

# DOES EARNINGS QUALITY MATTER? EVIDENCE FROM THE ATHENS EXCHANGE

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## ABSTRACT

The relation between accounting earnings and firm valuation has long been a topic of interest to academics and stock market participants. The study analyses the relationship between earnings quality and firm value using a sample of non-financial firms with shares listed on the Athens Exchange over the period 2004-2019. The empirical findings indicate that investors value earnings quality, and this is reflected in a better valuation for firms having earnings of higher quality. The results are robust to different methodologies and controls for firm-specific factors. The evidence is of particular importance for Greek firms seeking to expand their sources of financing beyond the Greek banking system. Such a development requires constant monitoring and strengthening of the corporate governance framework, with the aim of improving the quality of information conveyed by the firms to investors. In this respect, the provisions of Law 4706/2020 regarding the Greek corporate governance framework and the operation of the Hellenic Capital Market Commission seem to be in the right direction.

**Keywords:** earnings quality; firm value; Tobin's Q

**JEL classification:** G15; G32; M41; C33

# ΕΙΝΑΙ ΣΗΜΑΝΤΙΚΗ Η ΠΟΙΟΤΗΤΑ ΤΩΝ ΕΤΑΙΡΙΚΩΝ ΚΕΡΔΩΝ; ΕΥΡΗΜΑΤΑ ΑΠΟ ΤΟ ΧΡΗΜΑΤΙΣΤΗΡΙΟ ΑΘΗΝΩΝ

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## ΠΕΡΙΛΗΨΗ

Η σχέση λογιστικών κερδών και αποτίμησης των επιχειρήσεων αποτελεί για χρόνια θέμα ενδιαφέροντος τόσο για τους ακαδημαϊκούς όσο και για τους επενδυτές. Η μελέτη αναλύει τη σχέση της ποιότητας των κερδών και της αξίας των επιχειρήσεων με βάση ένα δείγμα από επιχειρήσεις του μη χρηματοπιστωτικού τομέα με μετοχές εισηγμένες στο Χρηματιστήριο Αθηνών κατά την περίοδο 2004-2019. Τα εμπειρικά ευρήματα δείχνουν ότι οι επενδυτές αξιολογούν θετικά την ποιότητα των κερδών και αυτό αντανακλάται σε καλύτερη αποτίμηση για τις επιχειρήσεις των οποίων τα κέρδη αξιολογούνται ως υψηλότερης ποιότητας. Τα αποτελέσματα της μελέτης εξακολουθούν να ισχύουν και μετά την εφαρμογή εναλλακτικών μεθοδολογιών αλλά και μετά το συνυπολογισμό συγκεκριμένων χαρακτηριστικών των επιχειρήσεων. Τα ευρήματα έχουν ιδιαίτερη σημασία για τις ελληνικές επιχειρήσεις που επιδιώκουν να επεκτείνουν τις πηγές χρηματοδότησής τους πέρα από τον τραπεζικό δανεισμό. Για να γίνει αυτό εφικτό, απαιτείται συνεχής παρακολούθηση και ενίσχυση του πλαισίου εταιρικής διακυβέρνησης ώστε να βελτιωθεί η ποιότητα των πληροφοριών που δημοσιοποιούν οι επιχειρήσεις στο επενδυτικό κοινό. Από αυτή την άποψη, οι διατάξεις του ν. 4706/2020 σχετικά με το πλαίσιο εταιρικής διακυβέρνησης στην Ελλάδα και τη λειτουργία της Επιτροπής Κεφαλαιαγοράς φαίνεται να είναι προς τη σωστή κατεύθυνση.

# DOES EARNINGS QUALITY MATTER? EVIDENCE FROM THE ATHENS EXCHANGE<sup>1</sup>

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## I INTRODUCTION

The quality of financial information is of great importance for both firms and investors. For example, firms can influence their cost of capital by affecting the precision and quantity of information available to investors through adopted accounting standards and corporate disclosure policies. More importantly, on the basis of both theoretical and empirical work (e.g. Easley and O'Hara 2004; Leuz and Verrecchia 2004; Francis et al. 2005), information risk (defined as the uncertainty of the quality of information used or desired by investors to price securities) is a non-diversifiable risk factor for which investors require a higher risk premium. The quality of information is also important for the economy as a whole, given that, often in the past, accounting fraud cases had shaken investors' confidence and, through spillover effects, had negative repercussions on stock markets and on the economies.

Focusing on the bottom line of a company's financial information, i.e. reported earnings, investors are aware that the numbers are affected by deliberate choices between various accounting treatments and business options. There is extensive evidence (anecdotal and empirical) that firms manage reported earnings to avoid earnings decreases or losses (e.g. Burgstahler and Dichev 1997; Dechow and Schrand 2004; Campa 2019), or sacrifice long-term economic value to hit a target or to smooth short-term earnings (e.g. Graham et al. 2005). In the accounting jargon, terms like "big bath" charges or "cookie jar" reserves are often met and they occur for a number of rea-

sons such as to influence stock market perceptions, to increase management's compensation or to avoid regulatory interventions. For instance, in a survey of CFOs conducted by Dichev et al. (2013), the respondents estimated that about 20% of firms manage earnings to misrepresent economic performance, with 93.5% of the answers attributing this misrepresentation to the desire to influence stock price. Also interesting is the finding that 60.1% of executives feel that managers manage earnings because they believe such misrepresentation will go undetected. Therefore, in order to assess the earnings power, analysts must make some determination of the quality of earnings.<sup>2</sup>

Although reported earnings have been the holy grail of firms' performance for centuries, and the importance of their quality is acknowledged in the literature as early as the mid-1930s (Graham and Dodd 1934), the empirical emphasis on the importance of their quality came much later. For example, Lev (1989) stated that "no serious attempt is being made to question the quality of the reported earnings numbers prior to correlating them with returns". Following this, researchers started paying more attention to the importance of "quality" using various measures as proxies of "earnings quality". Following Lev's

1 We would like to thank Seraina Anagnostopoulou, Hiona Balfoussia and Heather Gibson for useful comments on earlier drafts. The views expressed are of the authors and do not necessarily reflect those of the Bank of Greece. The authors are responsible for any errors or omissions.

