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STUDIES OF THE QUALITY AND USEFULNESS OF CORPORATE FINANCIAL REPORTING

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The undersigned Jernej Koren, a student at the University of Ljubljana, Faculty of Economics, (hereafter: FELU), declare that I am the author of the doctoral dissertation entitled *Studies of the quality and usefulness of corporate financial reporting*, written under supervision of associate professor Aljoša Valentinčič, PhD.

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ŠTUDIJE O KAKOVOSTI IN UPORABNOSTI FINANČNEGA POROČANJA GOSPODARSKIH DRUŽB

POVZETEK

Namen finančnega poročanja podjetij je ekonomskim subjektom, ki so z njimi povezani, podati uporabne informacije za njihovo odločanje. Vsak izmed teh subjektov je soočen z negotovostjo o dejanskem stanju podjetja in (ekonomskimi) posledicami svojih dejanj, zato poskuša oblikovati poseben informacijski set, ki bi bil osnova za informirano sprejemanje odločitev. Računovodski pristop omogoča pridobiti odgovore na vprašanja o finančni zgodovini in delovanju podjetja v določenem času ter s pomočjo povzetka ekonomskih informacij v obliki finančnih izkazov zmanjšuje to negotovost. Namen finančnega poročanja je tako posredovanje informacij, uporabnih za oblikovanje odločitev o alokaciji virov tako znotraj podjetja kot med podjetjem in njegovim deležniškim okoljem.

Doktorska disertacija analizira različne teme, povezane s kakovostjo in/ali uporabnostjo finančnega poročanja gospodarskih družb. Sestavljena je iz treh delov, v katerih se preučevani vidiki navezujejo na politiko izplačil delničarjem, medsebojni vpliv revizije finančnih izkazov in stroška dolžniškega financiranja ter ocenjevanje tveganja s pomočjo računovodske bete. Opravljena je empirična analiza podatkov tako javnih kot zasebnih (nejavnih) podjetij s posebnim poudarkom na kakovosti izbora in pripravi podatkov.[1] V odvisnosti od preučevanega pojava in skladno z obstoječo literaturo so aplicirane različne ocenjevalne metode, od analize prelomnih točk do uporabe inverznega Millsovega kvocienta.

V prvem delu analiziramo prelomne točke izplačil javnih podjetij Združenega kraljestva v povezavi z možnim upravljanjem dobičkov, ki se odraža v občutnih razlikah v diskrecijskih *accruals*.[2,3] Politika izplačil, temelječa izključno na dividendah, je primerjana s posebej definirano politiko izplačil, temelječo na vseh neto denarnih tokovih delničarjev. Za prvo izmed le-teh se izkaže, da določa močnejše prelomne točke izplačil ocenjevanih podjetij. Kot metoda ocenjevanja je uporabljen nedavno razvit test prelomov, ki ima konceptualne prednosti pred testi, uporabljenimi v literaturi do sedaj. Nato ocenimo diskrecijske *accruals* v okolici identificiranih prelomov v porazdelitvah in najdemo značilne razlike v primerjavi s sosednjimi razredi. Poleg tega test prelomov uporabimo za dodaten vpogled v učinke regulatorskih in ekonomskih sprememb na izplačilno politiko podjetij.

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[1] Angleški termin *public firms* označuje podjetja, ki kotirajo na organiziranem trgu vrednostih papirjev ter se v tem razlikujejo od t. i. *private firms*, ki so prevedena kot zasebna oziroma nejavna podjetja.

[2] Zaradi v angleški obliki uveljavljene uporabe množine, ki odraža delo avtorja v sodelovanju z mentorjem in – pri določeni delih – morebitnimi drugimi soavtorji, je taka oblika uporabljena tudi v slovenskih povzetkih.

[3] Ob odsotnosti smiselnega slovenskega prevoda v finančni analizi široko uveljavljenega angleškega termina *accruals* in v izogib zapletom z ad hoc prevajanjem ali ne popolnoma ustreznim slovenskim izrazom, smo se odločili termin navajati v izvorni obliki, podani v kurzivi. *Accrual accounting* sicer pomeni načelo strogega upoštevanja nastanka poslovnega dogodka, *accruals* pa so vrednosti, pridobljene iz finančnih izkazov, upoštevajoč omenjeno načelo.

Drugi del disertacije se osredotoča na vpliv revizije na strošek dolžniškega kapitala zasebnih podjetij. Fokus raziskovanja zaradi potencialno večjega doprinosa k znanosti prenesemo v kontekst zasebnih podjetij, saj gre za področje, ki mu je v zadnjem času posvečena vedno večja pozornost, obenem pa je raziskovanje v tej sferi omejeno z dostopnostjo podatkov. Z dostopom do podrobne in kakovostne domače podatkovne baze finančnih izkazov zasebnih podjetij lahko oblikujemo relativno bolj natančno mero povprečnega stroška dolga, ki je za našo analizo glavni vhodni podatek. Naša glavna ugotovitev je, da ima odločitev majhnega zasebnega podjetja za prostovoljno revizijo zvišujoč (in ne znižujoč, kot bi intuitivno pričakovali) vpliv na ceno zadolževanja, ob čemer predstavimo interpretacijo na podlagi etiketiranja. Glede na to, da je rezultat nasproten dosedanjim rezultatom v stroki, smo še toliko bolj pozorni na natančno in izčrpno statistično analizo, ki – z uporabo različnih pristopov za obravnavo potencialne endogenosti v preučevanih razmerjih – v vseh oblikah potrdi osnovno opažanje.

Tretji del zadeva ocenjevanje relevantne mere sistemskega tveganja zasebnih podjetij, tj. računovodske bete. Po določitvi računovodske mere donosa sledimo teoriji in ocenimo beto posameznih podjetij, pri čemer ponovno uporabimo slovensko podatkovno bazo zasebnih podjetij. Računovodske bete nato navežemo na kazalnike poslovanja z namenom ocene njihove napovedne moči v povezavi s tveganjem, ki naj bi ga predstavljale. Rezultati v tem zadnjem delu niso enoznačni in omogočajo le omejeno uporabnost take analize.

