The impact of ownership structure, board attributes and XBRL mandate on timeliness of financial reporting: evidence from Turkey

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Abstract

Purpose – The purpose of this study is to investigate the effects of ownership structure, board attributes and eXtensible Business Reporting Language (XBRL) on annual financial reporting timeliness of non-financial companies listed on Borsa Istanbul (BIST).

Design/methodology/approach – To conduct the analyses, the authors used two samples. The main sample consists of 187 companies, while the subsample includes 54 companies in the BIST 100 index. The data set covers the 2010–2018 period. To investigate the influence of ownership structure, board attributes and XBRL on timeliness, panel regression and univariate analyses were used. To explore the factors associated with the likelihood of late filing, panel logistic regression analyses were employed.

Findings – The findings provide evidence that companies that have a high level of institutional ownership and women board membership file earlier. In line with prior studies, profitable companies file their accounts faster. Highly leveraged companies are late reporters. Further, XBRL has a positive influence on the filing of financial reports for the BIST 100 companies due to technological agility. Finally, companies that have less institutional ownership and that get qualified audit opinions are more subject to late filing.

Research limitations/implications – The authors acknowledge that this study has certain limitations. First, the results may not be generalized to the entire BIST population due to the exclusion of financial companies from the samples. Future research may explore the financial reporting timeliness of these companies. Second, the study did not investigate the relationship between timeliness and the information content in financial statements and the market reactions they arouse. Third, this study is trying to find out early evidence on the mandatory adoption of XBRL filings, which cover only three-year period due to the recent implementation of this regulatory practice. Thus, it needs further elaboration after the accumulation of data in the forthcoming years by the expansion of the sample beyond the 2016–2018 period. As companies would have more time to become familiar with XBRL, a more reliable conclusion may be drawn. Further, the study particularly focuses on the effect of XBRL adoption on the timeliness among filers. XBRL could also influence investors, auditors and other stakeholders. Future research could investigate the influence of XBRL on different stakeholders to produce more insightful implications.

Practical implications – This study offers several implications for managers, regulators and policy makers. First, companies that do not make timely financial reporting may find it more difficult to attract long-term capital by means of institutional investors. Since these investors view timely reporting as an ideal ingredient in corporate governance, it may have a positive impact on company reputation and corporate sustainability. The results also provide insights for regulatory authorities, policy makers and auditors on the causes of the reporting lag, thereby increasing their awareness and helping them in their decision-making process since improvements in timely availability and accessibility of financial information reduce information asymmetry for users and increase market efficiency. Additionally, companies that reduce their filing timeframe will be able to compare their results with other companies. However, the XBRL mandate could be much more burdensome to smaller firms. This may stem from the fact that larger firms may tend to use the in-house approach for XBRL and can afford more advanced financial reporting systems with automated coding algorithms attached to streamline their XBRL filings, whereas smaller firms are more likely to use the outsourcing approach due to the

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difference in the level of resources available for XBRL preparation. This finding also lends support to recent concerns that new technology creates an unleveled benefit in reporting efficiency for large companies, but not for small ones (e.g. Blankespoor *et al.*, 2014). This benefit may change the dynamics of the financial market and information environment, leading to further segmentation of the capital markets. The positive effects of XBRL adoption may accrue over time due to the potential benefits of learning curve experience since the XBRL mandate will help companies automate their reporting process and information processing, thereby strengthening internal control over financial reporting (Deloitte, 2013; Du *et al.*, 2013; Li, 2017). Companies may also efficiently incorporate auditor-proposed adjustments by cross-referencing impacted accounts and prepare revised versions of the financial reports, which are automatically rendered in various formats for auditors to assess (Wu and Vasarhelyi, 2004). Finally, investors and other users of financial information benefit from having quicker access to data, since this allows them to make more timely and reliable decisions, leading to greater benefits.

Originality/value – This paper contributes to the literature on the impact of adopting XBRL on the timeliness of financial reporting in emerging markets. Second, this study extends the literature and provides evidence on determinants of timeliness, covering both ownership structure and board attributes besides firm-specific characteristics. Hence, it provides valuable insights for companies, investors, auditing firms and policy makers.

Keywords Board attributes, Borsa Istanbul, Financial reporting, Ownership structure, Timeliness, XBRL

Paper type Research paper

1. Introduction

Timely disclosure is an important attribute of financial reporting for the capital markets to function well. The International Accounting Standards Board identifies timeliness to be an essential aspect of reporting in reaching relevant financial information, while the OECD (2004) lists timeliness as a good corporate governance principle. Regulatory authorities particularly focus on timely disclosure of financial information and set out mandatory rules for filing to reduce dissemination of asymmetric information (Jaggi and Tsui, 1999). Although the permitted financial reporting lag differs among countries, most of the companies do not wait until the end of the statutory period to file their annual reports.

Since financial information helps build investor confidence, allows assessment of corporate performance and enhances market efficiency, companies often adopt policies to comply with the regulations and file their financial statements on time to enable shareholders and stakeholders to take rational decisions (Abdelsalam and Street, 2007). Ashton *et al.* (1987) noted that delaying information usually makes the market less efficient due to investors postponing their investment decisions, which, in turn, affects corporate performance. Further, as argued by Owusu-Ansah (2000), timeliness is a useful tool in dealing with inefficiencies in capital markets. Thus, the more promptly the information is disclosed, the more relevant it is for users of financial reports.

Conversely, financial information becomes less relevant with the passage of time, and late filing may lead to a loss of reputation for companies due to a lack of transparency (Impink *et al.*, 2012). Thus, the value of timely financial reporting and the cost of early reporting must be balanced. In this frame, many companies publish their financial information using eXtensible Business Reporting Language (XBRL) format which is a global electronic reporting standard (Taylor and Dzuranin, 2010). XBRL enables firms to automatically process information by computer software, cutting out laborious and costly processes of manual reentry and comparison (Alles, 2009). According to SEC (2009), the major benefits of submitting financial information using XBRL include a greater level of financial information available to investors in a timelier and less costly manner, financial information with fewer errors and the ability to more easily compare financial information. Thus, XBRL is expected to increase the efficiency and timeliness of financial reporting by reducing the time and effort it takes the companies to generate reports for users (Dye, 2010; Yoon and Lee, 2011). It also benefits users by reducing the effort associated with converting company reports from various formats to a format that serves their unique needs (Taylor and Dzuranin, 2010).

The timeliness of financial reporting has also been related to ownership structure and board attributes. Many studies have documented that as ownership gets more concentrated, the controlling shareholders can potentially take advantage of good will from minority shareholders, delaying financial information disclosure (Abdelsalam and Street, 2007; Bebchuck and Hamdani, 2009; Bushman *et al.*, 2004; Marston and Polei, 2004). In contrast, studies held on board characteristics have usually identified a positive relationship between timeliness and board independence and board size, confirming greater monitoring role of non-executive directors (Abdelsalam and Masry, 2008; Ezat and El-Masry, 2008). Thus, these findings show that the evidence on the determinants of the timeliness is not clear-cut, particularly in emerging markets. This provides the motivation for this study.

This study aims to investigate the determinants of timeliness in financial reporting for the companies, listed on Borsa Istanbul (BIST) over the period 2010–2018. The sample covers 187 non-financial companies. In this study, the timeliness (TM) or the reporting lead time is defined as the number of days between the financial year-end and a company's release date of the annual report. We measure timeliness on three determinants, including ownership structure, board attributes and XBRL adoption. We also examine the impact of firm-specific attributes as control variables on timeliness of annual reports.