2 Although it is generally agreed in the literature that accounting quality is a concept much broader than earnings management and therefore the notion of earnings quality does not completely coincide with that of earnings management, herein we refer to the concepts of earnings management and earnings quality interchangeably, under the assumption that managed earnings cannot be considered as financial information of high quality.

study, extensive research is performed with the studies of Jones (1991), Dechow and Dichev (2002), Dechow et al. (1996), Ohlson (1995), Sloan (1996), Basu (1997), Raonic et al. (2004), Francis et al. (2004), Kothari et al. (2005) to name a few, focusing on the role of accruals, earnings persistence, earnings smoothness, timeliness, investor responsiveness, etc. as proxies of earnings quality.

Despite this extensive research, there is no consensus among both practitioners and academics on how to define and measure earnings quality. There is an agreement, however, that the term “earnings quality” is contextual, meaning different things to different users,<sup>3</sup> and that earnings do not perfectly measure performance. For example, Dechow et al. (2010), in reviewing the voluminous literature on the quality of earnings, starting with the assumption that reported earnings are a function of a company’s financial performance during a reporting period, note that an accounting system that measures an unobservable construct (performance) inherently involves estimations and judgment. Thus, it has the potential for unintentional errors and intentional bias (i.e. earnings management). Also, since companies choose among a set of pre-determined accounting standards to measure performance, no single standard will perfectly measure performance for any given company.<sup>4</sup>

Taking stock of the literature, the majority of the relevant studies utilises data from a few large economies, predominantly the US, and therefore there is scarce evidence for smaller economies (Balios, Sdrolis and Thanos 2020), while most studies examine the economic consequences of one attribute of earnings in isolation (Gaio and Raposo 2011). More importantly, not only the literature calls for more in-depth single country studies, but also Greece offers an interesting setting because of its distinctive financial reporting regime, culture and socio-economic context, weak enforcement of accounting regulation, and evidence of creative accounting (see for example Tsalavoutas et al. 2012; Ferentinou and Anagnostopoulou 2016).

Based on the above, and motivated by some recent cases of accounting irregularities involving firms listed on the Athens Exchange and by the explicit reference on the importance of earnings quality in the recent “Growth Plan of the Greek Economy” (prepared by a High Level Working Group chaired by Professor Pissarides), the present study attempts to shed light on the importance of accuracy and reliability of corporate disclosures, focusing on the importance of earnings quality. In particular, using data from non-financial firms with shares listed on the Athens Exchange (Athex) for the period 2004-2019, we analyse the relationship between earnings quality (EQ), as measured by the (composite) StarMine earnings quality index, and firm value, proxied by Tobin’s Q. We find that firms with earnings of higher quality are compensated with higher valuations. The results are robust to different model specifications and controls for firm-specific factors. The evidence is of particular importance as the increasing financing needs of Greek firms, following nearly a decade of subdued investment due to the Greek crisis, call for the development of more market-based solutions that would complement the banking system. Such a development would require, among other policy measures, increased efforts by the firms, the auditors, the State and the relevant supervisory authorities to improve the quality of information conveyed to investors.

The rest of the paper is organised as follows: the next section briefly reviews the relevant literature, putting emphasis on evidence from

<sup>3</sup> For example, Dechow and Schrand (2004) comment that the press refers to an earnings quality problem when earnings contain unusual items even if the disclosures are in accordance with the accounting principles, a perception not accepted by regulators and auditors that see earnings of high quality when they conform to the spirit of the rules. For creditors, the quality of earnings is related to how easily these can be converted to cash flows, while compensation committees usually see earnings of high quality when they reflect managers’ performance and are not influenced by events beyond management control.

<sup>4</sup> As an example, Dechow et al. (2010) use the concept of cost of goods sold (COGS), which represents the reportable measure of a firm’s unobservable inventory production performance during a given period. Although accounting standards define the costs to be included in COGS and the timing of the recognition of the costs, the resulting “standardised” measure of COGS will not be an equally good measure of decision-relevant performance across all companies (e.g. retail chains versus oil producing companies), and it will not be a perfect representation of performance.

Greece. Section 3 presents the proxies used to measure earnings quality and firm value, while Section 4 discusses the data and methodology employed in this analysis. Section 5 presents the relevant empirical results and, finally, Section 6 concludes.

## 2 LITERATURE REVIEW

The relation between accounting earnings and stock prices has long been a topic of interest to academics and stock market participants. Starting with the seminal papers by Beaver (1968) and Ball and Brown (1968), considerable empirical evidence suggests a relation between capital markets and financial statements and, particularly relevant for the present study, that accounting earnings are associated with stock returns. Kothari (2001) provides a comprehensive review of the main methodological issues and messages derived from the capital market research in accounting. Among other findings in the related literature, we note the low explanatory power of applied models and the small earnings response coefficients. This motivated researchers to expand their analysis, decomposing earnings into several attributes (i.e. persistence, smoothness, timeliness) in an attempt to gain a better understanding of the association between earnings and stock valuations. The study of these attributes drove researchers to pay increased attention to the concept of earnings management practices and thus to the value relevance of the quality of earnings. As stated by Lo (2008), among the research topics in accounting and finance, the most provocative is earnings management because it explicitly involves potential wrongdoing, mischief, conflict, cloak and dagger, and a sense of mystery.

Extensive research in the field based on the models of Jones (1991), Dechow and Dichev (2002), Ohlson (1995) and their modified versions suggests that investors price securities in a manner that reflects their awareness of accruals quality,<sup>5</sup> with lower-quality accruals being associated with higher costs of debt,

lower price, earnings multiples, and larger equity betas (e.g. Francis et al. 2005). Extended discussion on the concept of earnings management, as well as related critical reviews of studies on the relation between earnings quality and firms' valuation are offered in a number of papers (e.g. Healy and Wahlen 1999; Dechow and Skinner 2000; Dechow et al. 2010; Dichev et al. 2013).

In some selected evidence, DeAngelo et al. (1996), Barth et al. (1999) and Beatty et al. (2002) argue that firms with successive and consistent earnings increases are valued higher, but when the earnings increasing pattern is interrupted, the stock price falls substantially. Rountree et al. (2008) find that cash-flow volatility is negatively related to firm value, meaning that firms with smooth cash flows are valued with a premium, while Bao and Bao (2004) suggest that lower variability of earnings does not guarantee income smoothers' higher firm values. Instead, smoothers' earnings should be more value-relevant if they are of high quality. Chaney and Lewis (1995) argue that firms with smoother earnings have greater informativeness of their earnings and achieve higher earnings response coefficients, while Hunt et al. (2000) find that companies with smoother earnings enjoy higher market value and that the discretionary part of earnings smoothing has a stronger effect on this relationship. Dechow et al. (1996) report that, when earnings management is revealed, the share price will be negatively affected. However, Wang (2019), studying "reverse mergers"<sup>6</sup>, finds no reflection of earnings management in the firm's value. Gaio and Raposo (2011), using a cross-country sample, find a strong and positive relation between earnings quality and firms' value, while Yu et al. (2019) document a negative relationship between earnings quality and IPO underpricing.