Če sklenemo, v disertaciji predstavljene ugotovitve dodatno dopolnjujejo identificirana raziskovalna vprašanja v sferi tako javnih kot zasebnih podjetij. Uporabnost finančnih izkazov za posredovanje informacij je analizirana v treh različnih kontekstih s splošnim zaključkom, da so izkazi uporabni za širok spekter namenov pod pogojem, da so zanesljivi in zadovoljive kakovosti. Kljub temu svojih ugotovitev ne smatramo kot neizpodbitnih in z zanimanjem spremljamo nadaljnja dognanja o teh temah.

KLJUČNE BESEDE: analiza prelomnih točk, politika izplačil delničarjem, zasebna (nejavna) podjetja, strošek dolga, prostovoljna revizija, računovodska beta

STUDIES OF THE QUALITY AND USEFULNESS OF CORPORATE FINANCIAL REPORTING

SUMMARY

The purpose of financial reporting is to provide economic agents involved with a firm with useful information for their decision-making. Each agent is, faced with uncertainty regarding what state the firm is in and what are the possible consequences of his actions, interested in a specific information set that forms the basis for informed decision-making. Accounting provides the answers to questions regarding the temporal financial history of the firm and through summarised economic information in the form of financial statements reduces uncertainty. Thus, the objective of financial reporting is to provide information that is useful for making decisions on resource allocation both within the firm and between the firm and its stakeholder environment.

This PhD dissertation analyses different topics related to the quality and/or usefulness of corporate financial reporting. Consisting of three parts, the aspects identified relate to the pay-out policy, the interplay of financial statement audits and the cost of debt capital and risk assessment using accounting data. Both public and private firms' data are empirically analysed and special care is taken in quality data preparation. Different estimation methods are used, depending on the phenomenon studied and following extant research, ranging from threshold analysis to inverse Mills ratio application.

In the first part, we analyse pay-out thresholds of UK listed firms in association with possible earnings management, reflected in marked differences in discretionary accruals. Purely dividend-defined pay-outs are compared to the net shareholder cash flow definition of pay-outs and the former proves to be a stronger threshold for the firms in question. As a method of analysis, a recently proposed test of discontinuity is applied with a conceptual advantage over other tests used in the literature. We then estimate discretionary accruals at the identified breaks in distributions, finding significant differences with regard to surrounding observations. Moreover, the discontinuity test is used to provide further insight into regulatory and economic changes affecting the pay-out policy.

The second part of the thesis focuses on the effect of audits on the cost of debt capital for private firms. We move the focus of our research to a private firm setting for reasons of potentially larger contribution in an area that is receiving increasing attention but is limited research-wise in terms of data availability. Utilising access to a high-quality domestic database of private firms, we are able to construct a relatively more precise measure of average interest rate on debt as one of the inputs for our analysis. We find that a voluntary decision to be audited has a positive (and not negative, as intuitively expected) effect on the firms' cost of debt and present a labelling interpretation of this finding. Due to the result being contrary to existing ones in the field, we perform an exhaustive statistical analysis using

various approaches to address potential endogenous causes of such a relationship only to confirm our findings.

The third part is concerned with estimating a relevant measure of systematic risk for private firms, namely the accounting beta. Establishing a measure of accounting return, we follow the theory to estimate individual firms' betas, again benefiting from a Slovenian dataset of private firms. Accounting betas are then related to performance indicators in order to associate their predictive power to the risk they are to be presenting. The results of this last part are not univocal and indicate limited usefulness of such analysis.

All in all, the findings presented in this dissertation shed additional light on identified research questions from both the public and private firms' domain. The informativeness of financial statements is tested in three different settings, and the general conclusion is that they can be used for a range of purposes given that they are reliable and of sufficient quality. Still, we do not consider our findings unquestionable and encourage further research on these topics.

KEYWORDS: threshold analysis, pay-out policy, private firms, cost of debt, voluntary audit, accounting beta

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INTRODUCTION

Information is essential to functioning organisations and markets. As economic agents (owners/shareholders, managers and directors, customers and suppliers, agents in financial markets (investors, lenders), standards setters and regulators, government (tax) authorities and other stakeholders) face uncertainty regarding the future consequences (outcomes) of their current decisions and actions associated with the firm, accounting (financial) reports serve as an instrument in reducing this uncertainty. A firm's financial history is reflected in these reports, and for them to be informative, the decision makers have to believe there are multiple events that can occur and they have to be uncertain about which evens have already occurred. Without this uncertainty, there is no role for information conveyed through the reports (Christensen & Demski, 2003; Christensen & Feltham, 2003).

Thus, financial reporting has economic value for the agents involved. Accounting has dual, decision-facilitating and decision-influencing, roles within organisations with the signal (the report itself) potentially changing agents' beliefs about the outcomes of their decisions. Hence, it may change their action preferences. In addition to this, accounting information also has importance in facilitating contractual agreements both within the firm and between the firm and its environment (Christensen & Feltham, 2003).

A full set of financial statements, containing "financial position at the end of the period, earnings for the period, comprehensive income for the period, cash flows during the period [and] investments by and distributions to owners during the period" (Flood, 2013, p. 19), is therefore the primary means of conveying information that a firm publishes about itself. The main users of financial statements, both existing and potential investors and creditors, are concerned with predicting the firm's future cash flows, as this affects its ability to pay dividends, interest and other loan obligations. For this purpose, financial reporting is expected to provide information on (Flood, 2013, p. 17):

- *Economic resources, claims against the entity, and owners' equity*. […]
- *Economic performance and earnings*. […]
- *Liquidity, solvency and funds flows*. […]
- *Management stewardship and performance*. […]
- *Management explanations and interpretations*. […]

The role of financial reporting, together with the accounting system in place that defines the way in which the economic situation of a firm is reflected, is therefore in effectively conveying relevant information to the users. Davies and Crawford (2012) list the properties of useful preparation, analysis and presentation of accounting data, which are combined with the Financial Accounting Standards Board's (FASB) identification of characteristics of useful information as set out in its *Conceptual framework for financial accounting* (Flood, 2013) into the following list.

Decision-useful financial information should thus be:

- relevant; meaning it is applicable for the purpose required and its use makes a difference in assessing the consequences or expectations of actions taken, i.e. it reduces uncertainty
- reliable; meaning it faithfully represents information that users believe it represents
- accurate; meaning it is free from errors in content or principles used
- comparable and consistent; meaning it allows comparisons across firms or time due to using the same data measurement and presentation methods and standards
- verifiable; meaning it can be replicated with the same result
- timely; meaning it is available in time relevant for decision-making
- clear; meaning it is understandable to users for whom it is intended
- cost-efficient; meaning that costs of providing and using the information should not exceed its benefits

Hence, financial reporting has to be of good quality, for if the inputs to the decision-making process are inaccurate, unreliable or even false, one cannot expect economic agents to make correct inferences and consequently they cannot make efficient decisions with economic effects for themselves, the firms involved and society as a whole.