This paper has several contributions. First, it contributes to the literature on the impact of XBRL adoption on timeliness of financial reporting in emerging markets. Although XBRL mandate may affect information processing efficiency to improve the timeliness of financial reporting, no study has ever assessed the impact of the XBRL mandate on the timeliness of financial reports filing in Turkey, a leading country in emerging capital markets [1]. Second, this study extends the literature and provides evidence on determinants of timeliness, covering both ownership structure and board attributes besides firm-specific attributes. Hence, it provides valuable insights for companies, investors, auditing firms and policy makers in improving financial reporting and in increasing market efficiency.

The remainder of the study is organized as follows: Section 2 gives a regulatory and conceptual background and sets out the hypotheses; Section 3 describes the data and methodology; Section 4 presents the empirical findings; and, finally, Section 5 concludes with a discussion of the findings.

2. Regulatory background, literature review and hypotheses

2.1 Regulatory background

Financial information should be timely available to provide valuable insights for decision makers. Regulatory authorities require listed companies to publish their audited financial statements within a specified period after the accounting year-end period. In Turkey, the obligations of the listed companies in reporting their annual financial statements are defined by two regulatory sources: (1) Turkish Commercial Law (TCL) and (2) Capital Markets Law. The new TCL, issued in July 2012, requires that financial statements of all companies, whether they are listed or not, be prepared in conformity with the Turkish Financial Reporting Standards, which are the Turkish adaptations of the International Financial Reporting Standards. According to the TCL, companies should prepare their annual financial statements at least three weeks before the annual general assembly and no later than the end of the third month.

According to the Turkish regulations, listed companies must prepare their interim financial statements every quarter in accordance with the Turkish Accounting Standards and the Capital Market Board (CMB). Yearly and semi-annual financial statements must be approved by the independent auditing firms. In accordance with the CMB legislation, listed companies must file their financial statements electronically to the public via the Public Disclosure Platform (PDP) operated by the central securities depository (CSD) of Turkey.

In Turkey, from 1989 to 2003, the CMB communiqué, enacted in 1989 and titled as "*Rules and Principles Related to Financial Statements in the Capital Market,*" was the only regulatory source that obliged listed companies to publish financial statements in a statutory timeframe. Although the CMB published several communiqués related to the financial reporting from 1989 to 2003, there were no major changes in the timing of financial statements filings. The communiqué enacted in 2003 [2] obliged companies to publish their unconsolidated financial statements within 10 weeks of the financial year-end, and consolidated financial statements within 14 weeks of the financial year-end. These requirements became effective for listed companies by the beginning of 2005. To harmonize accounting standards, the CMB issued a new communiqué [3] in 2008 by updating its 2003 predecessor (CMB, 2008).

A new communiqué [4] was issued by the CMB in 2013 and shortened the deadline for the filing of accounts for listed companies by 10 days. This regulation became effective at the beginning of 2014, requiring listed companies to disclose their annual consolidated financial statements within 70 days, unconsolidated financial statements within 60 days, first and third quarter consolidated financial statements within 40 days, first and third quarter unconsolidated financial statements within 30 days, second quarter consolidated financial statements within 50 days and second quarter unconsolidated financial statements within 40 days from the year-end date. Further, the CMB has mandated the use of the PDP for the dissemination of financial statements since June 2009. The aim is to facilitate the processing of financial information and any other material events for investors and other stakeholders.

One final note on regulatory framework is that authorities often adopt rules requiring companies to provide financial information in an interactive and machine-readable format since it enables investors to capture and analyze information more quickly and at a lower cost (CFA Institute, 2017). One of these formats is XBRL. XBRL taxonomies are the core element in digital financial reporting and represent a useful support for companies to increase their transparency and preserve interoperability of financial reports (Valentinetti and Rea, 2011, 2012). In June 2016, the CSD [5] mandated the use of the XBRL for filing financial reports across listed companies to increase the speed and availability of financial information and to improve processes and efficiency. The companies prepared their first annual filings by using XBRL format in 2016. Different from many countries, there has been no voluntary period for the companies to implement XBRL. They are required to use XBRL taxonomy to report only their financial statements, but not their footnotes. Further, they are not allowed to extend the tagging.

2.2 Literature review

Many researchers have investigated different aspects of timeliness in financial reporting since it is an essential ingredient of corporate reporting theory. While there are numerous studies addressing different determinants of timeliness, the dimensions of ownership structure, board attributes and the impact of XBRL adoption remain slightly in the shadows, especially in emerging markets.

One line of studies on timeliness has focused on the impact of board attributes and ownership structure on financial reporting (Abdelsalam and Masry, 2008; Alsmady, 2018; Lim, 2012). Abdelsalam and Masry (2008) examined the influence of board members' independence and ownership structure on timeliness of corporate Internet reporting by a sample of Irish-listed companies, revealing that timeliness is positively associated with the independence of board members, supporting the stewardship theory that focuses on achieving the goals of companies in protection of long-term welfare of other parties. Lim (2012) provided evidence on how ownership concentration and structure relate to the timeliness in Malaysia by using a sample of 1,276 firms from 1996 to 2009, showing that closely held firms report earlier, particularly if the largest shareholder is a foreigner or a

financial institution. Alsmady (2018) investigated the effects of board attributes and ownership types on timeliness of financial reports for 68 companies listed on the Amman Stock Exchange over the period 2011–2015, and showed that CEO duality and women presence have significant effects on financial reporting. He also indicated that the age and size of the company have a negative effect on timeliness, while foreign ownership has a positive effect.

Regulatory change may be another determinant of timeliness, and it is in line with the compliance theory proposed by Tyler (1990). The mandate of XBRL is one of them. XBRL adoption may ease regulatory compliance to the extent that it promotes more timely reporting and allows easier comparison of information across companies (Baldwin and Trinkle, 2011; Valentinetti and Rea, 2013). Compliance with the mandate may also prompt companies to update their information systems to implement XBRL reporting. More powerful information systems can accomplish financial reporting more quickly (Du and Wu, 2018). Requiring information providers to use common elements with defined meanings facilitates automated consumption of reports, thereby enhancing transparency and legitimacy, which is in line with the institutional theory (Debreceny *et al.*, 2011). Bunching theory claims that financial information acquisition and disclosure are bunched together with minimal or no time lag in between and suggests a minimal lag between financial information processing and its disclosure with the XBRL mandate; thus, financial reporting can be filed in a timelier fashion (Dye, 2010).

In fact, XBRL filing does not replace traditional annual filing; rather, it serves as an additional set of files to be filed with the CMB. By using XBRL, companies can automate data collection and dissemination processes. XBRL also enables preparers to use software to tag data in financial reports to the elements within a taxonomy and focuses on the delivery of a more efficient, better-controlled and detailed financial reporting process to increase the functionality (Dunne *et al.*, 2013). Thus, the interactive data in the format of XBRL free up resources from manual reporting tasks, and eventually help filers improve the timeliness of and speed at which they generate financial information while reducing the cost of filing, adding value to businesses, providing improvements in information flows, increasing the efficiency of financial reporting, enhancing inter-company comparability and cross-sectional analysis in many different forms to accommodate varying user needs (SEC, 2009; Willis, 2005).

