | 549,775 | 494,264 | 966,775 |
| Count | 16 | 16 | 16 | 16 | 16 | 16 |
|  | Total Sample | | | | | |
| Average | 20,816,367 | −14,547,897 | 6,267,490 | 5,302,796 | −257,995 | 5,044,801 |
| Min | 0 | −540,970,600 | −73,221,400 | −42,803,800 | −42,021,400 | −84,825,200 |
| Max | 1,050,756,400 | 0 | 509,785,800 | 157,609,800 | 17,620,000 | 151,068,000 |
| Count | 76 | 76 | 76 | 76 | 76 | 76 |

Note: This table presents the tax components of the Greek listed companies over the period 2018−2022. The tax components are presented in average terms and include deferred tax asset (DTA), deferred tax liability (DTL), net deferred tax (NDT), income tax, deferred tax expense/revenue (Deferred Tax), and total tax, which is the sum of income tax and deferred tax expense/revenue. Data are presented in five clusters.

The average net deferred tax in the sample is equal to 6.3 million euros. The highest net deferred tax in the sample amounts to 510 million euros and is presented by DEH. On the profit and loss statement side, the average income tax of the sample amounts to 5.3 million euros. This amount represents 1.5% of the sample's average revenue, a percentage which is rather low. However, the

average income tax stands for 25.26% of average profit before tax. The latter indicates that about one quarter of the Greek companies' profits is eroded by income taxes.[9]

When it comes to deferred tax expense/revenue, 27 firms in the sample present an average deferred tax revenue, one company presents zero deferred tax, and 48 companies present an average deferred tax expense. The relevant average term in the sample is −256 thousand euros. Finally, the average total tax expense/revenue in the sample amount to 5 million euros, with the maximum total tax expense being equal to 151 million euros.

## 5. Empirical results

In this section, I first discuss the correlation estimates among the variables considered in my study. Then, I present the results of the regression analysis on the financial performance, stock return and risk of the Greek publicly traded companies.

### 5.1. Correlation analysis

Table 4 presents the correlation coefficients among the average ROA, ROE, daily and annual stock return, stock risk, deferred tax asset, deferred tax liability, net deferred tax, income tax, deferred tax expense/ revenue, and total tax expense/revenue.

Based on correlation coefficients, ROA is related to deferred tax asset in a negative fashion, with the respective correlation coefficient being equal to −0.20, and positively related to deferred tax liabilities, with the relevant estimate being equal to 0.26. The correlation of ROA with net deferred tax is slightly positive at 0.08. ROA's correlation with income tax is positive at 0.65. The correlation of ROA with deferred tax expense/revenue is equal to 0.10. Finally, the correlation of ROA with total tax expense/revenue is quite high at 0.63.

The correlations of ROE with the explanatory variables are to the same direction with those of ROA, even though the magnitude of correlations deviate from those of ROA quite significantly.

The correlations of daily stock return move to the opposite direction compared to the correlation coefficients of ROA and ROE. The correlations with deferred tax asset and deferred tax liability are positive and negative, respectively. The correlation with net deferred tax is slightly negative at −0.05. Equal correlation is obtained for income tax expense. The correlation with deferred tax expense/revenue is actually nil (being equal to 0.01), while the correlation with total tax is slightly negative at −0.04. The sign of correlation coefficients of total annual stock return with tax items are similar to those of daily returns, while no significant differences are observed in the absolute magnitude of these estimates.

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[9] Interestingly enough, 13 out of 76 companies in the sample present nil average income tax over the period under study. This means that about 17% of the examined companies did not pay income taxes.