In the past decade, a process of global financial standards' unification has been underway with the International Financial Reporting Standards (IFRS) being accepted and implemented by countries around the world with the notable exception of the US.[4] IFRS are designed with the purpose of facilitating international comparability of financial reporting, and since January 2005 all listed firms in the European Union are required to comply with them. To date, there is still an on-going debate on whether accounting quality has truly improved with the standards' implementation or if more competing standards would still be more fitting to account for the various (history-, culture-, institutions'- and customs-related) country differences. Since 2009, IFRS for SMEs is issued and available for implementation as a less complex set of standards addressing different reporting needs of small and medium, predominantly private firms. As SMEs account for the vast majority of firms in every economy, their potential use of IFRS for SMEs may be another big step towards a global accounting framework.

Based on the briefly presented context above, the issue of quality and usefulness of corporate financial reporting is relevant, interesting and promising of possible added value in national as well as international context. We thus focus our following research work on three selected aspects, each of them being related to the research theme in its own merit.

In the three papers that follow, we firstly investigate the public firm domain, where pay-out policies of listed firms are evaluated and the usefulness of the concept of discretionary

[4] Still, work on convergence between IFRS and US GAAP has been taking place since 2002.

accruals, computed from balance sheet and income statement items, is put to the test. We then shift our focus from public to private firms and investigate their cost of debt with a rigorous econometric model. Here, both the quality and usefulness of firm reporting are implicit in the analysis as the fact of whether or not the financial statements are audited proves central. Thirdly, we assess the utility of computing an accounting-defined measure of risk for private firms that has not been explicitly used in existing research thus far. This measure could be used for various purposes, cost of capital and related valuation possibilities being the primary ones. The following paragraphs provide an outline of each research undertaking.

In the first paper, thresholds in pay-outs of UK listed firms are initially evaluated. Shareholder cash flows in relation to the firm are combined into a common measure, and its distributional properties are examined using a robust test for discontinuities, having conceptual advantages over the tests applied in the literature thus far. Thresholds of interest are then evaluated with regard to discretionary accruals, the part of total accruals that is known to reflect possible misuse of the management.

In the second paper, the effect of (voluntary) audit on the firm's cost of debt is under scrutiny. Benefiting from a database containing detailed financial reports of all private firms in Slovenia, we are able to isolate those with a choice of being audited. Their average cost of debt is assessed from financial statements relatively more precisely than in related studies, and particular care is taken during the analysis, with a battery of sensitivity tests due to suspicions of self-selection. The robust results obtained are contrary to existing findings in the field.

In the third paper, we analyse the usefulness of accounting beta. Using different measures of accounting return, we estimate individual firms' betas based on proposed approaches. The high-quality dataset of Slovenian private firms is again used for this investigation. Betas obtained are then related to various performance measures with the intent of assessing their predictive power for possible use in risk analysis.

1 SHAREHOLDERS' PAY-OUT-RELATED THRESHOLDS AND EARNINGS MANAGEMENT[5]

ABSTRACT

We investigate the thresholds in net shareholder pay-outs (dividends, share buy-backs and issuances) of a large sample of UK quoted firms. Discretionary accruals are analysed at these thresholds in relation to earnings management. By examining distributions and using a robust test for discontinuities, we show the existence of thresholds at zero bins of variables in question. Additionally, by looking at differences in means and medians of discretionary accruals in sorted distributions, we find that they are statistically different from bin to bin in the vicinity of previously identified thresholds.

KEYWORDS: threshold analysis, test of discontinuity, pay-out policy, dividends, net shareholder cash flows, discretionary accruals

JEL CLASSIFICATION: G35

[5] The paper is co-authored with Aljoša Valentinčič (University of Ljubljana) and has been presented at the European Accounting Association 35th Annual Congress (Ljubljana, 2012) and at the 2012 American Accounting Association Annual Meeting (Washington, D.C.). It has been accepted for publication in *Economic and Business Review*.

1.1 INTRODUCTION AND PRIOR RESEARCH

Earnings, as the primary performance indicator of a firm, can be managed with the intent of companies reaching expectations-set performance thresholds (Burgstahler & Dichev, 1997), meeting analyst forecasts (Degeorge, Patel, & Zeckhauser, 1999), satisfying certain contractual obligations or fulfilling liabilities stemming from borrowing activities. Earnings management is also observed around certain corporate events, for example stock offerings or acquisitions (Erickson & Wang, 1999) or in connection with managers' compensations and bonus schemes (Bergstresser & Philippon, 2006). Still, earnings management cannot only be seen in a negative light. Under certain conditions, it may also be beneficial for owners – through application of a manager's acquired expertise in forecasting earnings or not dismissing a hired manager (who is good-working) too fast (Arya, Glover, & Sunder, 1998) – or at least neutral in a way that decisions taken with managed earnings in consideration are the same as they would be had earnings not been managed (Ronen & Yaari, 2010).

Among other factors, assuming managers' threshold reasoning and, consequently, the possible appearance of earnings management, is also a company's dividend policy. Dividend policy is determined by the company's management and, as there is no unique rule regarding the dividend policy, similarly efficient and successful companies can – and do – have different dividend pay-outs (Brigham & Ehrhardt, 2005). Miller and Modigliani (1961) proposed a model of dividend irrelevance where corporate value should not be related to pay-out policy in a perfect and frictionless capital market.[6] Excluding taxes and transaction costs, investors should thus be indifferent between (cash) dividends and capital gains.