Existing literature shows evidence that the XBRL mandate improves the timeliness of financial reporting (Du and Wu, 2018; Weissmueller and Johnson, 2014; Yoon and Lee, 2011). Yoon and Lee (2011) examined the effect of XBRL filing requirements on timeliness of financial reporting by using 1,908 companies in the USA, revealing that the release horizons have been slightly shortened after XBRL mandate, particularly for large companies, but the difference was not statistically significant. Similarly, using a sample of 50 firms from the 2009 Fortune 500 listing, Weissmueller and Johnson (2014) find that the firms file their 10-Qs and 10-Ks reports earlier after the XBRL mandate. Du and Wu (2018) investigated the effect of XBRL on timeliness by using annual and quarterly filings in the USA from 2007 to 2014, indicating that the reporting lag is shortened by one to two days after the XBRL adoption. They further provided the evidence that the XBRL mandate improves the timeliness of financial reporting for large filers. Zhou (2019) examined how XBRL adoption is associated with 10-K filing timeliness in the USA from 2007 to 2016, arguing that the XBRL mandate decreases the 10-K filing lag for Tier 1, Tier 2 and Tier 3 accelerated filers, while filing lag increases significantly in the post-XBRL period for Tier 3 smaller reporting companies.

Another stream of studies has addressed the association of XBRL adoption, timeliness and internal control performance (Amin *et al.*, 2018; Hwang *et al.*, 2020). Since the companies generally create XBRL-tagged financial statements by converting their traditional financial statements, the internal control of companies over financial reporting is likely to influence the

efficiency of their XBRL tagging process. Amin *et al.* (2018) argued that the mandated XBRL disclosure incentivizes firms to automate the financial reporting process, which enhances internal control efficiency and results in higher audit confidence and reduced audit hours. Hwang *et al.* (2020) investigated 1,344 firms over the period of 2006–2013 to explore the impact of internal control weaknesses (ICWs) on the timeliness of financial reporting after the XBRL mandate and indicated that the filing lags of companies with ICWs are longer than those of companies without ICWs under the mandated XBRL disclosure. Their analyses also revealed that the XBRL mandate has affected firms' filing behaviors differently, depending on firm characteristics such as firm size.

Some other studies on timeliness have offered evidence on firm-specific factors. Abdulla (1996) investigated the association between timeliness of annual reports and a set of determinants for 26 Bahraini companies, identifying a negative relationship between timeliness and profitability, and firm size. This result supports the signaling theory which suggests that more profitable companies abide by the deadline through reporting earlier. Owusu-Ansah (2000) examined annual reporting by 47 companies listed on the Zimbabwe Stock Exchange and reported company size and profitability as significant explanators for timeliness. Ajmi (2008) analysed the timeliness of annual reports for 231 companies listed on the Bahrain Stock Exchange over the period of 1992–2006, showing that size, profitability and leverage are the main determinants. Türel (2010) examined the impact of firm-specific and audit-related factors on the timeliness of financial reporting by 211 non-financial companies listed on BIST for 2007, indicating that companies that report net income and have unqualified audit opinions file earlier, while the companies audited by Big Four [6] are late reporters. Erer and Cömert (2014) explored the relationship between firm attributes and timeliness of financial reporting for non-financial companies listed on BIST from 2003 to 2010, indicating that high-leveraged companies are late reporters. They also stated that companies audited by Big Four and whose audit reports were unqualified and that did not change their auditors were early reporters.

2.3 Hypotheses development

2.3.1 Ownership structure. Ownership structure and the identity of shareholders are important attributes in explaining the timeliness of financial reporting. Companies that have more sophisticated investors usually provide more timely financial information. This is simply because long-term dedicated institutional investors are more likely to demand timely dissemination of financial information than transient institutional investors, in tandem with their better shareholder activism engagement (Bamahros and Wan-Hussin, 2006). This is in line with the disclosure theory, and it enhances financial reporting timeliness. In this study, we identify two types of ownership based on their influence on the market performance of companies: foreign ownership and institutional ownership.

2.3.1.1 Foreign ownership. Foreign investors are geographically dispersed, and they demand more information to monitor managerial activities. They are long-term investors, and they do not change their portfolios very often. Thus, timely financial information leads to better price discovery for them. Further, they have sophisticated skills to analyze financial information provided by companies (Kim and Yi, 2009). These comparative advantages allow foreign investors to exercise pressure on companies to disclose financial information in a timely manner. This is also supported by the fact that companies with foreign investors are associated with higher transparency and lower information asymmetries (Jiang and Kim, 2004). Thus, we propose the following hypothesis:

H1a. The reporting lead time is negatively associated with foreign ownership.

2.3.1.2 Institutional ownership. Institutional investors have to comply with strict rules due to their responsibilities to the investors (Lim, 2012). They have resources, expertise and sophisticated tools to analyze financial information. They may also force management to act in the best interest of shareholders (Conover *et al.*, 2008). Institutional investors may either directly monitor companies or act as active traders. This implies that high level of institutional ownership positively affects the timeliness of financial reporting and decreases reporting lag since they push companies to publish their financial information fast (Sengupta, 2004). Thus, we formulate the following hypothesis:

H1b. The reporting lead time is negatively associated with institutional ownership.

2.3.2 Board attributes. Recent changes in corporate governance, especially on the issue of board composition, have motivated attempts to explore the link between timeliness and board diversity. Board characteristics may have significant influences on the timeliness by accelerating or decelerating the timely disclosure of financial information. In this study, we explore the effects of board characteristics on timeliness by using three attributes: board size, independent board membership and gender diversity.

2.3.2.1 Board size. Although board of directors plays a vital role for corporate governance, research findings are mixed. Some authors argue that larger boards are helpful to companies since sharing knowledge, experience and ideas could lead to more efficient decision-making (Zainal Abidin *et al.*, 2009). Further, larger boards are more effective in monitoring companies than smaller boards (Fauzi and Locke, 2012). However, other studies claim that larger boards may cause delays in financial reporting due to the risk of a decrease in coordination among board members (Eisenberg *et al.*, 1998). They claimed that a small board may be more effective and capable of presenting better financial reports that will improve the timeliness of financial reports. Thus, we formulate the following hypothesis:

H2a. The reporting lead time is positively associated with board size.

2.3.2.2 Independent board membership. Board members perform necessary duties to protect the interests of investors; facilitating timely disclosures is one such duty. Independent board members have a positive influence on the timeliness and play an effective role in solving agency problems. They have few benefits from late reporting and insist on greater quality, as reflected in more timely disclosure of financial information (Abdelsalam and Street, 2007). Therefore, outside directors encourage timely disclosure to support shareholder interest and to avoid bearing reputation cost (Borokhovich *et al.*, 1996; Weisbach, 1988). Thus, we propose the following hypothesis:

H2b. The reporting lead time is negatively associated with the independent board membership.

2.3.2.3 Gender diversity. Female participation on board is one of the leading business approaches in many countries. As argued by Ren and Wang (2011), there is pressure in society to increase gender representativeness on boards. The presence of women directors has strong implications in decision-making. Srinidhi *et al.* (2011) and Gul *et al.* (2011) claimed that gender diversity could improve the quality of discussions and increase a board's ability in disclosure and reporting. Gavious *et al.* (2012) indicated that there is a significant relationship between accounting aggressiveness and women board membership. From these discussions, it is clear that women presence on board can decrease the amount of time needed to sufficiently discuss, comprehend and evaluate financial information and therefore may improve financial reporting timeliness. Thus, we propose the following hypothesis:

H2c. The reporting lead time is negatively associated with the presence of women on board.

