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Bankruptcy Risk, Its Financial Determinants and Reporting Delays: Do Managers Have Anything to Hide?

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Abstract: The aim of this study was to investigate whether firms' reporting delays are interconnected with bankruptcy risk and its financial determinants. This study was based on 698,189 firm-year observations from Estonia. Annual report submission delay, either in a binary or ordinal form, was used as the dependent variable, while bankruptcy risk based on an international model or the financial ratios determining it were the independent variables. The findings indicated that firms with lower values of liquidity and annual and accumulated profitability were more likely to delay the submission of an annual report over the legal deadline. In turn, firm leverage was not interconnected with reporting delays. In addition, firms with a higher risk of bankruptcy were more likely to delay the submission of their annual reports. Firms with different ages, sizes and industries varied in respect to the obtained results. Different stakeholders should be aware that when reporting delays occur, these can be conditioned by higher bankruptcy risk or poor performance, and thus, for instance, crediting such firms should be treated with caution. State institutions controlling timely submission should take strict(er) measures in cases of firms delaying for a lengthy period.

Keywords: bankruptcy risk; financial ratios; reporting delays; private firms; SMEs; Estonia

1. Introduction

Bankruptcy risk and information disclosure by companies are two “hot topics” in management, business and accounting literature due to their implications for stakeholders' decisions. Bankruptcy is a critical issue for firms due to its negative social and financial consequences (Wu 2010). Risk information might not be fully disclosed in or understood from financial statements and, consequently, stakeholders' decisions may be inappropriate (Linsley and Shrives 2006). Moreover, prior literature shows that financially distressed companies could have incentives to hide the reasons why they are not performing well (Singhvi and Desai 1971; Whittred and Zimmer 1984). Thus, the interconnection between financial distress (risk) and information disclosure is an ongoing important and promising area of research.

Although academia has been working on developing a bankruptcy theory for more than 60 years, no consensus yet exists (du Jardin 2015; Bauweraerts 2016), even in the EU's legal approach (Boon 2018). However, most researchers in the field agree that the main determinants of bankruptcy risk are liquidity, profitability and leverage, and these determinants are most frequently used in bankruptcy prediction models (Balcaen and Ooghe 2006; Tascón Fernández and Gutiérrez 2012; Lukason and Laitinen 2019). Thus, these determinants can condition the most when financial information is disclosed.

In general, there are two opposite explanations for the information disclosed. From the point of view of external users, more information is demanded, although the type of information could be

different depending on the stakeholders' informational needs. Perhaps, certain information can be favourable for some users but detrimental to others (Inchausti 1997). From the point of view of internal users, due to the presence of competitive reasons, managers may be reluctant to disclose certain kinds of information. This conflict of interests among users related to the demand for financial reporting, namely, information asymmetries, is part of the agency theory (Healy and Palepu 2001). The agency problem arises when investors and managers have non-aligned interests and relevant information is not disclosed (see Jensen and Meckling 1976). An example of these different interests is a bankruptcy situation where creditors and debtors both want to maximize their gains. In these circumstances, information delays could be a trade-off among a firm's stakeholders. Previous studies provide evidence that a significant number of bankrupt firms incurred delays in releasing their financial statements in the final year before bankruptcy (Ohlson 1980; Lawrence 1983; Lukason 2013). Moreover, delays in publishing financial statements were significant predictors of failure (Ahmed and Courtis 1999) and potential indicators of financial distress (Peel et al. 1986; Peel and Peel 1988).

There may be several reasons causing reporting delays. According to Altman et al. (2010, p. 17), the late filing of accounts may be an intentional managerial decision in the case of companies which are facing financial difficulties, because they do not want to publish unfavourable information, "a by-product of the financial difficulties a firm faces" or even the result of a disagreement between auditors and directors due to the "true and fair view" of firms. The longer a company takes to file accounts after year-end, the more probable that it is encountering difficulties (Altman et al. 2010).

Delays in filing accounts have direct negative consequences for privately held firms, as late filing is associated with lower credit ratings (Clatworthy and Peel 2016), increase of information asymmetries (Owusu-Ansah and Leventis 2006) and, in general, is a way to decrease the quality of stakeholders' decision-making (Singhvi and Desai 1971). Thus, governments usually force minimum disclosure requirements for all companies through the use of penalties if those disclosure requirements are not met.

The aim of this study was to investigate whether firms' reporting delays are interconnected with bankruptcy risk and its financial determinants. As financial determinants, financial ratios portraying liquidity, profitability and leverage were implemented. We contextualized our research on a specific developed European country, Estonia, as factual whole population data about reporting delays were available.

The main contributions of this paper are the following. First, in line with Healy and Palepu's (2001, p. 411) research suggestions, we answered the question: which financial factors affect management's disclosure choices in an interesting institutional setting—Estonia. Second, we conducted a comprehensive study of privately held firms' financial reporting timeliness. Very little is known about information disclosure in this firm group (Luypaert et al. 2016), yet private firms constitute a major share of the European production capacity (Eurostat 2019). Moreover, private financial reporting differs significantly from listed companies' reporting due to the differences in their financing sources and the availability of information (Hopwood 2000; Berger and Udell 2006).