Historically, this has not been the case. Lintner's (1956) first study of dividend policy found that managers are reluctant to cut dividends and are willing to increase them only gradually after they are convinced of enough support for a higher level of dividends in the form of higher future earnings. Existing dividend levels thus act as a strong benchmark. In seeking to explain investor preferences for (cash) dividends, Shefrin and Statman (1984) put forward two explanations. Firstly, one of "self-control", where investors decide to consume only from dividends, not portfolio capital, and are thus demanding dividends. Secondly, following Kahneman and Tversky's (1979) behaviour theory proposition that losses loom larger than gains, dividends are preferred by people who are averse to regret (a potential increase in share price had they sold their stock instead of receiving a dividend). The behaviourist view can also be a potential explanation for dividend decreases having a more negative market effect than dividend increases. If dividends and their levels present a benchmark for investors, market reactions to dividend changes, especially downward, are found to be substantial (e.g. Grullon, Michaely, & Swaminathan, 2002). Bhattacharyya (2007, pp. 9-10), for example, also provides a short overview of stylised facts on dividends.

[6] DeAngelo and DeAngelo (2006) contested that pay-out policy is not irrelevant as put forward by Miller and Modigliani (1961), but their proposition was reconciled as having assumed different agency costs (Handley, 2008).

A company's dividend policy can be affected by various factors such as market imperfections, behavioural considerations, firm characteristics or managerial preferences (Baker, Powell, & Veit, 2002). They differ in importance to individual firms, but they form the basis for possible earnings management. While the latter two factors include firm- and management-specific factors, the former two factors comprise broader aspects such as different tax treatment of dividends and capital gains, overcoming information asymmetries with signalling new or additional information and shareholder and investor clienteles that favour dividends in various degrees at various times (see Baker and Wurgler (2004) for a catering theory of dividends).

The distributional analysis and existence of thresholds was first suggested by Hayn (1995), who points out the discontinuity of earnings around zero in her study of the information content of loses.[7] Building on this empirical irregularity, Burgstahler and Dichev (1997) show that firms manage earnings to avoid reporting loses or earnings decreases. They interpret low frequencies of small loss (earnings decline) observations and high frequencies of small profit (earnings increase) observations as a consequence of firms' active efforts to cross the loss (earnings decline) threshold, which results in a migration of observations to the right of such a divide as seen if a distribution is plotted. Assuming that without earnings management the distribution of earnings would be fairly smooth, they test the documented asymmetry around zero (earnings or changes in earnings) thresholds.

Their findings are confirmed by Degeorge et al. (1999), who add another threshold of meeting analyst forecasts (i.e. avoid earnings surprises). Additionally, they establish a hierarchical order of the three with positive earnings threshold being predominant, followed by not falling short of previous earnings and lastly meeting analyst expectations. Critique of distribution analysis is based mainly on the effect of the deflator and the sample selection procedure, both of which can have an effect on the resulting distribution (Durtschi & Easton, 2005). If the deflator differs systematically between profit and loss firms, it can move the scaled observations towards or away from zero, which is most commonly the case when scaling by market price but is also found for other deflators (Durtschi & Easton, 2009). Alternative explanations of the discontinuity include asymmetric effects of taxes and special items that also contribute to observed shapes of distributions (Beaver, McNichols, & Nelson, 2007).

We therefore study thresholds and earnings management from the standpoint of attaining (expected) pay-outs to investors as earnings levels are often directly or at least indirectly connected to the pay-outs, e.g. in companies with fixed pay-out ratio policy or linked to various contractual obligations that set limits on pay-out possibilities. The first study in this area is the analysis of Finnish companies that managed earnings to ensure constant dividend

[7] An interesting case of goal reaching behaviour research is also documented in the analysis of Carslaw (1988), who finds an abnormal distribution of income numbers in financial statements, with the bias tilting towards numbers just above multiples of powers of ten (i.e. $N \times 10^k$) as cognitive reference points. A similar study in the US (Thomas, 1989) confirms the pattern, extending it to EPS data as well, and notes the different behaviour of profit and loss reporting firms.

pay-out to large institutional investors who prefer stable dividends (Kasanen, Kinnunen, & Niksanen, 1996), whereas, in the US, Daniel, Denis and Naveen (2008) have shown that firms manage earnings upward to reach expected levels of dividends (defined as last year's dividend) when they expect they would otherwise fall short of it, proving they are important thresholds for managers. Similar findings are reported by Atieh and Hussain (2012) for the UK. They show that earnings may be managed by firms that also try to avoid a decrease or even elimination of dividends and show a concern for coverage ratios, but the pressure is lower for larger firms that face less restrictive debt covenants. Debt covenants can impose restrictions on dividend payments if the financial position of the firm does not appear adequate. Moir and Sudarsanam (2007) report three quarters of firms in their study to have covenants attached to debt contracts. Another recent study by Bennet and Bradbury (2007) proposes dividend cover to be considered as a threshold, as firms are likely to manage earnings to avoid cutting dividends, i.e. keeping them at least at their prior year's values.

A comprehensive survey of CFOs by Brav, Graham, Harvey and Michaely (2005) shows that managers are willing to go to great lengths to avoid a dividend cut, but increases in dividends are a second-order concern. The authors also observe that share repurchases have become an established alternative pay-out instrument to dividends. However, they do not convey the same signals about companies' future behaviour or performance. Dividends are seen as a more permanent commitment to provide shareholders with a reasonably stable cash flow, whereas repurchases (particularly the ones on a discretionary and non-constant basis) are viewed as more flexible. Repurchases would now be the primary choice of many firms had their dividend history not existed. Interestingly, little support is found for the signalling hypotheses, i.e. not many managers state they are paying dividends to convey a company's true state (future prospects) or to intentionally separate them from competitors. Taxes are also not a primary concern in deciding about the payment/increase of dividends or in choosing between them and repurchases.

Repurchases are gradually replacing dividends as the primary pay-out method, with higher correlation to possible swings in earnings levels (with a shorter lag than for dividends). Skinner (2008) reports that firms that pay dividends only practically do not exist anymore. Other research has also found a decline in dividends paid by US listed firms, attributing it to both different firm characteristics and lower propensity to pay in general (Fama & French, 2001). Contrary to the latter, Grullon and Michaely (2002) find repurchases to be important in substituting dividends and US corporations financing them with funds that would have been otherwise used for dividend increases. What further motivates our research is a finding of Hribar, Jenkins and Johnson (2006), who assert that share repurchases are used by some companies to reach analysts' earnings per share forecasts. This implies that repurchases might be viewed as a possible earnings management tool.