2.3.3 XBRL adoption. Technology advancements in the last decades make online reporting increasingly feasible (Basoglu and Hess, 2014). XBRL technology as a global reporting standard enables investors and other stakeholders to access and use financial information in an easier and faster way. There are several reasons why the adoption of XBRL should be associated with shorter reporting lags. First, as SEC (2009) indicates, XBRL assists in automating financial reports and information processing. The process of applying the XBRL taxonomy to prepare financial reports leads companies to producing meaningful and transparent documents, thus improving information sharing with external parties (Pinsker and Li, 2008). Second, the XBRL requirement can help in consolidating results very quickly and reliably between units and subunits. This allows companies to achieve internal benefits and automatically generate financial reports (Vasarhelyi *et al.*, 2010; Via and Garbellotto, 2015). Finally, using interactive data tagging automates financial reporting process. By avoiding the need to manually extract data from multiple documents, companies reduce the human effort required for proofreading, reviewing, checking and adding footnotes (Pinsker and Li, 2008). Automating the financial reporting process reduces the risk of human error and opportunities for management fraud and manipulation of accounting numbers, increasing preparer efficiency (Kim *et al.*, 2013; Wu and Vasarhelyi, 2004).

Prior studies claim that the XBRL mandate increases the efficiency and timeliness of financial reporting due to an automated process (Amin *et al.*, 2018; Du and Wu, 2018; Weissmueller and Johnson, 2014; Yoon and Lee, 2011). Amin *et al.* (2018) argued that the implementation of XBRL enables firms not only to share information with auditors efficiently but also to automate the extraction of relevant accounting data for internal reporting, which creates synergies between internal and external reporting and leads to shorter reporting lag. These benefits stem from more timely and transparent financial reporting (Hwang *et al.*, 2020).

Regulatory authorities also indicate that XBRL helps automate financial reporting and information processing (SEC, 2009). Thus, XBRL requirement improves efficiency via an automatic generation of financial reports, and it takes less time for a company to file its financial statements (Via and Garbellotto, 2015). Thus, it significantly improves the ability of accountants to more precisely direct and publish financial information to investors, regulators, analysts, lenders and other key stakeholders. However, one should also note that XBRL requires additional efforts and may increase the time to complete the filing of financial statements. Firms can be exposed to insignificant costs, such as learning XBRL classifications and how to create their own XBRL files. Nevertheless, as Du *et al.* (2013) pointed out, the number of errors in XBRL filings significantly decreases as companies file XBRL-formatted financial statements more. Thus, we propose the following hypothesis:

H3. There is a negative association between the reporting lead time and XBRL adoption.

2.3.4 Control variables. A review of previous studies addressing the timeliness of financial information leads us to consider the following firm-specific attributes as control variables to analyze the filing lag. These include financial performance, leverage, company size, audit opinion and audit size.

2.3.4.1 Financial performance. The profitability of a company has significant effects on timely reporting. Signaling theory suggests that the most profitable companies report earlier (Ismail and Chandler, 2004). Prior studies indicate that companies are more likely to disclose good news and delay the disclosure of bad news in line with the disclosure theories (Li, 2017; Milgrom, 1981; Owusu-Ansah, 2000). Bowen *et al.* (1992) proposed two explanations for this approach. The first one suggests that companies attempt to mitigate unfavorable reactions from shareholders to bad news, while aggravate favorable reactions to good news. The second explanation suggests that managers delay the disclosure of bad news, expecting that some good news may take place in the meantime and can partially compensate the adverse

effects of bad news (Givoly and Palmon, 1982; Lurie and Pastena, 1975). This approach is consistent with the shareholder theory. The financial performance is measured by different variables such as return on assets, return on equity and Tobin's Q. In this study, we use Tobin's Q to measure the profitability.

2.3.4.2 Leverage. Leverage refers to the use of debt to finance the operations. There are mixed results on the relationship between leverage and timeliness. Agency theory claims that agency costs increase with the leverage since shareholders will be more likely to engage in riskier activities that promise high returns with that financial structure (Jensen and Meckling, 1976). Thus, highly leveraged companies are expected to be associated with timelier disclosure to meet the needs of debt holders (Abdulla, 1996). However, the evidence in some studies argue that highly leveraged companies may delay the filing of financial reports because high leverage may increase financial distress and the probability of default, which may be viewed as bad news (Carslaw and Kaplan, 1991; Owusu-Ansah, 2000).

2.3.4.3 Firm size. Firm size is a commonly used explanatory variable for financial reporting timeliness. The argument is that larger companies are more likely to make timely disclosure than smaller ones (Kutcher *et al.*, 2007). Ashton *et al.* (1989) indicated that larger companies are more likely to reduce reporting delay since they are more closely followed by stakeholders. They are also able to afford higher audit fees and thus release their financial reports earlier (Abdulla, 1996).

2.3.4.4 Audit company. Auditor type is also a determinant on timeliness. Auditing companies may be split into two categories: the Big Four and others. Since Big Four companies have more resources, strong technology and more experienced and qualified human resources, they have flexibility in scheduling the audit and completing audit processes, thereby enabling financial reporting in a relatively faster time (Afify, 2009; Al-Ajmi, 2008; Clatworthy and Peel, 2016; Owusu-Ansah and Leventis, 2006; Schwartz and Soo, 1996; Türel, 2010).

2.3.4.5 Audit opinion. Timeliness in financial reporting may be a function of the audit opinion (Ashton *et al.*, 1989; Carslaw and Kaplan, 1991). Companies that get an unqualified opinion feel more comfortable since it gives a positive sign to the public about corporate financial performance. These companies file their annual reports earlier (Afify, 2009; Al-Ajmi, 2008; Carslaw and Kaplan, 1991; Daoud *et al.*, 2015; Ismail and Chandler, 2004; Nelson and Shukeri, 2011; Türel, 2010). The opposite is true when the companies get a qualified opinion.

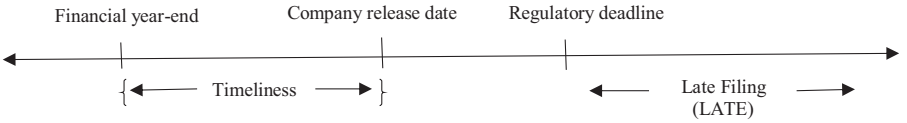
3. Research methodology

3.1 Sample

This section outlines the sample selection process. We use two samples for conducting the analyses. The main sample consists of 187 non-financial companies listed on Borsa Istanbul (BIST ALL), while the subsample includes 54 non-financial companies in the BIST 100 index (BIST 100). We exclude financial institutions from the analysis since they are subject to special regulations. We used consolidated financial statements in our analysis. The timeline for our data set covers the 2010–2018 period. Thus, we have 1,683 and 486 observations for the main and subsample, respectively. We obtained the data from the following sources: (1) Public Disclosure Platform, (2) Central Securities Depository of Turkey, (3) annual reports, (4) company webpages and (5) direct connections by e-mail or contact with companies' investor relations departments. We collected board data manually to examine the effects of board attributes on timeliness for the 54 companies in the BIST 100 index.

Our model also compares reporting lead time between pre-XBRL and post-XBRL periods. As the companies became obliged to file their financial statements by XBRL since the year-end of 2016, we have three years of post-XBRL observations for all filers. We employ two approaches for measuring the timeliness: (1) the number of days between the financial year-

end date and the company release date of financial reports (TM), and (2) a binary measure that determines whether a company has disclosed its financial statements after the regulatory deadline (LATE).



3.2 Variables definition and measurement

We use a number of dependent, independent and control variables to conduct the analyses. We list and define our variables in Table A1 in the Appendix.

We use two measures of financial reporting timeliness as dependent variables in our models: timeliness and late filing. Similar to other studies (Owusu-Ansah, 2000; Owusu-Ansah and Leventis, 2006), we measure *timeliness* or *the reporting lead time* (TM) as the number of days between the financial year-end and a company's release date of the annual report.

Late filing (LATE) is computed by a binary variable, where "1" indicates if the company files its financial statements after the regulatory deadline, and "0" otherwise.