**Table 4.** Correlations.

| | ROA | ROE | Daily Return | Total Return | Risk | DTA | DTL | NDT | Income Tax | D.T. Exp/Rev | Total Tax |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ROA | 1.00 | 0.11 | −0.07 | −0.05 | −0.25 | −0.20 | 0.26 | 0.08 | 0.65 | 0.10 | 0.63 |
| ROE | 0.11 | 1.00 | 0.42 | 0.24 | 0.61 | −0.03 | 0.04 | 0.02 | 0.13 | 0.08 | 0.16 |
| Daily Return | −0.07 | 0.42 | 1.00 | 0.86 | 0.68 | 0.12 | −0.15 | −0.05 | −0.05 | 0.01 | −0.04 |
| Total Return | −0.05 | 0.24 | 0.86 | 1.00 | 0.51 | 0.15 | −0.17 | −0.05 | −0.04 | 0.02 | −0.03 |
| Risk | −0.25 | 0.61 | 0.68 | 0.51 | 1.00 | 0.13 | −0.15 | −0.04 | −0.18 | 0.02 | −0.15 |
| DTA | −0.20 | −0.03 | 0.12 | 0.15 | 0.13 | 1.00 | −0.23 | 0.50 | −0.13 | 0.05 | −0.09 |
| DTL | 0.26 | 0.04 | −0.15 | −0.17 | −0.15 | −0.23 | 1.00 | 0.73 | 0.19 | 0.09 | 0.21 |
| NDT | 0.08 | 0.02 | −0.05 | −0.05 | −0.04 | 0.50 | 0.73 | 1.00 | 0.08 | 0.12 | 0.13 |
| Income Tax | 0.65 | 0.13 | −0.05 | −0.04 | −0.18 | −0.13 | 0.19 | 0.08 | 1.00 | −0.07 | 0.87 |
| D.T. Exp/Rev | 0.10 | 0.08 | 0.01 | 0.02 | 0.02 | 0.05 | 0.09 | 0.12 | −0.07 | 1.00 | 0.44 |
| Total Tax | 0.63 | 0.16 | −0.04 | −0.03 | −0.15 | −0.09 | 0.21 | 0.13 | 0.87 | 0.44 | 1.00 |

*This table presents the correlation coefficients among the ROA, ROE, daily stock return, annual (total) stock return, stock risk, deferred tax asset, deferred tax liability, net deferred tax, income tax, deferred tax expense/revenue, and total tax over the period 2018−2022.

When it comes to stock risk, its correlation with deferred taxes is positive at 0.13. The opposite is the case for the correlation with deferred tax liability. The correlation with net deferred tax is slightly negative at −0.04. Moreover, the correlation of risk with income tax expense is negative at −0.18. The correlation with deferred tax expense/revenue is rather insignificant at 0.02. Finally, the correlation of stock risk with total tax expense/revenue is negative at −0.15.

Overall, the results of correlation analysis entail that the variables I have chosen to use in my analysis have some sort of relationship with financial performance, stock return, and stock risk of the Greek listed companies. However, whether these linear relationships can be interpreted as if the selected variables can explain or affect financial performance, stock return and risk will be answered via the results of the regression analysis that follow in the next section.

## 5.2. Econometric analysis of performance and risk

### 5.2.1. Econometric analysis with aggregate tax components

The outcomes of model (1) and the two-factor model (2) on the Greek companies' financial performance, stock return, and risk are provided in Table 5. The estimates of variables, t-statistics on their statistical significance and R-squared are presented in the table.

In the case of ROA, model (1) produces a positive and statistically significant estimate for net deferred tax. The value of this estimate is equal to 0.18, indicating that an increase in net deferred tax by 1% can result in an increase in an increase of ROA by 18 basis points. The corresponding estimate for

ROE is also positive and significant being equal to 0.29. The results on the positive relationship between financial performance and net deferred tax remain robust when running the alternative model (2) with the lagged values of ROA and ROE in the independent factors. Model (2) shows that along with net deferred tax, lagged financial performance can affect concurrent performance. Lagged ROA's coefficient is equal to 0.76, indicating a high level of financial performance persistence. ROE's figures also persist, but at a lower degree compared to ROA, as the relevant estimate in model (2) is equal to 0.16.

Overall, the accentuated significantly positive relation of financial performance with the net deferred tax agrees with the corresponding findings of the literature reported, among others, by Nwaorgu et al. (2019), Sabina and Chimere (2023), and Ikwa and Jones (2022).

Model's estimates (1) with total tax and ROA or ROE being the independent and the dependent variables, respectively, are highly statistically significant. The slopes are positive, indicating a positive relation between financial performance and total tax. This finding contradicts those studies that report a negative relationship between performance and the tax items found on the statement of profit and loss (e.g., Touyo and Adeusi, 2018, and Rohaya et al., 2010). The results remain robust when I run model (2) having the lagged ROA and ROE as explanatory factors.

When it comes to both daily and annual stock returns, the results of model (1) with net deferred tax being on the right-hand side of the model are statistically insignificant at all. These results cannot establish a relationship between stock return and net deferred tax, similar to that found by Sougiannis (1999), Baumann and Shaw (2016), Chaney and Jeter (1994), Citron (2001), Chang et al. (2009), and Harumova (2017). The respective results of the alternative model (2) are statistically insignificant too, indicating that neither net deferred tax, nor the lagged returns can explain concurrent stock returns. The latter evidences a lack of return persistence for the publicly traded shares of the Greek listed companies. Similar results on stock returns are obtained when total tax is considered in the independent variables of models (1) and (2).