In this paper, we analyse a UK sample with focus on three theoretically possible shareholder-related cash flows.[8] Next to dividend pay-outs, we also consider share repurchases and issuances of new shares, where the company is receiving funds from investors, resulting in a "negative" pay-out to shareholders. As these three shareholder-related cash flows might all be broadly regarded as dividend (pay-out) related decisions, we investigate the existence of thresholds in all three cases. This view is in line with Ohlson's (1995) valuation model that confirms Miller and Modigliani's (1961) value displacement property, as dividends are paid out of book value and consequently reduce market value on a one-for-one basis, rendering dividend policy irrelevant. Ohlson's model allows for (requires) negative net dividends, i.e. capital contributions (share issuances) exceeding pay-outs.

As accruals, and more precisely their discretionary component, are often associated with lower earnings quality and possible earnings management (e.g. see Dechow, Ge and Schrand (2010) for an overview), we are also interested to what extent discretionary accruals are present at the hypothesised pay-out thresholds. Although Yong and Miao (2011) find that dividend paying status is associated with the quality of earnings in general, they also find that the association is stronger when dividends increase in size. Therefore, inspecting the margin of dividend payment or dividend increase would be informative, since firms potentially having difficulties in reaching these thresholds could still make use of discretionary accruals to arrive to them.

H1: Companies attempt to reach thresholds of net shareholders pay-outs, which results in breaks in distributions of net shareholder pay-outs.

H2: Thresholds are associated with significant discretionary accruals levels.

This study helps to determine if repurchases and new share issuances, although not typically regular events, affect the pay-out level targeted by the management. This would broaden the perception of flows that are viewed as important in setting companies' dividend policy. In the process, a robust test of discontinuity of distribution is used (Garrod, Ratej Pirkovic, & Valentincic, 2006). Moreover, discretionary accruals as a proxy for earnings management are analysed in relation to the pay-out levels.

The remainder of the paper is structured as follows. Section 2 presents the research design employed in our analysis. That is followed by sample selection and data description in the next section. Section 4 presents the main empirical results and section 5 reports additional tests. Section 6 concludes.

[8] The beginning of section 1.3 explains our choice of the UK market.

1.2 RESEARCH DESIGN

We begin our investigation by constructing the variables representative of pay-out-related thresholds. Typically, dividend pay-outs are investigated either in their total amount or as change from year to year, both relative to opening total assets to account for size differences among firms. We denote DIV as the ratio of dividends to lagged total assets and D_DIV as the ratio of change in dividends from the previous year to the current year, scaled by lagged total assets. The variable D_DIV_DIV scales the dividend change from the previous year to the current year by the previous year's dividends level to get a variable representing relative yearly pay-out changes.

We calculate net shareholder cash flows as the sum of all cash flows investors might be dealing with, i.e. dividends received plus stock repurchases (as positive cash flows from the company to shareholders) less any share issuances in a given year (negative cash flows from shareholders to the company):

$$net\ shareholder\ cash\ flows = dividends + share\ repurchases - share\ issuances$$

Analogous to the dividend variables above, NSCF denotes the ratio of net shareholder cash flows to lagged total assets, D_NSCF scales yearly changes in net shareholder cash flows by lagged total assets and D_NSCF_NSCF is the change in net shareholder cash flows scaled by its lagged value. We also calculate and perform initial analyses on the scaled sums of dividends and stock repurchases only, but, as dividends are highly dominating this sum, the results do not differ in any important way from dividend-only findings and offer no incremental insights. This part is therefore not investigated further in this paper.

Variables as defined above are then distributed into bins of widths 0.005 for total assets scaling and 0.01 for pay-out scaling.[9] That corresponds to forming groups that contain observations with values within 0.5% of lagged total assets or 1% of lagged pay-out. These increments are also used for all subsequent bins. Bin widths for pay-out scaling are twice as big as for total assets scaling, because the latter are much larger in absolute value and their use as a denominator results in much smaller ratios that have to be presented with higher accuracy to prevent artificial "histogram over-smoothing" (Scott, 1979). All bins are defined

[9] These bin widths were selected for both, comparability with prior research investigating distributions, although of different analysed and scaling items (Burgstahler & Dichev, 1997; Durtschi & Easton, 2005; Bennet & Bradbury, 2007), and ease of interpretation. As setting the bin width can have a huge effect on the histogram being constructed (Wand, 1997), we considered various alternative widths in the process. While the software suggested widths for histograms of intervals in the following section were between 0.0045 and 0.0048 for total assets scaling and between 0.010 and 0.011 for pay-out scaling, various optimal bin width formulas (Scott, 1979; Wand, 1997; Garrod et al., 2006) produced a span of results. These ranged from widths of below 0.001 using Freedman-Diaconis' formula ($h = \frac{2 \times IQR}{\sqrt[3]{n}}$) to over 100 using the Sturgers' rule ($h = \frac{x_{max} - x_{min}}{1 + \log_2 n}$), also dependent on the variable. The latter widths were drastically reduced to 0.400 or less if outliers at 1% were removed before the calculation. Suggested bin widths obtained using the Scott's formula ($h = 3.49 \times \hat{\sigma} n^{-1/3}$) were between the two extremes.

to include lower bound, as we want the central bin to include observations with zero and small positive values and exclude the upper bound. Although debatable, we consider zero (as the scaled amount, or change, where applicable) as the first non-negative signalling value and thus the threshold to investigate. The so-called "zero bin" is therefore defined as including x if $0 \leq x < 0.005$ or $0 \leq x < 0.01$ in the case of scaling the variables by lagged pay-out. We also draw attention to the distinction between the terms used in subsequent analysis. The terms central bin, zero bin and bin(0) all denote the first bin of the distributions immediately to the right of zero, containing the smallest positive scaled observations and the exactly-zero observations at its lower bound. The bins further to the right are denoted as bin(1), bin(2), etc., and bins further to the left are denoted as bin(-1), bin(-2), etc. We use the expressions zero observations, zero values or zeros to denote observations in the central bin for which the values of the variables analysed are exactly equal to zero.

We plot histograms for all variables in this paper, with and without zero values. We do so because we expect a large number of observations to have the value of zero (either no dividends are paid out or the dividend level is the same as in the previous year, resulting in zero change), and we investigate whether zero values are predominant in threshold- attaining behaviour or does this behaviour exist without zeroes as well. Furthermore, a visual inspection of the distributions might reveal other potential points (bins) of interest that would be investigated further.