To estimate the determinants of timeliness, we use three sets of independent variables, namely, ownership structure, board attributes and XBRL adoption. While ownership structure involves foreign ownership and institutional ownership, board attributes consist of board size, independent board membership and women board membership.

Figure 1 outlines the research framework along with the hypothesized relationships.

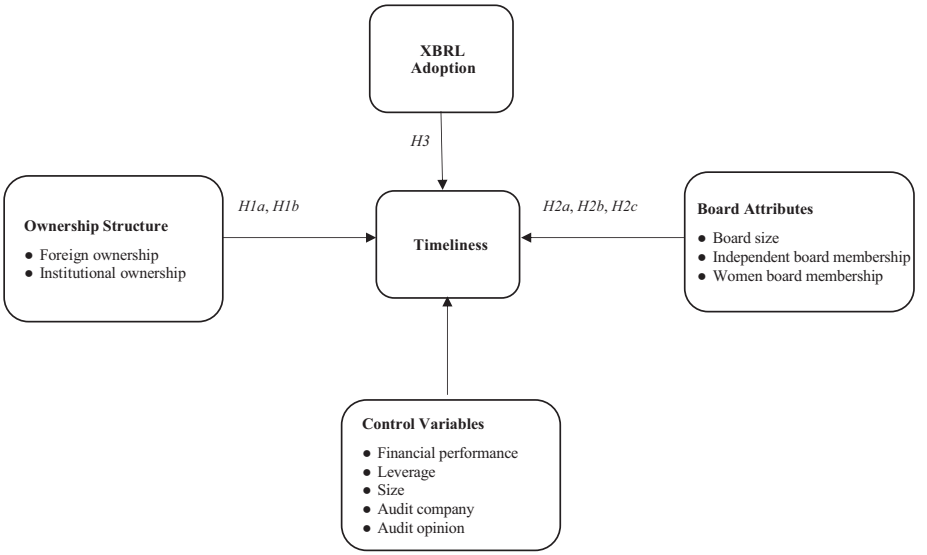


Figure 1.
Research framework

3.3 Data analysis

3.3.1 Timeliness regression analysis. This section presents the models for data analyses. To explore the influence of ownership structure, board attributes and XBRL mandate on timeliness, we used the following cross-sectional regression models. In the following equations, subscript i denotes the ith firm and subscript t denotes the tth period.

$$TM_{i,t} = \alpha_1 + X_1 FOWN_{i,t} + X_2 IOWN_{i,t} + X_3 Tobin's\ Q_{i,t} + X_4 LEV_{i,t} + X_5 SIZE_{i,t} + X_6 BIG4_{i,t} + X_7 OPIN_{i,t} + Year\ Fixed\ Effects + \varepsilon_{i,t} \quad (1)$$

$$TM_{i,t} = \alpha_1 + X_1 XBRL_{i,t} + X_2 XBRL_{i,t} * SIZE_{i,t} + X_3 XBRL_{i,t} * BIG4_{i,t} + X_4 Tobin's\ Q_{i,t} + X_5 LEV_{i,t} + X_6 SIZE_{i,t} + X_7 BIG4_{i,t} + X_8 OPIN_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$TM_{i,t} = \alpha_1 + X_1 BSIZE_{i,t} + X_2 BIND_{i,t} + X_3 BWMN_{i,t} + X_4 Tobin's\ Q_{i,t} + X_5 LEV_{i,t} + X_6 SIZE_{i,t} + X_7 BIG4_{i,t} + X_8 OPIN_{i,t} + Year\ Fixed\ Effects + \varepsilon_{i,t} \quad (3)$$

For Model 1, the sample size is 1,683 observations (187 companies) and the period is 2010–2018. To rule out the possibility that reporting lag has declined over the period for reason unrelated to *XBRL* adoption (i.e. CMB's most recent changes to the filing deadline in 2013), our sample for Model 2 starts from 2014. The resulting sample size is 935 observations, and the sample period ranges from 2014 to 2018. For Model 3, the sample size is 486 observations (54 companies in the BIST 100 index), and the sample period is 2010–2018.

In Model 2, *XBRL* is a variable that takes "1" if a firm year belongs to post-*XBRL* period (2016, 2017 and 2018), and "0" otherwise (2014, 2015). The interaction term *XBRL*SIZE* indicates how the timeliness of large firms has changed between pre- and post-*XBRL* periods compared to small firms. The interaction term *XBRL*BIG4* indicates how the timeliness of firms audited by *BIG4* has changed between pre- and post-*XBRL* periods.

We include year fixed effects to control for differences in reporting lag across time (following Amin *et al.*, 2018). One could argue that reporting lag may well have decreased without the adoption of *XBRL*. We control for this possibility via year fixed effects in Model 1 and Model 3.

To estimate the regression model, we first conducted a fixed effects model and an F test to see if any firm-specific characteristics exist. We rejected the null hypothesis and concluded that there were individual effects, and that the pooled OLS model cannot be used. In the next step, we employed Hausman (1978) test. The test indicated that we cannot reject the null hypothesis, and therefore we preferred random effects model over fixed effects model.

Additionally, we tested whether the assumptions of the regression model were violated. We employed the approaches of Levene (1961) and Brown and Forsythe (1974) for heteroscedasticity. These approaches are designed to check the equality of variances between the cross-section units. Hence, we concluded that the estimated random effects model has an autocorrelation problem. In the next step, we employed Baltagi–Wu locally best invariant (LBI) and the Durbin Watson test to detect the existence of autocorrelation for random effects model. We concluded that the estimated model has an autocorrelation problem. To eliminate heteroscedasticity and autocorrelation problems, we reestimated the model with the estimator of Arellano (1987), Froot (1989) and Rogers (1993).

3.3.2 Late filing regression analysis. We conducted logistic regression analyses to investigate the factors associated with the likelihood of firms filing late (coded as unity in the dependent variable). We defined a company as a late filer if it files the report beyond the timeline dictated by the regulation. We would expect late filers to have generally poorer financial performance or higher leverage.

$$LATE_{i,t} = \alpha_1 + X_1 Tobin's\ Q_{i,t} + X_2 LEV_{i,t} + X_3 SIZE_{i,t} + X_4 BIG4_{i,t} + X_5 OPIN_{i,t} + X_6 FOWN_{i,t} + X_7 IOWN_{i,t} + X_8 XBRL_{i,t} + \varepsilon_{i,t} \quad (4)$$

$LATE_{i,t}$ is computed by a binary variable, where "1" indicates if the company files its accounts after the regulatory deadline, and "0" otherwise.

After estimating the logit and probit models, we first assessed the level of statistical significance of each specification with several tests. The null hypothesis that every single indicator is zero was tested with a *Z*-test on each parameter. Thereafter, the joint hypothesis that all the coefficients are zero was tested via a chi-squared test. In the final step, the McFad *R* square and LR statistic values were calculated to analyze the explanatory power of the model.

4. Empirical findings

Table 1 displays the descriptive statistics and bivariate correlations among the variables for BIST ALL companies. None of the correlations between predictor variables has a value above 0.49. The variance inflation factors (VIF) for the variables are also far lower than the cut-off value of 10, suggesting that multicollinearity is not a concern for our models [7]. By using data from 1,683 observations over the period of 2010–2018, we found the average reporting time as 64 days. Table 2 displays the descriptive statistics and bivariate correlations among the variables for the BIST 100 companies with board data. None of the correlations between predictor variables has a value above 0.49. By using data from 486 observations over the period of 2010–2018, we found the reporting lead time (TM) as 62 days.