The next section discusses relevant prior literature and sets the research hypotheses. Section 3 describes the data and methods, while our empirical results with a discussion are presented in Section 4. The paper concludes in Section 5 with a provision of limitations, practical implications and suggestions for further research.

2. Literature Review and Development of Hypotheses

Disclosure regulation is, in many countries, motivated by the concern of reducing informational gaps between informed and uninformed stakeholders (Healy and Palepu 2001). Accounting disclosure is essential for decision-making purposes and could condition incorrect decisions and predictions for firms' stakeholders (Botosan 1997). Agency theory considers accounting policy choice and disclosure as part of the contracting process between firms and its stakeholders (Smith and Watts 1992; Skinner 1993).

Therefore, international accounting regulation highlights timeliness (i.e., non-delayed presentation) as one of the main characteristics of financial information (IASB 2010).

Different incentives could influence the timing of the financial statements' filing, such as the delay of unfavourable information that could affect the attainment of external financing. Some firms may delay the reporting of losses because they need to have "a good look" for obtaining more external financing (Givoly and Palmon 1982). In many cases, the delay itself becomes a signal of possible poor performance (Elliott 1982). It is a fact that the pre-insolvency non-submission of annual reports is common (Lukason 2013), and thus, financially distressed firms might not want to show their poor situation. As a "vicious circle", they are probably not going to receive more financial support if they obtained losses in previous accounting periods. Indeed, financially distressed companies are more likely to distort their financial communication. This idea is based on the agency perspective through asymmetric information, in line with Darrough and Stoughton's (1990) theory of selective disclosure in the context of financial distress. There is strong evidence that firms with losses are less likely to disclose information than other firms (Ajinkya et al. 2005). According to the obfuscation hypothesis, managers may try to obfuscate failures (Courtis 1998; Clatworthy and Jones 2003) and the reporting delay may be a strategy to hide bad news. The latter is illustrated by multiple studies highlighting that managers are prone to release good results as soon as possible but tend to delay losses as much as possible (Kross 1982; Haw et al. 2000). Thus, relying on selective disclosure and obfuscation theories, we considered whether bankruptcy risk and its main determinants were interconnected with reporting delays and outlined the findings from the relevant literature.

As an important cause of reporting delays is corporate financial distress (Impink et al. 2012), the determinants of this troubled financial situation should be taken into account. Indeed, the huge number of bankrupt firms during the worldwide recession in 2009 caused by the global credit crunch has rekindled studies aimed at detecting the first warning signs of financial distress (Mselmi et al. 2017; Geambasu et al. 2013). Concretely, studies suggest that ratios measuring profitability, liquidity and leverage are the most relevant in predicting bankruptcy (Scott 1981; Laitinen 1991; Balcaen and Ooghe 2006; du Jardin 2015; Altman et al. 2017; Lukason and Laitinen 2019). Consequently, we propose the following hypotheses considering liquidity, annual and accumulated profitability, leverage and bankruptcy risk in interconnection with reporting delays.

2.1. Liquidity and Reporting Delays

According to prior literature, bankrupt firms usually have liquidity problems (Lukason and Laitinen 2019). It is considered a technical insolvency (Laitinen and Suvas 2016), meaning that businesses cannot meet their current financial obligations. Consequently, the liquidity of the firm affects bankruptcy probability (Scott 1981) and empirical studies (e.g., Bunn and Redwood 2003) indicate that higher liquidity reduces the probability of failure. Therefore, firms with liquidity problems may not want to reveal their distressed situation, and deriving from this, the first hypothesis is as follows:

Hypothesis 1 (H1). *The higher the liquidity, the lower the likelihood of delaying annual reporting over the submission date set in law.*

2.2. Profitability and Reporting Delays

Common determinants of financial distress are annual and accumulated (aggregated) profitability (Altman et al. 2017; Lukason and Laitinen 2019). Keasey and McGuinness (1990) suggest that the profitability ratio is a significant indicator of failure for a number of years prior to the date of failure. Also, profitable companies have been noted to be less likely to delay annual accounts (Dogan et al. 2007).

The annual profitability is relevant for bankruptcy prediction models as it "captures the capacity of the firm to manage its assets efficiently and generate enough funds to meet its financial obligations" (Pindado et al. 2008, p. 998). In theory, an increase in profitability should reduce the likelihood of financial distress and failure (Chiaromonte and Casu 2017). Prior literature on this indicator

related to timeliness highlights that late reporting exhibits less profitability (Hashim et al. 2013; Luypaert et al. 2016). Submission delays are often related to losses for the period, that is, companies experiencing losses are expected to have longer reporting delays than the ones reporting profits (Givoly and Palmon 1982; Ismail and Chandler 2004), although the results are not fully conclusive (Bonsón and Borrero 2011). Thus, we expect the following interconnection between annual and accumulated profitability and reporting delays:

Hypothesis 2 (H2). *The higher the accumulated profitability, the lower the likelihood of delaying annual reporting over the submission date set in law.*

Hypothesis 3 (H3). *The higher the annual profitability, the lower the likelihood of delaying annual reporting over the submission date set in law.*