Finally, as far as stock risk is concerned, the relationship with net deferred tax is immaterial. However, the relationship of risk with total tax is negative and significant at $-0.32$, in model (1), or $-0.28$, in model (2). In addition, model (2) reveals no persistence in risk figures over the study period.

**Table 5.** Regression analysis of performance and risk i.

| | Dependent Variable: ROA | | Dependent Variable: ROE | | Dependent Variable: Daily Return | | Dependent Variable: Annual (Total) Return | | Dependent Variable: Risk | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coef's | T-stat | Coef's | T-stat | Coef's | T-stat | Coef's | T-stat | Coef's | T-stat |
| Panel A: Model (1) | | | | | | | | | | |
| Constant | *3.24 | 8.22 | **7.61 | 2.27 | *0.11 | 7.34 | *23.64 | 8.17 | *3.08 | 18.55 |
| Net Deferred Tax (B/S) | ***0.18 | 1.69 | ***0.29 | 1.70 | 0.00 | −0.93 | −0.77 | −0.93 | −0.04 | −0.82 |
| R-squared | 0.11 | | 0.12 | | 0.00 | | 0.00 | | 0.00 | |
| Constant | 0.18 | 0.50 | 1.16 | 0.30 | *0.12 | 6.88 | *24.97 | 7.44 | *3.40 | 17.83 |
| Total Tax (P&L) | *3.22 | 15.90 | *6.85 | 3.13 | −0.01 | −0.81 | −0.98 | −0.51 | ***−0.32 | −1.96 |
| R-squared | 0.40 | | 0.13 | | 0.00 | | 0.00 | | 0.12 | |
| Panel B: Model (2) | | | | | | | | | | |
| Constant | *1.19 | 2.82 | 3.83 | 1.49 | *0.11 | 8.12 | *23.45 | 8.01 | *2.60 | 9.89 |
| Lagged Perf/Ret/Risk | *0.76 | 10.81 | *0.16 | 4.36 | 0.00 | −0.10 | 0.03 | 0.71 | 0.10 | 1.17 |
| Net Deferred Tax (B/S) | ***0.18 | 1.93 | ***0.28 | 1.68 | 0.00 | | 0.58 | 0.77 | −0.02 | −0.73 |
| R-squared | 0.47 | | 0.16 | | 0.00 | | 0.00 | | 0.06 | |
| Constant | −0.11 | −0.28 | −3.08 | −1.08 | *0.12 | 7.50 | *23.92 | 7.18 | *2.89 | 10.84 |
| Lagged Perf/Ret/Risk | *0.56 | 6.73 | *0.14 | 4.03 | −0.01 | −0.14 | 0.03 | 0.61 | 0.09 | 1.17 |
| Total Tax (P&L) | *2.11 | 7.72 | *7.83 | 4.60 | −0.01 | −0.81 | −0.76 | −0.43 | *−0.28 | −4.32 |
| R-squared | 0.59 | | 0.12 | | 0.00 | | 0.00 | | 0.13 | |

* Statistically significant at 1%; ** Statistically significant at 5%; *** Statistically significant at 10%.

This table presents the results of a panel regression analysis of the Greek listed companies' performance and risk over the period 2018−2022, in which the tax components are taken into consideration. Financial performance is measured as the return on assets (ROA) and the return on equity (ROE). Stock performance is calculated as the average daily return and the annual total return. Risk is the standard deviation of daily returns. The alternative independent variables considered are the net deferred tax on the balance sheet side and total tax on the profit and loss statement side. The lagged values of performance and risk are also used as control variables.