Table 3 displays the descriptive statistics, the number of late filing companies and the number of companies filing on last day for each year. As shown in Table 3, we observe that the reporting lead time (TM) has decreased by 10–15 days after the implementation of new regulatory deadlines on filing in 2013. Since 2013, on average, 38% of the companies have reported their accounts either on the last day of regulatory deadlines or later.

We also analyze the trend in reporting lag in Table A2 in Appendix. We observe a 3-day (3.90%), 13-day (17.57%) and 2-day (3.28%) decrease in the mean reporting lag for the years 2012, 2013 and 2014, respectively. In all other years, the reporting lag exhibits no change until 2018. In 2018, there is a 1-day (1.69%) decrease in the mean reporting lag. The main reason for the high decrease in 2013 is the regulatory policy change in the reporting period, shortening the deadline of filings by 10–15 days, and affecting the companies in the following years (Table 3).

Before estimating the regression equation for Model 2, we first conducted a univariate analysis to compare the reporting lag for pre- and post-XBRL adoption periods. We set the sample period to four years around 2016, when XBRL was initiated; two years before (2014 and 2015) and two years after (2017 and 2018) XBRL mandate. We excluded the transition year of 2016 from the sample to minimize a possible confounding effect. A paired-sample *t*-test and Wilcoxon signed-rank test were conducted for both BIST ALL and BIST 100 companies. Table 4 presents the results. For BIST ALL companies, the mean of release horizons for post-XBRL period is 58.62 days, which is shorter than that of pre-XBRL period (59.30 days) by 0.68 days and the difference is statistically significant at the 10% level for Wilcoxon signed-rank test and insignificant for *t*-test. For BIST 100 companies, the mean of release horizons for post-XBRL period is 56.10 days, which is shorter than that of pre-XBRL period (58.14 days) by 2.04 days and the difference is statistically significant at the 5% level for both tests. These results show that the effect of mandatory XBRL adoption on timeliness is slightly more salient for large companies. This is in line with the findings of other studies (Du and Wu, 2018; Yoon and Lee, 2011; Weissmueller and Johnson, 2014).

Variables	Variable names	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. *TM*	Timeliness	64.51	15.04	1.00								
2. *TOBIN'S Q*	Financial performance	0.99	1.14	−0.06*	1.00							
3. *LEV*	Leverage	0.55	0.43	0.14*	0.15*	1.00						
4. *SIZE*	Size	19.32	2.13	−0.25*	0.23*	−0.04	1.00					
5. *BIG4*	Audit company	0.59	0.49	−0.17*	0.13*	−0.04	0.44*	1.00				
6. *OPIN*	Audit opinion	0.91	0.29	−0.16*	0.00	−0.17*	0.20*	0.16*	1.00			
7. *FOWN*	Foreign ownership	0.18	0.27	−0.13*	0.14*	0.00	0.38*	0.29*	0.12*	1.00		
8. *IOWN*	Institutional ownership	0.53	0.31	−0.17*	0.13*	−0.07*	0.41*	0.49*	0.19*	0.35*	1.00	
9. *XBRL*	XBRL Adoption	0.33	0.47	−0.27*	−0.06*	0.06*	0.11*	0.04	0.01	0.02	0.03	1.00

Note(s): *$p < 0.05$

Table 1.
Descriptive statistics and correlation matrix (BIST ALL)

Table 2.
Descriptive statistics and correlation matrix (BIST 100)

Variables	Variable names	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12
1. *TM*	Timeliness	62.68	16.29	1.00											
2. *TOBIN'S Q*	Financial performance	1.03	0.89	−0.09*	1.00										
3. *LEV*	Leverage	0.56	0.22	0.14*	−0.11*	1.00									
4. *SIZE*	Size	20.99	1.62	−0.36*	0.27*	0.10*	1.00								
5. *BIG4*	Audit company	0.83	0.38	−0.24*	0.19*	0.08	0.49*	1.00							
6. *OPIN*	Audit opinion	0.97	0.16	−0.18*	0.01	−0.18*	0.12*	−0.04	1.00						
7. *FOWN*	Foreign ownership	0.24	0.24	−0.08	0.29*	0.01	0.38*	0.23*	0.00	1.00					
8. *IOWN*	Institutional ownership	0.60	0.26	−0.17*	0.00	−0.01	0.23*	0.44*	0.08	0.05	1.00				
9. *XBRL*	XBRL adoption	0.33	0.47	−0.27*	−0.06	0.12*	0.19*	0.02	−0.05	0.01	0.02	1.00			
10. *BSIZE*	Board size	8.18	2.23	−0.34*	0.08	0.10*	0.46*	0.21*	0.11*	0.22*	0.22*	0.07	1.00		
11. *BIND*	Independent board membership	0.24	0.13	−0.24*	−0.02	0.11*	0.23*	0.11*	−0.10*	0.00	0.01	0.34*	−0.04	1.00	
12. *BWMN*	Women board membership	0.11	0.12	0.05	−0.15*	−0.08	−0.34*	−0.22*	−0.02	−0.21*	−0.14*	0.03	−0.26*	−0.05	1.00

Note(s): *$p < 0.05$

Years	Average (TM)	Min (TM)	Max (TM)	Stdev (TM)	No. of late filing companies	No. of companies filing on last day	Percentage of late and last date filing
2010	73	28	99	16.92	2	46	25.67
2011	77	31	130	18.15	1	47	25.67
2012	74	37	104	17.55	3	58	32.62
2013	61	35	84	8.44	6	61	35.83
2014	59	30	71	9.30	2	70	38.50
2015	59	33	90	10.45	1	69	37.43
2016	59	32	119	11.60	2	67	36.90
2017	59	30	81	10.10	1	66	35.83
2018	58	24	91	11.01	5	59	34.22

Table 3. Descriptive statistics (BIST ALL) and late filing

		Mean (standard deviation) Pre-XBRL (2014, 2015)	Post-XBRL (2017, 2018)	Difference	Test statistics (p-value) t-value	Wilcoxon signed-rank test
BIST ALL ($N = 187$)	Reporting lag (TM)	59.30 (9.45)	58.62 (9.78)	0.68	1.40 (0.162)	−1.95 (0.051)*
BIST 100 ($N = 54$)	Reporting lag (TM)	58.14 (10.70)	56.10 (12.00)	2.04	2.39 (0.02)**	−2.28 (0.023)**

Note(s): ** and * represent significance at the 5% and 10% levels, respectively, in two-tailed tests. The year 2016 is excluded from the sample to minimize a possible confounding effect

Table 4. Univariate comparisons between pre- and post-XBRL periods

Table 5 displays the parameter estimates of the effects of ownership structure, XBRL adoption and control variables on timeliness of financial reporting for the main sample, and Table 6 shows the parameter estimates of the effects of board attributes on timeliness of financial reporting for the subsample.

Table 5 displays the results of the random effects model. Model 1 shows that the institutional ownership as independent variable and financial performance and leverage as control variables are significant ($p < 0.05$). Of these variables, institutional ownership and financial performance are negatively associated with TM, while leverage is positively associated. These results are in line with the findings of other studies (Abdelsalam and Street, 2007; Abdulla, 1996; Ajmi, 2008; Carslaw and Kaplan, 1991; Erer and Cömert, 2014; Lim, 2012; Owusu-Ansah, 2000; Türel, 2010). Model 2 shows that only leverage and size are significant ($p < 0.05$) as control variables. Leverage is positively associated, while size is negatively associated with TM. Thus, companies that show a better financial performance or have more institutional investors file earlier. The results support hypotheses H1b. Institutional investors prove to act as active investors in monitoring the financial reporting process, thus facilitating speeding up the filing of accounts. We detect negative but insignificant relationship between foreign ownership and TM (H1a). The coefficients for XBRL and for the interaction terms XBRL*SIZE and XBRL*BIG4 are also insignificant for BIST ALL companies, showing that XBRL adoption does not have any influence on timeliness.