2.3. Leverage and Reporting Delays

Another significant indicator of business failure is leverage, which has been noted to have predictive abilities even four or five years prior to failure (Merwin 1942). For SMEs (i.e., micro-, small- and medium-sized firms), private debt provided by trade creditors and banks is their main source of finance, because they do not have access to capital markets. Thus, those firms rely, almost absolutely, on private lenders who also require timely information for their decision making (Peek et al. 2010). This means that borrowing is, for SMEs, the main reason for preparing their financial statements, thus creating a demand for timely financial statements as a way to mitigate agency problems with debt (Allee and Yohn 2009). However, the results in the literature are inconclusive on this topic. Some studies do not find evidence that heavier reliance on external debt financing will lead to more timely disclosure of information (Owusu-Ansah 2000; Hashim et al. 2013; Luypaert et al. 2016); however, contrary findings are also present (Carey and Clarke 2001). Empirically, prior research shows that leverage acts more as a proxy for distress and tends to be negatively related to timeliness (e.g., Impink et al. 2012). The monitoring cost theory postulates that highly geared companies are timely reporters (Owusu-Ansah and Leventis 2006). In turn, highly geared companies are expected to delay the presentation of their reports because the audit procedure of debt capital is more time consuming than that of equity capital (Carslaw and Kaplan 1991; Owusu-Ansah 2000; Conover et al. 2008). Thus, due to the controversial results in previous studies, we present the following hypothesis:

Hypothesis 4 (H4). *The level of leverage has no effect on the likelihood of delaying annual reporting over the submission date set in law.*

2.4. Bankruptcy Risk and Reporting Delays

The fact that financially distressed firms could delay reports has been empirically proven (e.g., Altman et al. 2010). Still, the majority of relevant studies used reporting delay as an independent variable, therefore focusing on how long delay period should be used to best predict future failure. For predictive purposes, such a setting is reasonable, as many distressed firms do not report at all (Lukason 2013). When to consider the cause of delaying, then at first the distress situation occurs and consequently the decision to delay is taken by management. Several theories explain why distressed firms could start delaying reports, such as the theory of selective disclosure (Darrough and Stoughton 1990) and the obfuscation theory (Courtis 1998). Still, the empirical evidence for these theoretical proposals is scant. Only one recent study by Luypaert et al. (2016), using firms from Belgium as an example, found certain evidence using a distress risk model from 1982—stating that higher distress risk leads to a longer delay in reporting—but the exact attributes of the distress risk model were not disclosed. From a practical viewpoint, it is logical that distressed firms may try to delay reporting bad news to their stakeholders, for instance, in order to avoid a reduction in trade credit and bank loans or customer trust. Thus, we would expect the following relationship with the last hypothesis:

Hypothesis 5 (H5). *The higher the risk of bankruptcy, the higher the likelihood of delaying annual reporting over the submission date set in law.*

3. The Study's Context, Data and Methodology

3.1. Context of the Study

This study was based on Estonian whole population data from 2000 to 2014. The start period was the year 2000, as for earlier years, the annual report submission dates were unavailable, and the end period was the year 2014, as when conducting the analysis, no submission dates were available for later years. Also, since 2016, an abbreviated format of the annual report became into use for SMEs, which would not be fully comparable with earlier reports. The analysis was composed of 698,189 firm-year observations. For most of the studied years, the available data represented more than 90% of the active firm population, while for a certain proportion of firms, financial information was missing in our database.

Estonian legislation obliges all firms to submit an annual report 0.5 years after the financial year has ended at the latest. For the overwhelming majority of firms, the financial and calendar years overlap, and thus, for almost all firms, the final annual report submission date is 30 June in the year after the financial year. The Estonian regulation of six months is rather similar to other countries, where relevant research has been conducted, e.g., 7 months in Belgium (Luypaert et al. 2016) and 9 months in the United Kingdom (Clatworthy and Peel 2016). For each firm, information about the financial year end date and actual submission date is available, and thus, we can account for exactly how long the delay was for the report submission.

The Estonian Business Code provides different penalties for firms that submit annual reports later than the final submission date. The simplest penalty is that a firm will be fined, the worst penalty, in turn, being that a firm will be deleted from the business register, which normally occurs after several consecutive years of non-submission. Still, according to Estonian law, firm deletion proceedings can already begin after one year has passed from the submission deadline. Deletion from the business register means that a firm cannot function anymore unless it is reinstated to that register.

In the early 2000s, delays were quite common—occasionally more than half of firms delayed by at least one day; however, due to the implementation of a digital submission system in the late 2000s and better monitoring of submissions, the share of delaying firms dropped to around one-third of the population. Still, many of the delaying firms never submitted a report due to the termination of activities (including permanent insolvency). The latter firms were not included in the sample, as financial information from the annual report was needed for testing the hypotheses.