<sup>5</sup> The interest in accruals quality stems from the fact that although accruals are an essential part of income, they are not recognised in the cash flows statement and are not easily detected (e.g. Peasnell et al. 2005). For an overview discussion on accruals, see Ohlson (2014).

<sup>6</sup> A reverse merger occurs where a private company acquires a public company, mostly for the purpose of bypassing the complex process of going public.

ing. In another strand of the literature, Leuz et al. (2003) find less earnings management for countries with developed stock markets, dispersed ownership, strong investor rights and strong legal enforcement, with the negative association between investor protection and earnings management being supported by Haw et al. (2004), Lang et al. (2006), Burgstahler et al. (2006) and Francis and Wang (2008). Overall, there is no consensus in the literature on how significant earnings quality is for firms' valuation, with results often depending on the choice of the earnings quality proxy and the type of country investigated.

The introduction of International Financial Reporting Standards (IFRS) since 2005 in the EU motivated a number of studies, which aimed to examine whether IFRS led to a decrease in earnings management practices, improving the quality of corporate disclosures (e.g. Ball 2006; Barth et al. 2008; Chen et al. 2010; Ahmed et al. 2013; Christensen et al. 2013; Doukakis 2014; Ipino and Parbonetti 2017). The literature provides reasons for both the arguments that mandatory adoption of IFRS may improve or reduce accounting quality, and this may be explained by the fact that the quality of accounting numbers is affected by multiple factors, with accounting standards being only one of them. More interesting, the literature also suggests that the regulatory efforts to increase earnings quality might have had unintended consequences, with firms substituting one form of earnings management with another (for example accrual-based earnings management with real earnings management). Finally, the literature has also examined the effect that economic crises may have on earnings management, with unclear findings. For example, Filip and Raffournier (2014) provide the conflicting views in the literature on earnings management in troubled periods, while after analysing the earnings management behaviour of European listed companies (from 16 countries) during the 2008-2009 financial crisis and the years before, they report a significant decline in income smoothing and an improvement of accruals

quality during the crisis period. They also show that country-specific characteristics, such as law enforcement, corporate governance quality and importance of financial markets, partially explain cross-country differences in income smoothing, but have no impact on measures of accruals quality.

Regarding the evidence from Greece, Baralexis (2004) reports that creative accounting was practised in Greece frequently, with large companies overstating profit, the overriding motive being demand for external financing, while small companies understated profit in order to reduce income taxes. Koumanakos et al. (2005) investigated mergers and acquisitions cases during the period 2001–2003 involving Athex-listed firms and, by focusing on discretionary accruals as a measure of managers' earnings manipulation, found weak evidence of biased accruals reported by managers in the year preceding the announcement and the completion of the deal.<sup>7</sup> However, using a broader sample, Koumanakos et al. (2008) documented that several major Greek companies in financial distress with qualified audit opinions do appear to have manipulated their reported earnings by exploiting the weaknesses of Greek accounting principles. Gasteratos et al. (2016) examined the phenomenon of earnings management in the Greek construction industry and found that discretionary accruals (showing lower profits) increase in periods of higher corporate tax rates, with large companies resorting to earnings management more frequently than small ones. On the other hand, Balios, Sdrolias and Thanos (2020), by examining whether and to what extent Greek state-owned firms engage in earnings management techniques, found no evidence of any earnings management techniques during the period 2012-2016.

Dimitropoulos and Asteriou (2008), using a sample of non-financial firms with shares listed

<sup>7</sup> Speaking of earnings management and merger activity, a nice summary of the international evidence together with the finding of downward earnings management in firms seeking to be acquired can be found in Anagnostopoulou and Tsekrekos (2015).

on the Athens Exchange during the period 1995-2004, found weak evidence of earnings timeliness. Nevertheless, they found that disclosure improves earnings informativeness for firms with low conservatism, but not in the case of firms with high timeliness. Overall, their findings suggest that there are cases where better disclosure may not result in more informative stock prices. For the same period, using a similar sample, Dimitropoulos and Asteriou (2009) analysed the relevance of financial reporting and concluded that investors price accruals, with non-discretionary accruals being more important compared to the discretionary ones in explaining stock return movements. Iatridis and Alexakis (2012) provide evidence that the provision of voluntary accounting disclosures is negatively associated with earnings management.

In another strand of the literature, the quality of earnings is linked to corporate governance practices. For example, Bekiris and Doukakis (2011) examined the association between corporate governance and accruals earnings management in a sample of firms listed on the Athens, Milan and Madrid stock exchanges, and found an inverse relationship between corporate governance and earnings management, especially for large and middle capitalisation firms. Tasios and Bekiaris (2012), using a survey method to investigate auditors' perceptions of the quality of financial reports of Greek firms, concluded that the quality of financial reports of Greek companies is perceived to be moderate, while the main factors which auditors believe that lead to poor quality in financial reporting are earnings management, deviation from accounting principles, insufficient supervision/audit from public authorities, family ownership, and poor corporate governance. Smaraidos et al. (2018) investigated the impact of corporate governance on decisions that may manipulate earnings in Greek listed firms and concluded that firms with a strong and independent board of directors combined with an active audit committee, together with financial soundness and the presence of a

large audit firm, are deterred from practices related to earnings management.

Regarding the relationship between auditor activity and earnings management, Caramanis and Lennox (2008), by focusing on the association between audit effort (measured by audit hours) and earnings management, find that managers are reporting aggressively high earnings when audit effort is low as, based on their results, firms are more likely to report income-increasing abnormal accruals than income-decreasing abnormal accruals when audit hours are lower, while the magnitude of income-increasing abnormal accruals is negatively related to audit hours. Also, firms are more likely to manage earnings upwards to just meet or beat the zero earnings benchmark, when auditors work fewer hours. Tsipouridou and Spathis (2012, 2014), by examining the relationship between earnings management and auditor reporting (opinion), found that audit opinions are not related to earnings management. Also, the size of the audit firm does not affect the level of earnings management, and the audit opinion qualification is not issued in response to management's opportunistic behaviour. However, they also commented that the interpretation of the results is conditional on the Greek context, where the economic bonding of auditors with their clients is strong, investor protection is low, enforcement mechanisms are weak and there is low litigation and reputation loss, even in the post-IFRS period.