To formally test our assumption that zero bins in dividends and net shareholder cash flows are a valid and valuable threshold for companies, we employ a robust test for discontinuity of a distribution proposed by Garrod et al. (2006) – henceforth GRPV test – which requires no strict assumptions about the underlying distribution that one is testing. Requiring an assumption of normality in the test statistic was a shortcoming that accompanied (dis)continuity of distribution tests applied thus far in the literature, e.g. in Burgstahler & Dichev (1997). Developed with earnings-management applications in mind, the GRPV test is especially reliable in samples with more than 5,000 observations, a number that we easily exceed in our analysis.

The GRPV test statistic τ, derived from Chebyshev inequality, is computed as follows in equation (1.1) below, while assuming independent events gives us the inputs $E(X_i) = N \times p_i$ and $var(X_i) = N \times p_i \times (1 - p_i)$, where N is the total number of observations in the sample and p_i is the probability that an observation will fall into interval (i), primarily computed as an average of two adjacent intervals: $p_i = \frac{\tilde{X}_{i-1} - \tilde{X}_{i+1}}{2N}$.

$$\tau_i = \frac{\tilde{X}_i - E(X_i)}{\sqrt{var(X_i)}} \tag{1.1}$$

where $\tilde{X}_i$ is the actual number of observations in interval (*i*). Values of the test statistic are tabulated in Garrod et al. (2006) and a break in the distribution at interval (*i*) is identified at standard significance levels of 10%, 5% and 1% corresponding to absolute values of the τ statistics of 3.16, 4.47 and 10.00 respectively.

We are also interested in the role accruals have at the hypothesised thresholds and in particular the discretionary component of total accruals. We use the modified Jones model (Dechow, Sloan, & Sweeney, 1995) to estimate non-discretionary accruals, which we then use to determine the discretionary component of accruals as the difference between estimated values and total accruals. Firstly, total accruals are computed as:

$$TACC = (\Delta CA_t - \Delta CL_t - \Delta Cash_t + \Delta STD_t - Dep_t)/TA_{t-1} \quad (1.2)$$

where ΔCA_t is the change in current assets, ΔCL_t is the change in current liabilities, $\Delta Cash_t$ is the change in cash and cash equivalents, ΔSTD_t is the change in short term debt, Dep_t is depreciation and amortisation charges, and TA_{t-1} is lagged total assets. The modified Jones model is of the following form:

$$NDACC = \alpha_1(1/TA_{t-1}) + \alpha_2(\Delta REV_t - \Delta REC_t) + \alpha_3(PPE_t) \quad (1.3)$$

where TA_{t-1} is lagged total assets, ΔREV_t is the change in revenues, scaled by lagged total assets, ΔREC_t is the change in receivables, scaled by lagged total assets, and PPE_t is gross property plant and equipment, scaled by lagged total assets. Estimates of α_1, α_2 and α_3 are obtained by estimating the model in equation (1.3) by industries, with total accruals on the left-hand side. The estimated coefficients are then used to generate non-discretionary accruals.

The residuals of this model are discretionary accruals. Discretionary accruals are then analysed bin-wise for possible differences in their mean or median values. For this purpose, the t-test for means and the Wilcoxson rank-sum for medians are used. We expect statistically significant differences of discretionary accruals in bins around zero thresholds that would link the two potential indicators of earnings management and suggest discretionary accruals' use in connection with these thresholds.

1.3 SAMPLE SELECTION AND DESCRIPTION

We acquire data of publicly listed UK companies from *Datastream*. This market is selected because companies in the UK have historically paid considerable dividends that still persist. A large majority (almost 85%) of UK firms paid dividends in the 1990s and dividend pay-outs dominated proportion-wise, although repurchases have been on the rise (Renneboog &

Trojanowski, 2005).[10] Even recently, despite the trend of declining pure dividend pay-outs (Skinner, 2008), UK firms still tend to pay out dividends relatively more often than elsewhere (Denis & Osobov, 2008). As we want to have the initial sample as broad as possible, companies in the period from 1990 to 2012 are considered. Prior to 1990, the lack of data availability hinders a more detailed analysis, and an incomplete set of companies' financial information was provided for 2012 at the time of data collection.

A note is necessary about dividend inputs from the database. Since IFRS-compliant reporting became mandatory for all listed companies in the EU for annual periods beginning on or after 1st January 2005, a provision in the standards requires companies to account differently for dividends paid. Before 2005, under the Statement of standard accounting practice (SSAP 17 - Accounting for post balance sheet events, 1980), dividends were accounted for as an adjusting post balance sheet event in the period to which they related. After 2005, it is prohibited to recognise dividends declared after the end of reporting period as a liability to that same reporting period (IAS 10 - Events after the reporting period). Instead, such dividends are disclosed in the notes but accounted for in the period in which they are paid. Thus, actual pay-out liability has priority over its source (earnings). This results in reported dividends in period (t) consisting of final dividend for period (t-1) and interim dividend(s) for period (t). Final dividend for period (t) is then recognised in period (t+1) financial statements, etc.[11]

TABLE 1.1: SAMPLE CONSTRUCTION PROCEDURE

firm-year observations of listed UK companies in the period 1990 – 2012	38,429
- observations with missing essential data	742
- observations with zero total assets or sales	2,065
- observations of financial and utility firms	5,380
final sample firm-year observations (3,177 distinct firms)	30,242

NOTES: This table presents the sample selection process. Starting sample of listed UK companies is obtained from *Datastream* and identified using nation code (WC06027). All financial industry related firms and utilities are excluded due to their specific operating properties.

We first eliminate entries with missing data that are essential for the analysis, e.g. missing total assets or industry codes. We then remove observations with zero total assets and/or zero sales, as these are not believed to be truly operational and the former would imply division by zero in the construction of our variables of interest. Lastly, as a common step, we remove firms from financial and utility sectors because of their operating specifics. We end up with 3,177 distinct firms and 30,242 firm-year observations as presented in TABLE 1.1. Out of these, 62% include dividend payments, 60% report proceeds from sale or issuance of stock

[10] Dividend payments have been more frequent in the UK also due to the more favourable tax treatment of dividends in the past (prior to the Finance Act 1997, see section *Additional tests* for more information) but remained high after the change as well.