3.2. Variables of the Study

All the formulas for the variables are provided in Table 1, and herewith, their choice was motivated. The concept of “timeliness” can have a different meaning than the occurrence of a delay from a regulatory deadline in the reporting of financial statements, and therefore, there are many proxies of timeliness available. McGee (2006) defined it as the period between the company's year-end and the date when the financial report was released for public view. Dyer and McHugh (1975) and Davies and Whittred (1980) remarked that reporting timeliness includes audit delay, which is the number of days between the balance sheet date and the date when external auditor's report is signed. Soltani (2002) considers the financial statement issue delay as the number of days between the balance sheet date and the date of declaring the notice of the annual general meeting. We used a universal approach to define the delay, namely, whether firms exceeded the legal deadline for submission, as the sample firms were mainly non-audited private SMEs. Such a universal definition enables a future international applicability of the results. We coded the submission delay in this study in the simplest way, namely, whether a firm succeeded in submitting the report during the legal time requirements

(that is, in half a year after the financial year; coded with 0) and whether it delayed the submission for at least one day (coded with 1). In the later analysis, this variable is named DELAY.

Table 1. Coding of the variables.

Dependent/Independent Variables		Control Variables	
Code	Calculation	Code	Calculation
RETA	Retained earnings/total assets	SIZE	Natural logarithm of total assets
EBITTA	Earnings before interest and taxes/total assets	AGE	Age (years) in the end of fiscal year
WCTA	(Current assets – current liabilities)/total assets	AGRI	NACE Rev.2 A dummy
BVETD	Book value of equity/total debt	MANUF	NACE Rev.2 B, C, D or E dummy
ZSCORE	Score from Altman et al. (2017) Model 2 *	CONST	NACE Rev.2 F or L dummy
DELAY	0—non-delay, 1—delay	SALES	NACE Rev.2 G dummy
MDELAY	0—non-delay, 1—moderate delay as ≤ 365 days, 2—severe delay as > 365 days	SERV	NACE Rev.2 from H to K or from M to U dummy

* Altman et al. (2017) Model 2 score was calculated as $1/(1 + e^{-L})$, where $L = 0.035 - 0.495 \times WCTA - 0.862 \times RETA - 1.721 \times EBITTA - 0.017 \times BVETD$, while for the meaning of WCTA, RETA, WCTA and BVETD refer to the calculation formulas provided in the table. NACE Rev.2 letters from A to U refer to the sections in the Statistical classification of economic activities in the European Community.

The dataset was broken down into 453,776 non-delayed observations and 244,413 delayed observations. All firms that had delayed, had at some point in time still submitted their delayed reports, as otherwise it would be impossible to calculate the independent variables (i.e., financial ratios and bankruptcy risk) from the same report. We considered two other options when coding the variable DELAY. First, the usage of DELAY in a continuous form is problematic, as for non-delayed firms, the management can freely choose a date inside the legal requirements, therefore making firms submitting right after financial year unfoundedly more correct than those doing it for instance after 180 days. Second, DELAY could be used in an ordinal form, for instance, by coding non-delayed firms with 0 and delays in ascending order to represent different lengths of delays. Such an approach is also challenging, as a grouping of delays based on their length is highly subjective, as no proper scientific and practical guidelines exist on how to implement it. Still, in the robustness test of the results, delays were also used in an ordinal form, where 0 denoted non-delay, while 1 and 2, respectively, delays ≤ 365 days and >365 days (variable MDELAY). The motivation for breaking delays into mild and severe delays was the Estonian legislation (see Section 3.1), according to which a delay of more than one year can lead to more severe consequences.

For coding the independent variables, we used the formulas used in the Altman et al. (2017) study, which is the extension of the initial Altman (1968) model on European non-listed firms. The formulas based on Altman et al. (2017) are as follows: (a) retained earnings to total assets (RETA) reflecting accumulated profitability (H2); (b) earnings before interest and taxes to total assets (EBITTA) reflecting annual profitability (H3); (c) working capital (i.e., current assets minus current liabilities) to total assets (WCTA) reflecting liquidity (H1); and (d) book value of equity to total debt (BVETD) reflecting leverage (H4). We acknowledge that there are different ratios available to study these financial dimensions, but our aim was to apply the most widely used ones (e.g., literature review by Dimitras et al. 1996). The second model in the Altman et al. (2017) study (a logistic regression-based model named “Model 2”) includes the latter four variables, thus, we chose it for testing H5. This failure prediction model included Estonian firms for the model estimation and has a high classification accuracy in Estonia, and thus, is suitable for use in this country. In Estonian scientific literature there are so far no multi-sectorial prediction models available, thus, the usage of the Altman et al. (2017) second model is a good solution for calculating bankruptcy risk in Estonia irrespective of firm sector. For each observation, the values of RETA, EBITTA, WCTA, BVETD and Z-score based on the Altman et al. (2017) second model (coded

as ZSCORE) were calculated. We used the bankruptcy risk in a transformed logit format, namely, $0 \leq \text{ZSCORE} \leq 1$, where larger values indicate higher bankruptcy risk. All four ratios were winsorized before usage in statistical analysis, as classical statistical analysis methods can be quite sensitive to outliers, which are common in case of financial ratios.

3.3. Methodology of the Study

For testing the hypotheses, logistic regression analysis (logit) (Stata 15.1 command “logistic”) was used with DELAY as the dependent variable. Hypotheses from H1 to H4 were assessed together with four independent variables (RETA, EBITTA, WCTA, BVETD), and for the H5, the ZSCORE was the only independent variable, thus, resulting in two sets of logit models (Models 1.1, 1.2 and 1.3 to assess hypotheses from H1 to H4 and Models 2.1, 2.2 and 2.3 to assess H5). The testing of H1 to H4 and H5 were separated into two sets of models, as the variable ZSCORE was calculated based on the other four independent variables, which would lead to serious multicollinearity issues. When Models 1.1 and 2.1 were base models without control variables, two additional sets of models were then composed to study how the characteristics of firms portrayed with different control variables altered the initial results.