The quality of information reported by Greek firms improved after the adoption of IFRS.<sup>8</sup> Indicatively, Iatridis and Rouvolis (2010) investigated the effects of the transition from Greek GAAP to IFRS, examining, among other issues, the degree of earnings management under IFRS and the value relevance of IFRS-based accounting numbers. They concluded that the quality of firms' financial measures improved significantly following the transition

<sup>8</sup> It should be noted that similar evidence, i.e. that IFRS adoption reduces the scope for earnings management, is related to timelier loss recognition and leads to more value relevant accounting measures, is also found internationally (e.g. Iatridis 2010).

period and therefore IFRS adoption led to more value relevant accounting measures. Dimitropoulos et al. (2013) also found convincing evidence that the implementation of IFRS contributed to less earnings management, timelier loss recognition and greater value relevance of accounting figures, compared to the Greek accounting standards. Chimonaki and Vergos (2019) examined whether IFRS adoption resulted in decreased accounting manipulation and found evidence that IFRS adoption has increased transparency and lowered information costs.

On the other hand, Tsalavoutas et al. (2012), by examining the combined value relevance of book value of equity and net income before and after the mandatory transition to IFRS in Greece, found that the expected higher accounting quality after the adoption of IFRS, as expressed by higher combined value relevance of book value and net income, was not identified in the case of Greek companies. However, they documented an increase in the valuation weight put on the book value of equity and a decrease in the valuation weight on net income, consistent with IFRS being more focused on the balance sheet and introducing more volatility and less persistence in net income. In addition, they found that reconciliation statements, due to the introduction of IFRS, were incrementally value relevant and therefore conveyed useful information to investors. Ferentinou and Anagnostopoulou (2016) examined the use of Accrual-based Earnings Management (AEM) and Real Earnings Management (REM) before and after the mandatory adoption of IFRS in 2005 and found a statistically significant shift from AEM to REM after the adoption of IFRS, indicating the replacement of one form of earnings management with the other.

Regarding the effect of the global financial crisis on earnings quality, Iatridis and Dimitras (2013), using a sample of Portuguese, Irish, Italian, Greek and Spanish listed companies, concluded that firms in Portugal, Italy and Greece tend to engage more in earnings man-

agement in their effort to improve their lower profitability and liquidity and to accommodate their higher debt. In addition, the reported financial numbers of Portuguese and Greek firms that are audited by the Big 4 auditors were found to be of higher quality before the crisis. In a later study for the same countries, Dimitras et al. (2015) provided evidence that financially distressed companies that are audited by one of the Big 4 auditors exhibit lower discretionary accruals, and the results revealed that Greek and Spanish companies reduced earnings management manipulation during the recession. Finally, Kousenidis et al. (2013), for a sample of EU countries including Greece, indicate that, on average, earnings quality has improved in the crisis period; however, in the presence of incentives for earnings management, earnings quality deteriorates, while Persakis and Iatridis (2015, 2016), for a sample of publicly listed firms in advanced countries, including Greece, found that during the financial crisis, earnings quality decreased, with the effect being more severe in countries characterised by medium and weak shareholder protection, and that higher audit quality implied higher earnings quality.<sup>9</sup>

### 3 MEASURING EARNINGS QUALITY AND FIRM VALUE

#### 3.1 EARNINGS QUALITY PROXY

Although the respective literature is vast, there is no consensus regarding the most appropriate measure of earnings quality (e.g. Dechow et al. 2010). A general classification is between accounting-based and market-based measures (Francis et al. 2004). Accounting-based measures use only accounting data and refer to the effectiveness of cash flow allocation, while market-based measures use both accounting and market data and focus on the relationship between earnings and stock returns. Sepa-

<sup>9</sup> Another interesting strand of the literature on earnings management, although less relevant to the present study, links tax auditing mechanisms, forensic accounting and tax evasion to earnings management (e.g. Balios et al. 2020).



rately, Dechow et al. (2010) recognise three broad proxies for earnings quality: statistical properties of earnings; investors' responsiveness to earnings; and external indicators of financial reporting quality.

The measure of accruals quality is one of the most widely used measures in the literature. It is based on the idea that the stronger the correlation of earnings with cash flows, the higher earnings quality is. Earnings with higher level of discretionary accruals are considered to be of lower quality. The importance of earnings persistence and cash flow predictability is also emphasised in the equity valuation models, especially those relying on the discounted cash flow (Dechow et al. 2010). Due to the complexity of the earnings quality concept, in the present study we chose to use a composite indicator in measuring the quality of earnings.

Specifically, we use the StarMine Earnings Quality (EQ) score, which is included in the Refinitiv Eikon database and represents a quantitative measure of the reliability and persistence of earnings as a proxy of earning quality. It is a percentile ranking from 0 to 100 (with 100 denoting the highest quality) and is calculated on the basis of financial statements data. It identifies companies that are likely to have earnings with high or low sustainability over a period of one year, based on decomposing past earnings into sustainable and non-sustainable components, in line with the methodology developed by StarMine.<sup>10</sup> The quantitative multi-factor econometric model follows the empirical evidence from the literature, based on which accounting quality is a broad concept, can take a number of forms and can be manifested in a number of ways (e.g. earnings persistence, discretionary accruals, etc.). It favours earnings backed by cash flows, while it disfavours earnings driven by accruals and other non-sustainable sources. In practice, it identifies companies with high operating efficiency, strong cash flow and a proven record of earnings meeting the earlier projections. Higher values of persistence and predictability indicate higher earnings quality. Therefore, earnings with higher score are a

more precise indicator of future performance, accurately capture the current and past performance and are a reliable measure of firm valuation. Companies with a high EQ score possess strong fundamentals and are more likely to outperform their benchmark, while companies with a low EQ score are not necessarily involved in earnings management, since it could also reflect declining performance compared with the past. The EQ score consists of four components: accruals (four-quarter changes in current and non-current operating assets and liabilities scaled by the company's average assets); cash flows (annualised free cash flow scaled by the company's average assets); operating efficiency, measured by operating profit margin and net operating asset turnover; and exclusions,<sup>11</sup> measured by the recent quarterly value of the special items and other exclusions, scaled by average assets.