Table 6 displays the parameter estimates of the effects of board attributes and control variables on timeliness for our subsample. Model 3 shows that only women board membership is significant ($p < 0.05$) and negatively associated with TM. The results support H2c. We find no support for a significant association between board size (H2a), independent board membership (H2b) and TM. These results are in line with the findings of the previous

Random effects		Standard errors		Arellano Froot Rogers	
Variables	Variable names	Model 1	Model 2	Model 1	Model 2
Independent variables					
Ownership structure					
Foreign ownership	*FOWN*	−3.52 (1.89)*		−3.52 (3.28)	
Institutional ownership	*IOWN*	−4.30 (1.80)**		−4.30 (2.15)**	
XBRL adoption	*XBRL*		3.35 (4.40)		3.35 (4.64)
XBRL and SIZE	*XBRL*SIZE*		−0.14 (0.24)		−0.14 (0.25)
XBRL and BIG4	*XBRL*BIG4*		−1.59 (0.95)*		−1.59 (0.97)
Control variables					
Financial performance	*TOBIN'S Q*	−1.30 (0.37)***	−0.66 (0.40)	−1.30 (0.51)***	−0.66 (0.48)
Leverage	*LEV*	5.53 (1.07)***	3.29 (1.35)**	5.53 (1.19)***	3.29 (1.40)**
Size	*SIZE*	−0.12 (0.20)	−1.32 (0.36)***	−0.12 (0.25)	−1.32 (0.34)***
Audit company	*BIG4*	−0.51 (0.85)	0.93 (1.02)	−0.51 (1.30)	0.93 (0.97)
Audit opinion	*OPIN*	−1.75 (1.06)	−1.15 (1.06)	−1.75 (1.37)	−1.15 (0.97)
Constant		78.78 (3.76)***	84.24 (6.78)***	78.78 (4.47)***	84.24 (6.32)***
R-squared (overall)		0.32	0.12	0.32	0.12
Number of Obs.		1,683	935	1,683	935

Table 5.
Regression results (BIST ALL)

Note(s): Standard errors in parentheses *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. We do not report coefficients on the year fixed effects

studies (Du and Vu, 2018; Gavious *et al.*, 2012; Gul *et al.*, 2011; Sengupta, 2004; Via and Garbellotto, 2015) and provide evidence that women presence on board improves the ability of a board to file their annual reports faster by exhibiting better monitoring skills.

Table 7 displays the parameter estimates of the effects of ownership structure, XBRL adoption and control variables on LATE measured by the probability of a company filing its accounts after the regulatory deadline. The results of two estimating methodologies, namely logit and probit models, are highly consistent for the pattern of parameter significance. The results show that the institutional ownership and audit opinion are significant ($p < 0.05$) and are negatively associated with TM. Apparently, companies with a stronger information demand from institutional investors are less likely to be late in financial reporting.

The result on the audit opinion (OPIN) in Table 7 suggests that companies that receive qualified opinions are late reporters. The auditors increase their audit time to eliminate any disagreements. Another possible explanation could be that the managers may try to avoid a qualified opinion by negotiating with the auditors not to harm their performance. This result is in line with the findings of other studies (Afify, 2009; Al-Ajmi, 2008; Daoud *et al.*, 2015; Ismail and Chandler, 2004; Nelson and Shukeri, 2011; Türel, 2010).

Table 8 presents a summary of the hypotheses, with the level of support for each.

Random effects Variables	Variable names	Standard errors Model 3	Arellano Froot Rogers Model 3
Independent variables			
Board attributes			
Board size	*BSIZE*	−0.45 (0.37)	−0.45 (0.50)
Independent board membership	*BIND*	5.23 (6.17)	5.23 (8.18)
Women board membership	*BWMN*	−15.78 (5.21)***	−15.78 (7.66)***
Control variables			
Financial performance	*TOBIN'S Q*	−0.09 (0.76)	−0.09 (0.91)
Leverage	*LEV*	3.62 (3.64)	3.62 (4.47)
Size	*SIZE*	−1.63 (0.75)**	−1.63 (1.03)
Audit company	*BIG4*	−5.03 (1.81)***	−5.03 (4.01)
Audit opinion	*OPIN*	−5.59 (2.81)**	−5.59 (4.98)
Constant		119.22 (15.18)***	119.22 (19.05)***
R-squared (overall)		0.36	0.36
Number of Obs.		486	486

Note(s): Standard errors in parentheses $^{**}p < 0.05$, $^{***}p < 0.01$. We do not report coefficients on the year fixed effects

Table 6.
Regression results for board attributes (BIST 100)

Variables	Variable names	Model 4 Logit	Model 4 Probit
Independent variables			
Ownership structure			
Foreign ownership	*FOWN*	1.77 (0.89)**	0.73 (0.37)**
Institutional ownership	*IOWN*	−2.38 (0.82)***	−1.01 (0.36)***
XBRL adoption	*XBRL*	−0.09 (0.46)	0.02 (0.19)
Control variables			
Financial performance	*TOBIN'S Q*	−0.79 (0.48)	−0.30 (0.19)
Leverage	*LEV*	0.78 (0.57)	0.30 (0.23)
Size	*SIZE*	0.24 (0.15)	0.08 (0.06)
Audit company	*BIG4*	0.30 (0.56)	0.19 (0.23)
Audit opinion	*OPIN*	−2.71 (0.50)***	−1.10 (0.21)***
Constant		−6.30 (2.64)**	−2.62 (1.09)**
LR statistic		42.67	41.97
McFadden R^2		0.17	0.17
Number of Obs		1,683	1,683

Note(s): Standard errors in parentheses $^{**}p < 0.05$, $^{***}p < 0.01$

Table 7.
Regression results for late filing (BIST ALL)

5. Discussion and conclusion

The timeliness and comparability of financial information are key elements that affect information asymmetry between providers and users of the information in capital markets and help enhance the value relevance and usefulness of that information for market participants. This study investigates the determinants of timeliness in financial reporting of non-financial companies listed on BIST over the period of 2010–2018. To conduct the analysis, we use ownership structure and board attributes as the main variables. We also examine whether the mandatory XBRL requirement of Capital Market Board of Turkey in 2016 affects the timeliness of financial reporting since we expect XBRL can help companies

Hypothesis	Variable name	Expected sign	Actual sign	Level of support
Ownership structure				
Hypothesis 1a: The reporting lead time is negatively associated with foreign ownership	*FOWN*	−	−	Not supported
Hypothesis 1b: The reporting lead time is negatively associated with institutional ownership	*IOWN*	−	−	Supported*
Board attributes				
Hypothesis 2a: The reporting lead time is positively associated with board size	*BSIZE*	+	−	Not supported
Hypothesis 2b: The reporting lead time is negatively associated with the independent board membership	*BIND*	−	+	Not supported
Hypothesis 2c: The reporting lead time is negatively associated with the presence of women on board	*BWMN*	−	−	Supported*
Hypothesis 3: There is a negative association between the reporting lead time and XBRL adoption	*XBRL*	−	−	Not supported
Control variables				
Financial performance	*TOBIN'S Q*	−	−	Supported*
Leverage	*LEV*	+	+	Supported*
Size	*SIZE*	−	−	Supported*
Audit company	*BIG4*	−	−	Not supported
Audit opinion	*OPIN*	−	−	Not supported

Note(s): *$p < 0.05$

Table 8. Summary of hypotheses

prepare their reports more quickly under the internationally standardized taxonomies, allowing information users to easily search for and facilitate the detection and collection of information.