In Models 1.2 and 2.2, two control variables, namely, firm size (coded as SIZE), measured as a natural logarithm of total assets, and firm age (coded as AGE), measured as years from foundation to the end of the specific financial year, were included. In Models 1.3 and 2.3, the latter two control variables were supplemented with firm sector control variables. The industry dummies (the respective NACE Rev.2 sections with proportions in the dataset in brackets) were coded as follows: (1) primary sector firms—AGRI (A; 5%); (2) industrial firms—MANUF (B, C, D, E; 11%); (3) construction firms—CONST (F, L; 20%); (4) sales firms—SALES (G; 22%); and (5) service firms—SERV (from H to K, from M to U; 42%). As service firms hold the largest proportion in the sample, that sector was used as the base category and not included in Model 1.3 and Model 2.3 estimations. In the case of both models, the marginal effects were presented and multicollinearity tests conducted. In addition, the robustness of the results in respect to the dependent variable choice was reassessed for Models 1.1 and 2.1 using the dependent variable MDELAY in ordered logistic regression (Stata 15.1 command “ologit”). The models assessed with either logistic regression (dependent variable DELAY) or ordered logistic regression (dependent variable MDELAY) were as follows (*i* denotes firm and *t* period):

$$\text{Model 1.1: } \text{DELAY}_{it} = b_0 + b_1 \times \text{RETA}_{it} + b_2 \times \text{EBITTA}_{it} + b_3 \times \text{WCTA}_{it} + b_4 \times \text{BVETD}_{it} + \varepsilon_{it}$$

$$\text{Model 1.2: } \text{DELAY}_{it} = b_0 + b_1 \times \text{RETA}_{it} + b_2 \times \text{EBITTA}_{it} + b_3 \times \text{WCTA}_{it} + b_4 \times \text{BVETD}_{it} + b_5 \times \text{SIZE}_{it} + b_6 \times \text{AGE}_{it} + \varepsilon_{it}$$

$$\text{Model 1.3: } \text{DELAY}_{it} = b_0 + b_1 \times \text{RETA}_{it} + b_2 \times \text{EBITTA}_{it} + b_3 \times \text{WCTA}_{it} + b_4 \times \text{BVETD}_{it} + b_5 \times \text{SIZE}_{it} + b_6 \times \text{AGE}_{it} + b_7 \times \text{AGRI}_{it} + b_8 \times \text{MANUF}_{it} + b_9 \times \text{CONST}_{it} + b_{10} \times \text{SALES}_{it} + \varepsilon_{it}$$

$$\text{Model 2.1: } \text{DELAY}_{it} = b_0 + b_1 \times \text{ZSCORE}_{it} + \varepsilon_{it}$$

$$\text{Model 2.2: } \text{DELAY}_{it} = b_0 + b_1 \times \text{ZSCORE}_{it} + b_2 \times \text{SIZE}_{it} + b_3 \times \text{AGE}_{it} + \varepsilon_{it}$$

$$\text{Model 2.3: } \text{DELAY}_{it} = b_0 + b_1 \times \text{ZSCORE}_{it} + b_2 \times \text{SIZE}_{it} + b_3 \times \text{AGE}_{it} + b_4 \times \text{AGRI}_{it} + b_5 \times \text{MANUF}_{it} + b_6 \times \text{CONST}_{it} + b_7 \times \text{SALES}_{it} + \varepsilon_{it}$$

$$\text{Model 1.1 (reassessed): } \text{MDELAY}_{it} = b_0 + b_1 \times \text{RETA}_{it} + b_2 \times \text{EBITTA}_{it} + b_3 \times \text{WCTA}_{it} + b_4 \times \text{BVETD}_{it} + \varepsilon_{it}$$

$$\text{Model 2.1 (reassessed): } \text{MDELAY}_{it} = b_0 + b_1 \times \text{ZSCORE}_{it} + \varepsilon_{it}$$

4. Results and Discussion

The descriptive statistics of variables are documented in Table 2. It can be seen that the means and medians of WCTA, EBITTA, RETA, and BVETD were higher in the case of non-delayed firms, therefore presenting better financial situations for non-delayed firms than for delayers. Also, the ZSCORE obtained higher mean and median values in the case of delayed firms, therefore indicating a higher risk of bankruptcy. These results are in line with prior literature, e.g., [Courtis \(1976\)](#), [Abdulla \(1996\)](#), [Owusu-Ansah \(2000\)](#). Out of the population applied, 42% of firms were from the service sector, followed

by firms dealing with sales and construction. The median age of firms was 6.9 years, therefore reflecting an adolescent company, and the median size was 43.5 thousand euros (the natural logarithm of size was 10.68), indicating a micro firm. Thus, our paper contributes to the scant literature on firms with a small size (Luypaert et al. 2016). Six logit models were composed, which are documented in Tables 3 and 4 with respective marginal effects and multicollinearity statistics (i.e., variance inflation factors, VIFs). Additionally, two ordered logistic regression models are presented in Table 5 to demonstrate the robustness of the results in respect to the dependent variable choice.