### 3.2 FIRM VALUE PROXY

Tobin's Q ratio is a widely used measure to proxy companies' value (e.g. Lang and Stulz, 1994; Bitner and Dolan 1996; La Porta et al. 2002; Kapopoulos and Lazaretou 2007; Rountree et al. 2008; Toudas 2009; Gaio and Raposo 2011; Davidson et al. 2013; Pagratis et al. 2014; Dybvig and Warachka 2015). The literature suggests that Tobin's Q is a good proxy of firm value and it provides continuous, long-term valuation of a company, indicating market participants' expectations regarding the company's future performance and economic returns.<sup>12</sup> A Tobin's Q ratio of one suggests that the company is fairly valued. Values higher than one imply that the company generates economic rents by using its assets efficiently. In line with the literature (e.g. Wang 2019; Gaio and Raposo 2011), we measure Tobin's Q as follows:

<sup>10</sup> For details regarding the StarMine econometric model, see for instance Gaumer et al. (2009) and [http://www.premiacap.com/QWAFAFEW/atas\\_20051020.pdf](http://www.premiacap.com/QWAFAFEW/atas_20051020.pdf).

<sup>11</sup> It should be noted that the component of exclusion refers to North America only and is not taken into consideration for companies located in other countries.

<sup>12</sup> Note that, among other assumptions, Tobin's Q assumes that financial markets are efficient and thus the market value can be seen as an unbiased estimate of the present value of a firm's future income streams and that the book-to-value is a good proxy for the replacement cost of the firm's capital.

$$Q_{i,t} = (BVA_{i,t} + MVE_{i,t} - BVE_{i,t}) / BVA_{i,t} \quad (1)$$

where  $Q_{i,t}$  is the Tobin's  $Q$  of firm  $i$  in fiscal year  $t$ ;  $BVA_{i,t}$  is the book value of total assets of firm  $i$  in fiscal year  $t$ ; <sup>13</sup>  $MVE_{i,t}$  is the market value of common equity of firm  $i$  (computed as stock price times the number of common shares outstanding) in fiscal year  $t$ ; <sup>14</sup> and  $BVE_{i,t}$  is the book value of equity of firm  $i$  in fiscal year  $t$ .

#### 4 DATA AND METHODOLOGY

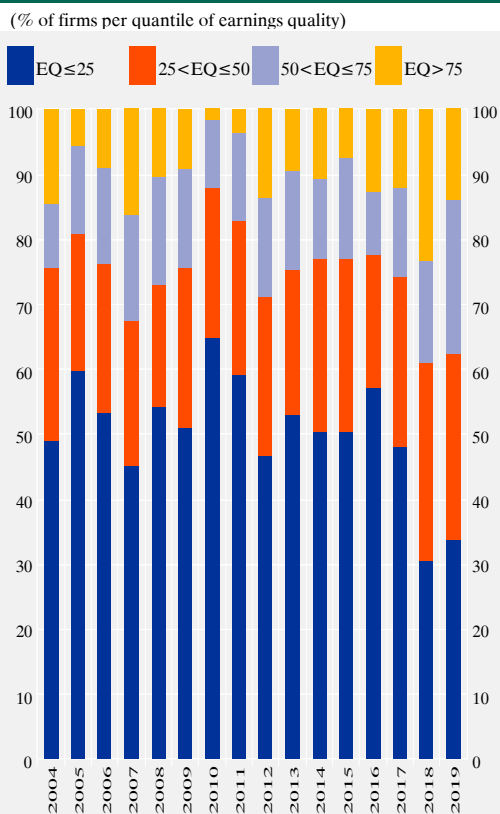
In order to empirically test the relationship between earnings quality and firm value, we run the following panel regression:

$$Q_{i,t} = \alpha + \beta_1 EQ_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 \Delta(SALES_{i,t}) + \beta_5 DEBT_{i,t} + \varepsilon_{i,t} \quad (2)$$

where  $EQ$  is the earnings quality score (StarMine EQ score). In addition, based on empirical evidence (e.g. Durnev and Kim 2005; Dechow et al. 2010) which supports that the choice of accounting methods is associated with firm characteristics, such as size, performance, leverage, growth opportunities, etc., we control for firm characteristics. In particular, we include company size ( $SIZE$ ), measured as the log of total assets, return on assets ( $ROA$ ), the logarithmic change in annual sales ( $\Delta SALES$ ), and leverage ( $DEBT$ ), proxied by the total-debt-to-total-assets ratio. Both fixed effects (FE) and random effects (RE) models with and without time-effects are applied. Our dataset includes an unbalanced panel of 1,953 observations, covering the period from 2004 to 2019. Balance sheet information, stock price data and the StarMine EQ score were drawn from the Refinitiv Eikon database.

Panel A of Table 1 includes selected descriptive statistics of the variables under examination.<sup>15</sup> The average Tobin's  $Q$  of the sample is 1.10, while the median value is 0.94, indicating that the market's long-term valuation of the average Greek firm reflects its reported fundamentals. Regarding EQ, there is significant

Chart 1 Distribution of firms per quantile of earnings quality (EQ) per year



Source: Authors' own estimations.  
Note: The chart plots the distribution of firms per quantile of earnings quality score. Indicatively, the blue bar reports the percentage of firms in the sample belonging to the bottom 25% quantile with respect to earnings quality.

variability in the sample, with the average value of 33 indicating moderate quality of earnings, although there seems to be a tendency of improvement over time, especially in the last two years (see Chart 1). Panel B of Table 1 shows the Pearson correlations among the variables. The correlation coefficients between Tobin's  $Q$  and the other variables are positive, albeit rather low, while the respective correlations between EQ and the other variables are slightly higher.

<sup>13</sup> The book value of assets is used as a proxy for the replacement cost.

<sup>14</sup> Following a common practice in the accounting literature, we used the stock price three months after the end of the fiscal year.

<sup>15</sup> It should be noted that outliers were not removed from the sample, as their exclusion did not alter the key findings and inferences of the applied models.