**Table 6.** Regression analysis of performance and risk ii.

| | Dependent Variable: ROA | | Dependent Variable: ROE | | Dependent Variable: Daily Return | | Dependent Variable: Annual (Total) Return | | Dependent Variable: Risk | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coef's | T−stat | Coef's | T−stat | Coef's | T−stat | Coef's | T−stat | Coef's | T−stat |
| **Panel A: Model (3)** | | | | | | | | | | |
| Constant | *5.78 | 9.97 | **11.22 | 2.19 | **0.05 | 2.29 | *10.39 | 2.39 | *2.41 | 9.60 |
| Deferred Tax Asset (B/S) | *−0.49 | −3.08 | ***−0.66 | −1.68 | ***0.01 | 1.83 | *2.71 | 2.30 | **0.14 | 2.02 |
| Deferred Tax Liability (B/S) | *0.54 | 4.36 | ***0.79 | 1.72 | **−0.01 | −2.51 | ***−2.63 | −1.68 | **−0.13 | −2.50 |
| R−squared | 0.19 | | 0.12 | | 0.13 | | 0.14 | | 0.13 | |
| **Panel B: Model (5)** | | | | | | | | | | |
| Constant | −0.11 | −0.32 | 1.27 | 0.33 | *0.12 | 6.87 | *25.32 | 7.44 | *3.46 | 17.98 |
| Income Tax (P&L) | 3.72* | 17.07 | **6.66 | 2.73 | −0.01 | −0.95 | −1.59 | −0.74 | *−0.42 | −3.52 |
| Deferred Tax Exp/Rev (P&L) | 1.43* | 3.64 | ***7.52 | 1.71 | 0.00 | 0.04 | 1.19 | 0.31 | 0.05 | 0.22 |
| R−squared | 0.44 | | 0.13 | | 0.00 | | 0.00 | | 0.13 | |
| **Panel C: Model (4)** | | | | | | | | | | |
| Constant | *2.66 | 4.75 | *12.68 | 3.25 | *0.09 | 4.38 | *16.94 | 4.19 | *2.38 | 9.79 |
| Lagged Perf/Ret/Risk | *0.71 | 15.03 | *0.15 | 4.23 | −0.01 | −0.36 | 0.01 | 0.28 | 0.09 | 1.09 |
| Deferred Tax Asset (B/S) | **−0.34 | −2.38 | ***−2.11 | −1.95 | 0.01 | 1.46 | **2.45 | 2.22 | ***0.05 | 1.77 |
| Deferred Tax Liability (B/S) | ***0.22 | 1.94 | ***1.55 | 1.84 | 0.00 | −0.79 | ***−0.48 | −1.65 | ***−0.06 | −1.68 |
| R−squared | 0.49 | | 0.19 | | 0.01 | | 0.12 | | 0.11 | |
| **Panel C: Model (6)** | | | | | | | | | | |
| Constant | −0.20 | −0.52 | −3.13 | −1.08 | *0.12 | 7.36 | *24.26 | 7.10 | *2.92 | 10.68 |
| Lagged Perf/Ret/Risk | *0.54 | 6.31 | *0.14 | 4.02 | −0.01 | −0.16 | 0.02 | 0.53 | 0.09 | 1.13 |
| Income Tax (P&L) | *2.33 | 8.09 | *7.92 | 4.19 | −0.01 | −0.79 | −1.16 | −0.58 | *−0.31 | −3.71 |
| Deferred Tax Exp/Rev (P&L) | **1.51 | 2.76 | **7.49 | 2.17 | 0.00 | −0.28 | 0.70 | 0.19 | −0.18 | −1.44 |
| R−squared | 0.60 | | 0.12 | | 0.00 | | 0.00 | | 0.13 | |

* Statistically significant at 1%; ** Statistically significant at 5%; *** Statistically significant at 10%.

This table presents the results of panel regression analysis of the Greek listed companies' performance and risk over the period 2018−2022, in which the tax components are taken into consideration. Financial performance is measured as the return on assets (ROA) and the return on equity (ROE). Stock performance is calculated as the average daily return and the annual total return. Risk is the standard deviation of daily returns. The alternative pairs of independent variables considered are the deferred tax asset and deferred tax liability on the balance sheet side, and income tax and deferred tax expense/revenue on the profit and loss statement side. The lagged values of performance and risk are also used as control variables.

### 5.2.2. Econometric analysis with individual tax components

The results of models (3), (4), (5), and (6) are presented in Table 6. With respect to the association between financial performance and the balance sheet's deferred tax components, the results of model (3) indicate a negative impact by deferred tax assets on financial performance, which is expressed by ROA and ROE. The respective coefficients are equal to −0.49 and −0.66. The impact of deferred tax liabilities on performance is positive, with the relevant estimates being equal to 0.54 and 0.79. These findings are in line with the conclusions of Samara (2014) and Harumova (2017). The respective results of model (4) resemble these of model (3), whereas the lagged values of ROA and ROE are found to significantly affect concurrent financial performance (similar to model (2) in the previous section).

The results of model (5) with income tax expense and deferred tax expense/revenue, indicate that financial performance is positively related to these factors. This finding contradicts my expectations about a negative relation of performance with income tax and deferred tax expense/revenue, as well as the respective findings of Touyo and Adeusi (2018), Rohaya et al. (2010), Gadzo et al. (2013), Kherbachi (2019), Eneisik et al. (2023), Penman (2001), and Phillips et al. (2003). Similar results are provided by the alternative model (6).