Table 2. Descriptive statistics of the variables.

Variable	Non-Delayed Firms (N = 453,776)			Delayed Firms (N = 244,413)			All Firms (N = 698,189)		
	Mean	SD	Median	Mean	SD	Median	Mean	SD	Median
WCTA	0.30	0.49	0.31	0.22	0.54	0.24	0.27	0.51	0.29
EBITTA	0.05	0.35	0.04	0.01	0.39	0.03	0.03	0.37	0.04
RETA	0.23	0.71	0.32	0.09	0.85	0.21	0.18	0.77	0.29
BVETD	9.36	16.04	1.69	8.44	15.76	1.14	9.04	15.95	1.49
ZSCORE	0.36	0.22	0.35	0.40	0.24	0.39	0.37	0.23	0.36
SIZE	10.87	2.09	10.70	10.76	2.14	10.64	10.83	2.11	10.68
AGE	8.21	5.18	7.15	6.98	4.54	5.90	7.78	5.00	6.70

Note: Descriptive statistics are not reported for sectoral dummies, as they are not informative in the case of binary variables. Instead, the sectoral composition of the sample is described in Section 3.3. The *p*-value of the two-sample *t*-test and Brown-Forsyth ANOVA was <0.001 for all independent variables in Table 2. Correlations of the variables are documented in Appendix A.

Models 1.1, 1.2 and 1.3 indicated that three of the four financial ratios were significantly related to DELAY, namely, a rise in liquidity, annual profitability and accumulated profitability decreased the likelihood of a reporting delay, thus enabling to accept H1, H2 and H3. Based on the composed models (1.1 and 1.2), the relationship between leverage and reporting delays can be considered insignificant, leading to the acceptance of H4. Still, it must be acknowledged, that in Model 1.3, including the largest amount of control variables, leverage was significant, which could be caused by some sector-specific features. The marginal rise in accumulated profitability mattered the most, which could be explained by a strong managerial intent to hide dropping of it below a certain threshold, i.e., accumulated profits becoming very low or even negative. Firms seem to be more afraid of different sanctions concerning low (or negative) retained earnings, rather than being concerned about the consequences of a delay.

The control variables in Models 1.2 and 1.3 indicated that, *ceteris paribus*, larger firms are at a higher risk and older firms are at a lower risk of delay. Our results are opposite to Owusu-Ansah (2000), who found an inverse relationship between timeliness and the size of the company. A possible explanation for our results could be connected with the composition of the firm population, namely, the large proportion of micro firms. Smaller micro firms may have a very simple accounting, namely, so few items to report, that they can manage the composition of their reports quickly. Moreover, with the increase in size, the probability that a firm is using leverage increases, and thus, such firms could be more prone to hiding negative results from lenders as long as possible.

However, for older firms, this relationship is opposite (i.e., delays become less frequent), in line with Iyoha (2012). This may be caused by the fact that older firms have established a position in the market and do not want to hurt their prestige by delaying their reports. Firms in primary and sales sectors are more likely to delay than in the reference group of service firms. In turn, manufacturing and especially construction firms do not differ from service firms.

There are two additional findings concerning the age and size context based on the models presented in Table 3. Larger firms have to be more liquid and profitable, so that their likelihood to present annual reports in time would be the same as for their smaller counterparts. Larger firms have more stakeholders and there is wider public interest in them, which could lead to higher willingness to postpone unfavourable financial developments. At the same time, for instance in the case of a one-individual owned micro firm, where the owner is also the manager, they may not have any such

stakeholder relationships that could be affected by negative financial news. Concerning firm age, older firms, which have similar annual report submission behaviour than young firms, are less liquid and profitable. This could mean that older firms are less afraid of the consequences of disclosing poor performance. For instance, they might believe that their strong relationships with stakeholders, such as banks and suppliers as well as their established client base, will not be altered when disclosing negative financial news.

Table 3. Three logistic regression models with financial ratios as independent variables (dependent variable DELAY).

Variable	Coefficient	Std. Err.	p-Value	Marginal Effect	VIF
Model 1.1 (without controls)					
RETA	−0.169414	0.004029	0.000	−0.038500	1.58
EBITTA	−0.023577	0.007806	0.003	−0.005358	1.32
WCTA	−0.153814	0.006377	0.000	−0.034955	1.70
BVETD	0.000250	0.000183	0.173	0.000057	1.32
CONSTANT	−0.551097	0.002963	-	-	-
Model 1.2 (age and size controls included)					
RETA	−0.167613	0.004552	0.000	−0.037973	1.99
EBITTA	−0.096612	0.007851	0.000	−0.021887	1.34
WCTA	−0.112823	0.006672	0.000	−0.025560	1.84
BVETD	0.000399	0.000187	0.033	0.000090	1.37
SIZE	0.027070	0.001458	0.000	0.006133	1.48
AGE	−0.051906	0.000549	0.000	−0.011759	1.07
CONSTANT	−0.461071	0.016045	0.000	-	-
Model 1.3 (age, size and sector controls included)					
RETA	−0.165342	0.004575	0.000	−0.037455	2.01
EBITTA	−0.096059	0.007859	0.000	−0.021760	1.34
WCTA	−0.119481	0.006738	0.000	−0.027066	1.88
BVETD	0.000595	0.000189	0.002	0.000135	1.38
AGRI	0.120262	0.012354	0.000	0.027677	1.07
MANUF	−0.029713	0.008754	0.001	−0.006707	1.15
CONST	−0.002380	0.006978	0.733	−0.000539	1.21
SALES	0.072645	0.006704	0.000	0.016555	1.22
SIZE	0.027311	0.001472	0.000	0.006187	1.51
AGE	−0.052201	0.000552	0.000	−0.011825	1.08
CONSTANT	−0.480090	0.016106	0.000	-	-