**Table 1 Descriptive statistics and correlation matrix**

<i>Panel A: Descriptive statistics</i>						
	Q	EQ	SIZE	SALES	ROA	DEBT
Mean	1.10	33.24	18.43	0.0293	0.1323	0.3606
Median	0.94	25.00	18.15	0.0188	0.5690	0.3260
Maximum	10.91	100.00	23.58	3.6633	56.7268	6.6937
Minimum	0.30	1.00	13.66	-6.8998	-116.7328	0.0000
Std. Dev.	0.70	26.79	1.65	0.3508	9.2212	0.3127
Skewness	6.6	0.8	0.6	-5.2	-2.3	6.2
Kurtosis	81.2	2.6	3.4	108.5	36.6	98.1
Observations	1,953	1,953	1,953	1,953	1,953	1,953
<i>Panel B: Correlation matrix</i>						
	Q	EQ	SIZE	SALES	ROA	DEBT
Q	1					
EQ	0.22	1				
SIZE	0.01	0.16	1			
SALES	0.04	0.14	0.08	1		
ROA	0.09	0.32	0.25	0.24	1	
DEBT	0.15	-0.10	0.02	-0.06	-0.48	1

Source: Authors' own estimations.

Notes: The table includes descriptive statistics (Panel A) and the correlation matrix (Panel B) of Tobin's Q, earnings quality (EQ), the logarithm of total assets (SIZE), annual sales logarithmic changes (SALES), return on assets (ROA) and the total-debt-to-total-assets ratio (DEBT) for our sample over the period 2004-2019.

## 5 EMPIRICAL RESULTS

In order to proceed with the panel estimation, we first check for stationarity. The panel unit root tests are reported in Table 2. The null hypothesis that a unit root is present is rejected in all cases (assuming both common and individual unit roots), suggesting that Tobin's Q, earnings quality, return on assets, the logarithm of total assets, the log change in annual sales and the total-debt-to-total-assets ratio are stationary.

The panel estimation results of equation (2) are presented in Table 3. Our empirical findings (based on a fixed effects model) show that the firm value, as proxied by Tobin's Q, is sig-

nificantly and positively related to EQ. Note that the Hausman test is used in order to test the appropriateness of the FE model relative to the RE model. As shown in Table 3, there is evidence in favour of fixed effects in all cases. The advantage of the FE specification is that it controls for unobserved heterogeneity and allows for arbitrary correlations between the firm-specific fixed effects and the independent variables (Wooldridge 2010). Nevertheless, for robustness purposes, Table 1 also reports results for both FE and RE estimates, as well as pooled OLS estimates. Overall, the positive relation between Tobin's Q and EQ is statistically robust regardless of the estimation technique. More importantly, the information content of EQ remains significant

**Table 2 Panel unit root tests**

	Q	EQ	SIZE	SALES	ROA	DEBT
<i>Null: Unit root (assumes common unit root process)</i>						
Levin, Lin and Chu t-stat	-23.30***	-10.55***	-6.60***	-5.43***	-12.65***	-3.42***
<i>Null: Unit root (assumes individual unit root process)</i>						
Pesaran and Shin W-stat	-6.86***	-8.71***	-3.63***	1.41	-9.44***	0.055
ADF-Fisher Chi-square	448.7***	513.2***	347.8***	276.4	516.8***	339.8***
PP-Fisher Chi-square	355.2***	934.7***	541.0***	323.0**	870.4***	412.5***

Source: Authors' own estimations.

Notes: The table includes panel unit root tests for Tobin's Q, earnings quality (EQ), the logarithm of total assets (SIZE), annual sales logarithmic changes (SALES), return on assets (ROA) and the total-debt-to-total-assets ratio (DEBT).  $H_0$ : unit root is present. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% levels, respectively.

even after controlling for firm characteristics, i.e. size, return on assets, sales growth, and leverage.<sup>16</sup>

Moreover, in order to correct for any correlation within panels, we use a Prais-Winsten specification of the model with panel-corrected standard errors. We estimate the model using both a common autoregressive term and panel-specific autoregressive terms. In both cases, we use an AR(1) specification of the autoregressive term. The respective results are reported in Table 4. Our findings remain robust to within-panel correlation, suggesting that firms with higher earnings quality are valued more highly in the Greek stock market.

In order to further investigate the robustness of our findings, we estimate equation (2) using two alternative estimation methods. First, in order to address the concern that the relation between firm valuation and earnings quality may be endogenous, we estimate equation (2) using a two-stage least squares (2SLS) method. Earnings quality (EQ) is instrumented with its lagged value, return on assets, the log of the company's total assets, the logarithmic change in annual sales and the total-debt-to-total-assets ratio. The results are reported in Table 5 and clearly show that earnings quality positively impacts firm valuation, as proxied by Tobin's Q, even when we account for the possible endogeneity of EQ.

Finally, in order to address potential measurement error concerns (see Gompers et al. (2010) and Gaio and Raposo (2011) for a comprehensive discussion), we also use a quantile regression that can capture how the median or the 10th or 90th percentiles of Tobin's Q are affected by earnings quality. In general, the qth quantile regression has the following form:

$$Q(Q_{i,t}) = \alpha_i^{(q)} + \beta_i^{(q)}EQ_{i,t} + \gamma_i^{(q)}SIZE_{i,t} + \delta_i^{(q)}ROA_{i,t} + \zeta_i^{(q)}\Delta(SALES_{i,t}) + \eta_i^{(q)}DEBT_{i,t} + \varepsilon_{i,t} \quad (3)$$

This quantile specification allows the effect of earnings quality to be estimated in each of the 10 quantiles (0.1, 0.2, ... 0.9) of Tobin's Q distribution. We employ a bootstrap methodology with 2,000 replications to estimate standard errors of the quantile regression coefficients.

<sup>16</sup> The results from the control variables indicate that the valuation of earnings quality seems to be relatively more important for smaller firms, as suggested by the negative coefficient in the size variable. A puzzling result may be the positive sign of the debt coefficient, as higher corporate indebtedness is expected to negatively affect valuations. One possible explanation, based on the relatively low average levels of leverage reported in Table 1, is that firms were below optimal capital structure and therefore an increase in their leverage improves their valuation because of the interest tax shield. In addition, in conjunction with the negative sign of size, higher indebtedness, especially of smaller firms, may reflect the fact that these firms have to resort to borrowing to pursue profitable investment opportunities, as their internal profitability was not sufficient to finance new investments. This explanation is in line with previous evidence that only a small fraction of firms with shares listed on the Athens Exchange were in a position to finance their growth exclusively with internal resources (e.g. Athanasoglou, Asimakopoulos and Siriopoulos 2006).