When it comes to daily stock returns, the estimates of model (3) on deferred tax assets and deferred tax liabilities are significantly positive and negative, respectively. However, the absolute value of these estimates does not exceed one basis point. The respective coefficients provided by model (4) are insignificant. This is also the case for the estimates of models (5) and (6) with the profit and loss tax items. Regarding annual stock returns, the impact of deferred tax asset is highly positive and significant. The opposite is the case for deferred tax liability. These relationships are detected both by applying model (3) and model (4) and are in line with the findings of Baumann and Shaw (2016). For both types of stock return, the applied models (5) and (6) reveal no trace of persistence, which could possibly be exploited by investors.

Finally, the results of model (3) on stock risk show that deferred tax asset and liability bear a positive and a negative influence on the volatility of stock prices, respectively. This finding verifies the results reported by Chandra and Ro (1997). The sign and significance of DTA and DTL coefficients do not change when using model (4). On the other hand, the estimates of models (5) and (6) accentuate a negative relation of stock risk with income tax. The correlation of risk with deferred tax expense/revenue is not significant.

## 6. Conclusions

The relationship between taxation, financial performance, stock return and risk is examined in the current study with a sample of 76 Greek firms that were traded on the Athens Stock Exchange during 2018–2022. From a methodological perspective, correlation and panel data analysis is applied. Financial performance is measured as ROA and ROE. Six tax items are considered in my analysis, three of which are found on the balance sheet and three are included in the statement of profit and loss. The balance sheet items are deferred tax asset, deferred tax liability and net deferred tax. The profit and loss tax items concern income tax expense, deferred tax expense/revenue and total tax expense/revenue.

The empirical analysis shows that a significantly positive relationship exists between financial or firm performance and net deferred tax. A similar positive correlation is revealed between firm performance and total tax. Stock returns are not affected by net deferred tax and total tax. Moreover, the relationship of stock risk with net deferred tax is immaterial. However, the relationship of stock risk with total tax is negative and significant.

When it comes to the impact by the individual tax components, my results show that deferred tax assets affect financial performance is a negative way. The respective impact of deferred tax liabilities is positive. Similar positive correlations are found between financial performance and income tax expense, as well as performance and deferred tax expense/revenue.

Furthermore, daily stock return is not related to deferred tax asset and liability in a meaningful way from an economic perspective. This is also the case for the relationship of daily stock return with the expense for income taxes and the expense or revenue resulting from deferred taxation. The impact of deferred tax asset on annual stock returns is highly positive and significant. The opposite is the case for deferred tax liability.

Finally, in regard to stock risk, the results reveal a positive relationship with deferred tax asset and a negative correlation with deferred tax liability. On the other hand, the relationship of risk with income tax is found to be negative and significant, while the correlation of risk with deferred tax expense/revenue is immaterial.

Overall, my study is quite novel and up to date as it provides new empirical evidence on publicly available tax management factors that can possibly be used to explain the performance and risk of the Greek listed companies. Furthermore, I deem that the practical implications of my study can be very significant. In particular, my results can work as a handy selection tool when examining which companies present high prospects of a significant future financial performance based on their deferred and current taxation profile. Firms in Greece with higher net deferred tax, total tax expense/revenue, income tax and deferred tax expense/revenue are more likely to achieve better financial performance and adopt more generous dividend policies. Companies with such prospects are of particular interest to income seeking investors who search for investment opportunities in the capital markets that may reward them with higher dividends. However, investors should bear in mind that the stock returns they receive by investing in the Greek listed companies are affected by deferred tax assets and liabilities in a positive and a negative way, respectively. Therefore, investors should adapt their strategies by considering these trends. On the other hand, based on my results, risk averse investors should take into consideration the negative relationship between total tax and income tax with stock risk.

Furthermore, my study can be the basis for future research on the topic. Greece stands as a quite interesting case for research given its leading position in the Balkan territory and its significant presence in the Mediterranean region. Based on that, my study can act as a basis for relevant future studies with data from other countries in the neighborhood. By comparing my results to findings concerning other neighboring countries, one can have a more general view about the tax management and performance of the companies operating in the southwestern part of Europe.

**Use of AI tools declaration**

The author affirms that no artificial intelligence (AI) tools are used in the creation of this work.

**Conflict of interest**

The author declares no conflicts of interest in this paper.

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