[11] For example, GlaxoSmithKline (GSK), in its 2005 annual report, shows a breakup of dividends into four interims of (all in £m) 568, 567, 568 and 792 for 2005 respectively and 575, 573, 571 and 684 for 2004 respectively. But, since GSK normally pays a dividend two quarters after the quarter it is relating to, dividends actually paid in 2005 were the last two interims for 2004 and the first two interims for 2005. The sum of those, £m 2390, is then reported as dividends for 2005 and also found as the database entry.

and 11% show a change in redeemed, retired or converted stock. A substantial share of issuances indicates a possible large effect on NSCF, whereas the extent of repurchases is somewhat smaller than expected. Examination of the data also revealed some confounding entries in the form of negative values of repurchases (14 identified) and negative values of issuances (134 such cases); both of them are not supposed to be negative following the definition of *Datastream* datatypes. A subset of each was, where possible, manually checked back against firms' annual reports and entries were corrected accordingly, e.g. into positive values. Lastly, otherwise sound observations with missing dividends, repurchase or issuance data had those set to zero.[12]

TABLE 1.2 presents sample structure by years. As there are no big deviations in any specific year, we can observe a first peak in the number of listed UK companies in 1997, followed by a slight decrease and another gradual but steady increase in the years following up to 2006. However, in the last years there is quite a strong decline coinciding with the development and deepening of the financial crisis. Data for 2012 were not fully populated at the time they were collected.

TABLE 1.2: YEAR COMPOSITION

YEAR	N	IN %	YEAR	N	IN %	YEAR	N	IN %
1990	1,154	3.82	1998	1,462	4.83	2006	1,551	5.13
1991	1,166	3.86	1999	1,389	4.59	2007	1,491	4.93
1992	1,147	3.79	2000	1,398	4.62	2008	1,352	4.47
1993	1,152	3.81	2001	1,443	4.77	2009	1,236	4.09
1994	1,184	3.92	2002	1,474	4.87	2010	1,124	3.72
1995	1,183	3.91	2003	1,502	4.97	2011	1,063	3.51
1996	1,467	4.85	2004	1,553	5.14	2012	658	2.18
1997	1,542	5.10	2005	1,551	5.13			

NOTES: Year distribution of the sample is presented in this table. Total number of observations is 30,242. At the time of data collection, year 2012 was not fully populated, therefore the number of observations is accordingly smaller.

Descriptive statistics in TABLE 1.3 suggest skewed distributions in almost all variables. As we are interested in the centre of distributions and especially in specific breaks, quartiles are reported along with the average, but standard deviations indicate that there are substantial extreme observations.[13] The number of observations is mostly affected by the denominator, particularly when scaling by past dividends and less so when scaling by past NSCF. The first four variables use lagged total assets for scaling and are limited by that. Only DIV and D_DIV have comparable means and medians, dividends amounting on average to around 2%

[12] There were 1,521 such cases, of those only 390 with missing dividends. Remaining missing repurchases and/or issuances would prevent the construction of NSCF with dividends mostly available. Omission of these cases does not change the results.

[13] We did not exclude any outliers, since our central analysis is concerned with specific observations at the centre of respective distributions. As all our variables are ratios, outliers can arise due to disproportionate numerators and denominators in the span of one year. This may be related to one variable only. Therefore, by excluding outliers relating to one variable, we could lose economically-sound observations in other variables.

of previous year's total assets and dividend change being positive but of minor amount compared to total assets. The remaining four variables have means and medians differing in both sign and magnitude, once more implying skewed distributions.

TABLE 1.3: DESCRIPTIVE STATISTICS

VARIABLE	MEAN	25%	MEDIAN	75%	SD	N
DIV	0.024	0	0.015	0.033	0.086	26813
NSCF	-0.256	-0.001	0.009	0.030	6.274	26813
D_DIV	0.002	0	0	0.004	0.097	26813
D_NSCF	-0.156	-0.012	0.001	0.016	9.047	26813
D_DIV_DIV	0.425	-0.004	0.084	0.241	11.836	17201
D_NSCF_NSCF	39.208	-1	-0.039	0.229	2,175	22829

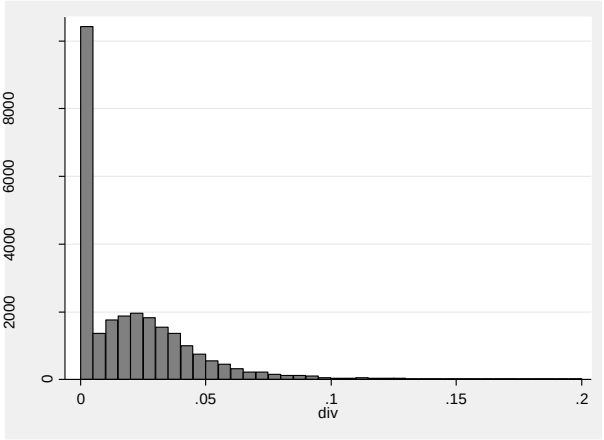
NOTES: This table presents descriptive statistics for analysed variables. DIV = dividends (WC04551) scaled by lagged total assets (WC02999); NSCF = (dividends + repurchases (WC04751) – issuances (WC04251)) = net shareholder cash flows scaled by lagged total assets; D_DIV = change in dividends from year (t-1) to (t) scaled by lagged total assets; D_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged total assets; D_DIV_DIV = change in dividends from year (t-1) to (t) scaled by lagged dividends; D_NSCF_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged net shareholder cash flows. Number of observations varies due to availability of respective denominators used in variables' construction.

For visual representation, we plot histograms of respective variables sorted into bins 0.005 or 0.01 wide as described in the previous section to arrive at distributions of interest. Almost all distributions imply a threshold at the zero bin, firstly in amounts relative to total assets (attaining dividends or non-negative net shareholder cash flows). Panels A and C in FIGURE 1.1 show striking mode bins of small non-negative pay-outs and a comparison of the two panels suggests that dividends clearly dominate also in NSCF calculation. Although halved in size (10,419 observations in bin(0) for DIV and 5,047 observations in bin(0) for NSCF), the zero bin of the latter is still clearly outstanding from the remaining distribution. There are also changes, with observations shifted to bins left of zero due to effect of issuances, but the distribution to the right of zero is not much different compared to DIV.