**Table 3 Panel data estimations**

	Pooled regression	FE model	FE model (with time-effects)	RE model	RE model (with time-effects)
EQ	0.0044*** (0.0007)	0.0021*** (0.0005)	0.0021*** (0.0006)	0.0027*** (0.0007)	0.0026*** (0.0007)
ROA	0.0222*** (0.0067)	0.0156** (0.0071)	0.0095 (0.0067)	0.0162** (0.0079)	0.0101 (0.0076)
SIZE	-0.0243*** (0.0088)	-0.5231*** 0.1040	-0.4639*** (0.1005)	-0.1682*** (0.0339)	-0.1415*** (0.0311)
SALES	-0.0010 (0.0058)	-0.0005 (0.0572)	-0.0009 (0.0026)	-0.0008 (0.0029)	-0.0013 (0.0027)
DEBT	0.6527*** (0.1300)	0.4904*** (0.1573)	0.5519*** (0.1925)	0.5987*** (0.1885)	0.6344*** (0.2168)
Constant	1.1559*** (0.1641)	10.4723*** (1.6109)	9.6292*** (1.8711)	3.8890*** (0.6309)	3.7060*** (0.6146)
R-squared	0.09	0.24	0.34	0.20	0.30
F-statistic	13.93	7.27	12.34	33.52	229.64
Durbin-Watson stat	0.38	0.76	0.71	0.63	0.61
<i>Specification tests</i>					
F-test (pooled OLS vs. FE)		17.90***	17.89***		
Hausman test (FE vs. RE)				71.38***	87.04***

Source: Authors' own estimations.

Notes: The table reports estimates of the following panel regression for the years 2004 to 2019:  $Q_{it} = \alpha + \beta_1 EQ_{it} + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 SALES_{it} + \beta_5 DEBT_{it} + \varepsilon_t$ , where  $Q$  is Tobin's  $Q$ ,  $EQ$  is the earnings quality score (StarMine EQ score),  $ROA$  is return on assets,  $SIZE$  is the log of the company's total assets,  $SALES$  is the logarithmic change in annual sales and  $DEBT$  is the total-debt-to-total-assets ratio. We estimate a pooled regression model, a fixed effect (FE) model without and with time-effects and a random effect (RE) model again without and with time-effects. Robust standard errors are in parentheses. An F-test is used to determine whether the fixed effects (FE) model outperforms the pooled OLS, and Hausman's test examines the appropriateness of the FE model relative to the RE model. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% levels, respectively.

**Table 4 Panel data estimations with autoregressive term**

	Pooled regression	Prais-Winsten with PCSEs model with AR(1)	Prais-Winsten with PCSEs model with panel-specific AR(1)
EQ	0.0044*** (0.0007)	0.0022*** (0.0004)	0.0025*** (0.0004)
ROA	0.0222*** (0.0051)	0.0038* (0.0021)	0.0071*** (0.0025)
SIZE	-0.0243* (0.0144)	-0.0383 (0.0287)	-0.0406** (0.0173)
SALES	-0.0010 (0.1103)	-0.0018 (0.0028)	-0.0013 (0.0438)
DEBT	0.6527*** (0.0661)	0.4843*** (0.0604)	0.5827*** (0.0711)
Constant	1.1559*** (0.2535)	1.5814*** (0.4955)	1.6268*** (0.3041)
Common AR(1)		0.6883*** (0.0411)	
R-squared	0.09	0.24	0.46
Wald $\chi^2$	198.73	61.08	67.29

Source: Authors' own estimations.

Notes: The table reports estimates of the panel regression using a Prais-Winsten specification with a common autoregressive term and with panel-specific autoregressive terms for the years 2004 to 2019:  $Q_{it} = \alpha + \beta_1 EQ_{it} + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 SALES_{it} + \beta_5 DEBT_{it} + \varepsilon_t$ , where  $Q$  is Tobin's  $Q$ ,  $EQ$  is the earnings quality score (StarMine EQ score),  $ROA$  is return on assets,  $SIZE$  is the log of the company's total assets,  $SALES$  is the logarithmic change in annual sales and  $DEBT$  is the total-debt-to-total-assets ratio. Panel-corrected standard errors are in parentheses. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% levels, respectively.

**Table 5 Two-stage least squares (2SLS) regression estimates**

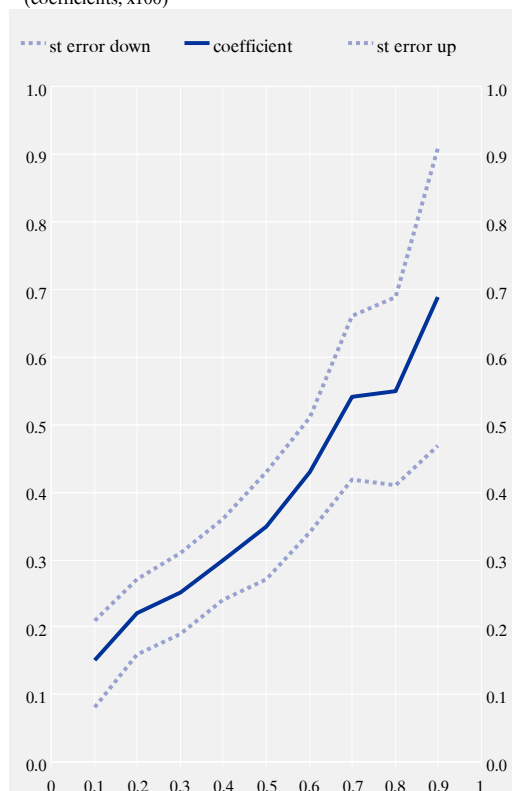
	First stage EQ	Second stage Q
EQ		0.0124*** (0.0022)
ROA	0.5327*** (0.1193)	0.0112* (0.0061)
SIZE	1.1330*** (0.3967)	-0.0334*** (0.0103)
SALES	0.2649 (0.2220)	-0.0058 (0.0060)
DEBT	2.7046 (2.1494)	0.6160*** (0.1381)
EQ_(lag 1)	0.2976*** (0.0313)	
C	2.3132 (7.2431)	1.0477*** (0.1823)

Source: Authors' own estimations.

Notes: The table reports parameter estimates of the two-stage least squares (2SLS) regression system of equations of earnings quality (EQ) and Tobin's Q (Q) at the firm level. EQ is instrumented with return on assets (ROA), the log of the company's total assets (SIZE), the logarithmic change in annual sales (SALES), the total-debt-to-total-assets ratio (DEBT) and its lagged value (EQ\_lag 1). Robust standard errors are in parentheses. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% levels, respectively.