Note: Omnibus tests of model coefficients, chi-square (*p*-value): Model 1.1 5655 (0.000), Model 1.2 14,965 (0.000), Model 1.3 15,216 (0.000). Hosmer and Lemeshow test, chi-square (*p*-value): Model 1.1 439 (0.000), Model 1.2 152 (0.000), Model 1.3 159 (0.000). Log likelihood of models: Model 1.1 −49,242, Model 1.2 −444,586, Model 1.3 −444,461. Nagelkerke Pseudo R^2 of models: Model 1.1 0.011, Model 1.2 0.029, Model 1.3 0.030. VIF means variance inflation factor.

Models 2.1, 2.2 and 2.3 (see Table 4) indicated that a rise in bankruptcy risk increased the likelihood that firms would delay the submission of their reports over the legal deadline, which was a hypothesized relationship in H5. Our results are in line with the idea that financially distressed companies could have incentives to hide the reasons why they are not performing well (Singhvi and Desai 1971; Whittred and Zimmer 1984). According to the obfuscation hypothesis, managers could try to obfuscate failures (Courtis 1998; Clatworthy and Jones 2003). Managers are eager to release good news as soon as possible (Haw et al. 2000), whereas firms with losses tend to delay the reporting of their results (Kross 1982).

Indeed, companies performing poorly are more likely to distort their financial communication, supporting the standard agency perspective through asymmetric information, in line with Darrough and Stoughton's (1990) theory of selective disclosure in the context of financial distress. There is strong evidence that firms earning losses are less likely to disclose information than other firms (Ajinkya et al. 2005). These arguments are not consistent with the conjecture supported by

Skinner (1994) and Skinner (1997), according to which firms could also have incentives to disclose bad news quickly in order to reduce litigation costs. The latter argument could be more likely for public firms when capital markets exert strong pressure on managers.

Table 4. Three logistic regression models with bankruptcy risk as independent variable (dependent variable DELAY).

Variable	Coefficient	Std. Err.	p-Value	Marginal Effect	VIF
Model 2.1 (without controls)					
ZSCORE	0.725253	0.010952	0.000	0.164815	1.00
CONSTANT	−0.891499	0.004875	0.000	-	-
Model 2.2 (age and size controls included)					
ZSCORE	0.703796	0.011046	0.000	0.159441	1.01
SIZE	0.009948	0.001241	0.000	0.002254	1.06
AGE	−0.051687	0.000545	0.000	−0.011709	1.06
CONSTANT	−0.599303	0.014384	0.000	-	-
Model 2.3 (age, size and sector controls included)					
ZSCORE	0.701166	0.011081	0.000	0.158834	1.01
AGRI	0.119269	0.012336	0.000	0.027445	1.06
MANUF	−0.029299	0.008739	0.001	−0.006614	1.15
CONST	0.002326	0.006970	0.739	0.000527	1.21
SALES	0.066445	0.006641	0.000	0.015134	1.20
SIZE	0.010216	0.001257	0.000	0.002314	1.09
AGE	−0.051953	0.000547	0.000	−0.011769	1.06
CONSTANT	−0.617003	0.014446	0.000	-	-

Note: Omnibus tests of model coefficients, chi-square (*p*-value): Model 2.1 4390 (0.000), Model 2.2 13,968 (0.000), Model 2.3 14,191 (0.000). Hosmer and Lemeshow test, chi-square (*p*-value): Model 2.1 1293 (0.000), Model 2.2 131 (0.000), Model 2.3 101 (0.000). Log likelihood of models: Model 2.1 −449,874, Model 2.2 −445,085, Model 2.3 −444,974. Nagelkerke Pseudo R^2 of models: Model 2.1 0.009, Model 2.2 0.027, Model 2.3 0.028. VIF means variance inflation factor.

The control variables behaved in Models 2.2 and 2.3 exactly in the same way as in their companion models with similar settings (i.e., Models 1.2 and 1.3). Multicollinearity was not an issue in any of the models. Namely, the average variance inflation factor (VIF) in all of the models remained very low and the maximum VIF was 2 over all models composed. In addition, the correlations of the variables documented in Appendix A remained below 0.5.