We use two samples. The main sample consists of 187 companies listed on BIST, while the subsample includes 54 companies in the BIST 100 index. The regression results for the main sample (BIST ALL) show that institutional ownership, financial performance and size are statistically significant and positively associated with the timely financial reporting, while leverage is statistically significant and negatively associated with the timely reporting. Thus, profitable or large companies and those companies that have high level of institutional ownership are more likely to file their accounts earlier. Institutional investors' preference for lower information asymmetries accelerates timely disclosure of financial reports. According to the regression results, XBRL mandate does not affect timeliness for companies in BIST. However, the univariate test results indicate that the effect of mandatory XBRL adoption on timeliness is slightly more salient for the BIST 100 companies. The results are important since timely provision of financial information at a reasonable cost is critical for investors and managers.

For the subsample (BIST 100) that estimates the effects of board attributes and control variables on timeliness, the findings reveal that only women board membership is statistically significant and positively associated with the timely financial reporting. Thus, companies that have more women on board release their financial statements earlier, ensuring timely disclosure of financial information and protecting the company reputation.

The results for the logit and probit analysis provide evidence that companies that have less institutional ownership and get qualified audit opinions are more subject to late filing. Further, the timeliness was negatively influenced by the reduction in the statutory filing deadline set by the CMB policy change in 2013.

5.1 Managerial implications

This study offers several implications for managers, regulators and policy makers. First, companies that do not make timely financial reporting may find it more difficult to attract long-term capital by means of institutional investors. Since these investors view timely reporting as an ideal ingredient in corporate governance, it may have a positive impact on company reputation and corporate sustainability. The results also provide insights for regulatory authorities, policy makers and auditors on the causes of the reporting lag, thereby increasing their awareness and helping them in their decision-making process since improvements in timely availability and accessibility of financial information reduce information asymmetry for users and increase market efficiency.

Additionally, companies that reduce their filing timeframe will be able to compare their results with other companies. However, the XBRL mandate could be much more burdensome to smaller firms. This may stem from the fact that larger firms may tend to use the in-house approach for XBRL and can afford more advanced financial reporting systems with automated coding algorithms attached to streamline their XBRL filings, whereas smaller firms are more likely to use the outsourcing approach due to the difference in the level of resources available for XBRL preparation. This finding also lends support to recent concerns that new technology creates an unleveled benefit in reporting efficiency for large companies, but not for small ones (e.g. Blankespoor *et al.*, 2014). This benefit may change the dynamics of the financial market and information environment, leading to further segmentation of the capital markets.

The positive effects of XBRL adoption may accrue over time due to the potential benefits of learning curve experience since the XBRL mandate will help companies automate their reporting process and information processing, thereby strengthening internal control over financial reporting (Deloitte, 2013; Du *et al.*, 2013; Li, 2017). Companies may also efficiently incorporate auditor-proposed adjustments by cross-referencing impacted accounts and prepare revised versions of the financial reports, which are automatically rendered in various formats for auditors to assess (Wu and Vasarhelyi, 2004). Finally, investors and other users of financial information benefit from having quicker access to data since this allows them to make more timely and reliable decisions, leading them to greater benefits.

5.2 Limitations and future research

We acknowledge that our study has certain limitations. First, the results may not be generalized to the entire BIST population due to the exclusion of financial companies from the samples. Future research may explore the financial reporting timeliness of these companies. Second, the study did not investigate the relationship between timeliness and the information content in financial statements and the market reactions they arouse. Third, this study is trying to find out early evidence on the mandatory adoption of XBRL filings, which covers only three-year period due to the recent implementation of this regulatory practice. Thus, it needs further elaboration after the accumulation of data in the forthcoming years by the expansion of the sample beyond the 2016–2018 period. As companies would have more time to become familiar with XBRL a more reliable conclusion may be drawn. Further, we particularly focus on the effect of XBRL adoption on the timeliness among filers. XBRL could also influence investors, auditors and other stakeholders. Future research could investigate the influence of XBRL on different stakeholders to produce more insightful implications.

Notes

1. Borsa Istanbul is categorized as an emerging market in market classification by several international institutions, including World Federation of Exchanges, MSCI, FTSE.
2. Serial: XI, No: 25 Communiqué for Accounting Standards in Capital Markets.
3. Serial: XI, No: 29 Communiqué on Principles of Financial Reporting in Capital Markets.
4. II-14.1 Communiqué on Principles of Financial Reporting in Capital Markets.
5. https://www.mkk.com.tr/tr/genel-mektup/752 (accessed November 15, 2020).
6. The Big 4 refers to Pricewaterhouse Coopers, KPMG, Ernst &Young and Deloitte & Touche.
7. The rule of thumb is that there is evidence of collinearity problems if the variance inflation factor (VIF) of a variable exceeds 10 (Gujarati, 1995, p. 339). The VIF scores can be given upon request.

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Appendix

	Variable	Definition	Type
1	Timeliness or reporting lead time (TM)	The number of days between the financial year-end and a company's release date of the annual report	Dependent variable
2	Late filing (LATE)	A binary variable, where "1" indicates if the firm files its financial statements after the regulatory deadline, and "0" otherwise	Dependent variable
3	Foreign ownership (FOWN)	Foreign ownership is measured by the proportion of foreign investors shares to total shares	Independent variable
4	Institutional ownership (IOWN)	Institutional ownership is measured by the proportion of institutional investors shares to total shares	Independent variable
5	Board size (BSIZE)	Board size is measured by the number of board members	Independent variable
6	Independent board membership (BIND)	Independent board membership is measured as the percentage of independent members on board	Independent variable
7	Women board membership (BWMN)	Women board membership is measured as the percentage of women directors on board	Independent variable
8	XBRL adoption (XBRL)	XBRL adoption is defined as a dummy variable, which equals to "1" if there is a mandatory XBRL adoption, and "0" otherwise (for years 2016, 2017, 2018 dummy variable equals to "1," otherwise "0")	Independent variable
9	Financial performance (TOBIN'S Q)	Financial performance is measured by using Tobin's Q* in line with previous studies (Guenster *et al.*, 2006; Ziegler and Schröder, 2010)	Control variable
10	Leverage (LEV)	Leverage is computed by total liabilities divided by total assets	Control variable
11	Size (SIZE)	Size is computed as the natural logarithm of market value of the firm	Control variable
12	Audit company (BIG4)	Audit company is defined as a dummy variable. Audit companies are classified as the Big Four and others. The Big Four are assigned "1," and the others are assigned "0"	Control variable
13	Audit opinion (OPIN)	Audit opinion is defined as a dummy variable. An unqualified audit opinion is assigned "1", and the rest is assigned "0"	Control variable

Note(s): * Tobin's Q is computed as follows

$$\text{Tobin's Q} = \frac{Market\ Value + Total\ Debt - Current\ Assets}{Total\ Asset}$$

Table A1.
Variable definitions

Years	Mean (TM)	Change in TM from previous year	Percent change in TM from previous year
2010	73		
2011	77	4	5.48%
2012	74	−3	−3.90%
2013	61	−13	−17.57%
2014	59	−2	−3.28%
2015	59	0	0.00%
2016	59	0	0.00%
2017	59	0	0.00%
2018	58	−1	−1.69%

Table A2.
Reporting lag trend

Note(s): Table reports the mean reporting lag over the sample period. Changes are computed in magnitude and percentage

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