**Chart 2 Quantile regression plot for earnings quality**

(coefficients, x100)



Source: Authors' own estimations.

Note: The chart plots estimates of the quantile regression coefficients of earnings quality with their associated 95% confidence interval in each of the 9 quantiles of Tobin's Q distribution.

Table 6 reports parameter estimates for selected quantiles, ranging from 0.10 to 0.90 for equation (3), while the quantile regression plot for earnings quality with the associated (95%)

**Table 6 Quantile regression estimates**

Quantile	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
EQ	0.0014*** (0.0004)	0.0022*** (0.0003)	0.0024*** (0.0003)	0.0028*** (0.0003)	0.0034*** (0.0004)	0.0043*** (0.0004)	0.0051*** (0.0007)	0.0058*** (0.0006)	0.0064*** (0.0011)
ROA	0.0099** (0.0039)	0.0106*** (0.0031)	0.0116*** (0.0027)	0.0130*** (0.0022)	0.0139*** (0.0018)	0.0139*** (0.0021)	0.0168*** (0.0034)	0.0177*** (0.0029)	0.0225*** (0.0042)
SIZE	0.0239*** (0.0044)	0.0193*** (0.0040)	0.0143*** (0.0039)	0.0084** (0.0041)	0.0033 (0.0048)	-0.0091* (0.0055)	-0.0313*** (0.0074)	-0.0547*** (0.0093)	-0.1041*** (0.0099)
SALES	0.0115 (0.0108)	0.0238* (0.0127)	0.0331*** (0.0120)	0.0416*** (0.0126)	0.0295 (0.0352)	0.0223 (0.0358)	0.0207 (0.0385)	0.0277 (0.0298)	-0.0456 (0.0380)
DEBT	0.5586*** (0.0491)	0.5686*** (0.0445)	0.5504*** (0.0439)	0.5690*** (0.0483)	0.6069*** (0.0574)	0.6363*** (0.0643)	0.6217*** (0.0910)	0.6631*** (0.1272)	0.6305*** (0.1043)
C	0.0064*** (0.0762)	0.1290*** (0.0712)	0.2742*** (0.0714)	0.4171*** (0.0753)	0.5357*** (0.0877)	0.8006*** (0.1052)	1.3182*** (0.1524)	1.8711*** (0.1764)	3.1002*** (0.1972)

Source: Authors' own estimations.

Notes: This table includes the parameter estimates for selected quantiles ranging from 0.10 to 0.90 of the following quantile regression model:  $Q(Q_{it}) = \alpha_i^{(q)} + \beta_i^{(q)}EQ_{it} + \gamma_i^{(q)}SIZE_{it} + \delta_i^{(q)}ROA_{it} + \zeta_i^{(q)}SALES_{it} + \eta_i^{(q)}DEBT_{it} + \varepsilon_{it}$ , where  $Q$  is the Tobin's Q,  $EQ$  is the earnings quality score (StarMine EQ score),  $ROA$  measures return on assets,  $SIZE$  is the log of the company's total assets,  $SALES$  denotes the logarithmic change in annual sales and  $DEBT$  is the total-debt-to-total-assets ratio. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% levels, respectively.

confidence interval is presented in Chart 2. Our estimates suggest that earnings quality is statistically significant across all quantiles. Interestingly, the EQ coefficient monotonically increases as we move from the lowest to the highest quantile of Tobin's Q distributions, suggesting that earnings quality plays an even more significant role for the highly valued companies.

## 6 CONCLUSION

Earnings management practices, earnings quality and their effect on investors' perception of the value of firms have attracted the interest of researchers for decades. High-quality earnings should clearly reflect the actual operating performance of firms, leading to a better reflection of their intrinsic value (e.g. Dechow and Schrand 2004). However, the empirical evidence remains inconclusive, depends on the choice of the earnings quality proxy and is mostly related to large economies.

Considering that accounting irregularities observed in some firms over the past few years have raised concerns about the quality of the reported earnings of firms with shares listed on the Athens Exchange, the present study attempts to shed light on the significance of earnings quality. Using financial and stock price data from non-financial Athex-listed firms for the period 2004-2019, a composite index of earnings quality, consisting of three components (accruals, cash flows, and operating efficiency), and Tobin's Q as a proxy for firms' value, we find that firms with better earnings quality are valued higher by investors. The results remain robust across different model specifications and controls for firm-specific characteristics.

Our findings are of particular interest to market participants and supervisory authorities and indicate that firms, through the quality of their earnings, can achieve higher valuations and, therefore, better terms of financing, especially when they need to gain access to international capital markets. The importance of

earnings quality in raising capital is well-documented in the literature, which supports the view that firms with the best earnings quality enjoy significant discounts in their cost of capital (e.g. Francis et al. 2002, 2005; Persakis and Iatridis 2015; Eliwa et al. 2016). This is also corroborated by recent evidence from the corporate bond market where Greek firms with strong fundamentals and high level of earnings quality find financing in international markets at a lower cost, compared with bank loans.<sup>17</sup>

Increasing the number of firms that are able to successfully raise capital from international markets at a lower cost requires, in addition to strong fundamentals, well-enforced outsider rights, which would limit insiders' acquisition of private control benefits and, consequently, mitigate insiders' incentives to manage accounting earnings because they have little to conceal from outsiders (Leuz et al. 2003). It is also well-documented in the literature that the valuation of firms is higher (and the required premium lower) in countries with better protection of minority shareholders (La Porta et al. 2002), as well as that strong investor protection is associated with effective corporate governance (La Porta et al. 2000). In this respect, the provisions of Law 4706/2020 regarding the Greek corporate governance framework and the operation of the Hellenic Capital Market Commission seem to be in the right direction. However, because of the dynamic nature of financial markets, continuous efforts are needed towards monitoring the effectiveness of corporate governance mechanisms, audit function, oversight and supervisory actions, with a view to ensuring the integrity of the financial reporting process.

<sup>17</sup> The importance of strong fundamentals and developments in the cost of financing for non-financial firms through bond issues are continuously discussed in several reports published by the Bank of Greece. Indicatively, see *Governor's Annual Report* for the years 2015 (Box IX.1, pp. 208-212) and 2019 (pp. 251-252) and *Monetary Policy Report*, July 2019 (pp. 142-143). Also, a detailed analysis of Greek non-financial firms' financing through international bond markets, as well as details on the Bank of Greece corporate bond index (which is available in Bloomberg) can be found in Migiakis (2014).

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