We tested Models 2.1, 2.2 and 2.3 with another international failure prediction model by Laitinen and Suvas (2013). The independent variable portraying bankruptcy risk remained highly significant and with a positive coefficient in the same way as in the models estimated using a failure risk variable based on the Altman et al. (2017) study. Thus, the principal findings were robust in respect to which failure risk proxy was applied. We tested Models 1.1 and 2.1 in respect to different reporting years separately. While coefficients and *p*-values can vary, the principal findings in respect to what variables are (in)significant and what is the direction of association were not altered.

As the results could vary in respect to how severe the reporting delay is, we divided the delays into two categories (mild and severe violators, respectively, ≤ 365 days delay for the former and > 365 days delay for the latter) and conducted an ordered logistic regression with the following categories: 0—non-delay, 1—mild delay, 2—severe delay (coded as MDELAY). The models reassessed with ordered logistic regression were 1.1 and 2.1 (see Table 5). The results indicated that in case the severity of delay is taken into account, the main findings of the study do not change. Moreover, an important additional finding from the usage of ordered logistic regression was that, with the decrease/increase in the values of financial ratios/bankruptcy risk, the likelihood of the delay severity increases.

Table 5. Two ordered logistic regression models with either bankruptcy risk or financial ratios as independent variables (dependent variable MDELAY).

Variable	Coefficient	Std. Err.	p-Value
Model 2.1 (reassessed)			
ZSCORE	0.7264177	0.0109311	0.000
Cut 1	0.8919471	0.0048691	-
Cut 2	5.0586590	0.0138542	-
Model 1.1 (reassessed)			
RETA	-0.1706418	0.0040111	0.000
EBITTA	-0.0254936	0.0077811	0.001
WCTA	-0.1534890	0.0063628	0.000
BVETD	0.0003768	0.0001828	0.039
Cut 1	0.5520110	0.0029594	-
Cut 2	4.7237970	0.0132191	-

In summary, our results contribute to reinforcing, empirically, the obfuscation hypothesis and [Darrough and Stoughton's \(1990\)](#) theory of selective disclosure in the context of financial distress, suggesting that managers' decisions related to disclosure of financial reporting are affected by the financial health of their companies. Managers may opportunistically make use of the information contained in annual reports, especially when financial performance is poor ([Neu 1991](#); [Merkl-Davies and Brennan 2007](#)) and prefer to delay the communication of bad news or even avoid disclosing it. If a company is at a high risk of bankruptcy, it is more likely to delay or not release financial reporting, because managers might want to hide their bad decisions, as suggested in [Altman et al. \(2010\)](#).

5. Conclusions

The objective of this paper was to investigate how reporting timeliness is linked with bankruptcy risk and its determinants (i.e., liquidity, profitability and leverage) by using the whole population of Estonian firms from 2000–2014, in total, around 700,000 firm-year observations.

Our findings showed that higher bankruptcy risk increased, but in turn, high liquidity, annual profitability and accumulated profitability decreased the likelihood of delayed reporting. Leverage was not associated with delayed reporting. The latter results were valid either in case just the fact of delay or the severity of delay was used as the dependent variable. These results point to the fact that healthy companies are more willing to disclose their official financial information on time, because it could be a sign of firms' good behaviour and, consequently, make companies trustworthy in the eyes of their stakeholders. In turn, companies performing badly are more likely to distort their financial communication. Other factors conditioning timely financial statement submission were firm size, age and functioning in some specific industries.

The main implication for different stakeholders is that the non-submission of financial statements may be a sign of a firm's decline. Specifically, a delay over the legal deadline can point to higher bankruptcy risk, and lower liquidity and profitability, although the latter aspects are not yet factually known because of the delayed submission. Thus, for instance, creditors can use this information to (re)consider their lending decisions when reporting delays have occurred. In addition, state institutions monitoring timely submission of annual reports could oversee their penalty policies, as this study provides some hints that such action could be intentional. As delays are very usual in other countries as well (e.g., in the United Kingdom), the results obtained in this research could be transferrable to other environments as well.

This study was not free of limitations. First, our analysis was based on a single country example. In future studies, the usage of a large international sample is suggested, although the availability of data for a whole population could, in many countries, pose an issue. Second, our study did not outline

the causes of firms' (delayed) filing choice, which could be an interesting avenue for follow-up research. Perhaps the analysis of socio-demographic or behavioural variables of managers of SMEs could shed light onto that issue. Third, we did not explain the consequences of reporting delays. For instance, the events after a delay (or serial delays) could be accounted for, for example, whether delaying firms more frequently enter into voluntary or involuntary liquidation procedures, obtain loans less frequently or exhibit other negative events (e.g., payment defaults, reduction in their market share).

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Appendix A

Table A1. Correlation table of variables.

	RETA	EBITTA	WCTA	BVETD	LNSIZE	AGE
RETA	1	0.483 *	0.494 *	0.182 *	0.370 *	0.090 *
EBITTA		1	0.304 *	0.065 *	0.191 *	−0.035 *
WCTA			1	0.482 *	−0.122 *	0.036 *
BVETD				1	−0.232 *	−0.007 *
SIZE					1	0.229 *
AGE						1

Note: * $p < 0.01$. The correlations between ZSCORE and SIZE/AGE were respectively $-0.085/-0.031$ with $p < 0.01$.

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