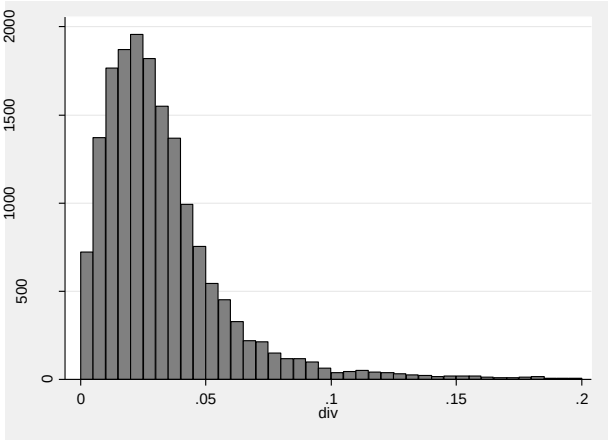
Bin(0) modes disappear when observations equalling exactly zero are excluded in panels B and D. What remains is a mode in some of the subsequent positive bins (around 2-3% of lagged total assets) for both DIV and NSCF. While the zero bin in DIV does not stand out in any way, the one in NSCF is missing almost 400 observations (estimated as the difference to the average of adjacent bins) for a smooth, normal-like distribution. This case could indicate that NSCF are not a threshold of their own, in a way that firms would target its combined value as a reference point for investors.

FIGURE 1.1: HISTOGRAMS OF SELECTED DISTRIBUTIONS

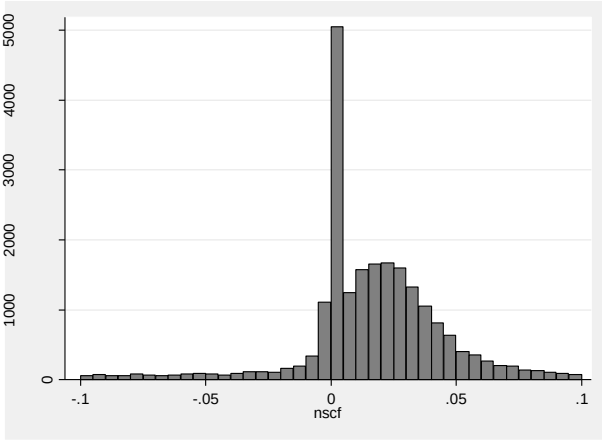
PANEL A: DIVIDENDS SCALED BY LAGGED TOTAL ASSETS



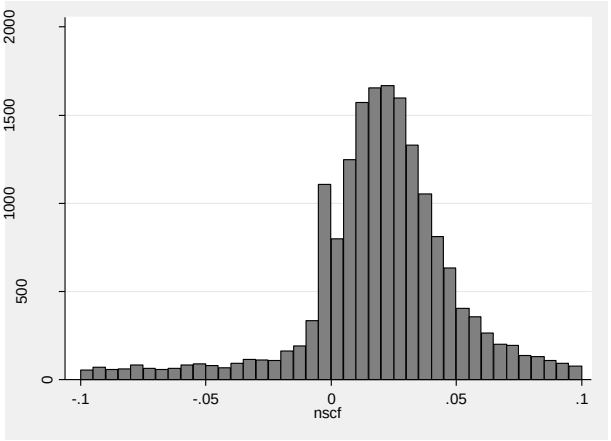
PANEL B: DIVIDENDS SCALED BY LAGGED TOTAL ASSETS (WITHOUT 0S)



PANEL C: NET SHAREHOLDER CASH FLOWS SCALED BY LAGGED TOTAL ASSETS



PANEL D: NET SHAREHOLDER CASH FLOWS SCALED BY LAGGED TOTAL ASSETS (WITHOUT 0S)

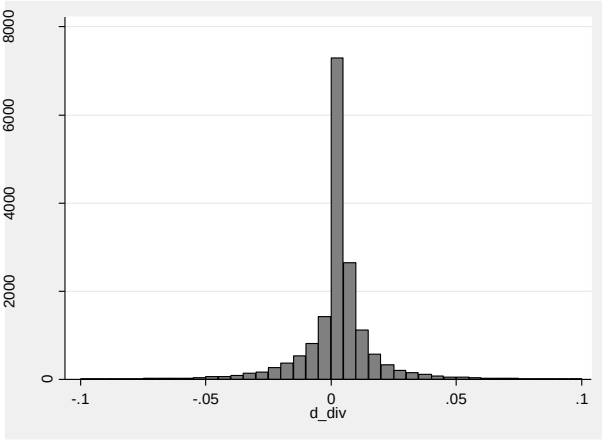


NOTES: This figure presents distributions of variables of interest. Panels A and B graph DIV, with and without zero observations, and panels C and D graph NSCF, with and without zero observations. DIV = dividends (WC04551) scaled by lagged total assets (WC02999) and NSCF = (dividends + repurchases (WC04751) – issuances (WC04251)) = net shareholder cash flows scaled by lagged total assets.
Bin width is 0.005 with lower bound inclusion, i.e. "zero bin" includes x if $0 \leq x < 0.005$, "bin one" includes x if $0.005 \leq x < 0.01$, etc.

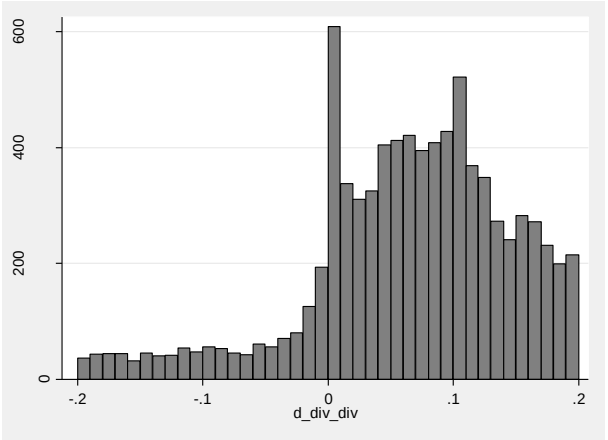
As observations of zero in given variables have such an effect on distributions, they are not reported in FIGURE 1.2, but are still included in the analysis that follows. Findings of clearly modular bin(0) are confirmed for scaled changes in dividends (Panel A) and scaled changes in net shareholder cash flows (Panel C) – even without observations equalling exactly zero. What is of interest is that, in case of D_NSCF, the bin with the second highest frequency is actually the first negative (and not positive, as more commonly expected), bin and this pattern is repeated bin-wise as we move away from zero bin. The negative effect issuances have on D_NSCF outweighs the combined positive effect of dividends and repurchases in these cases.

FIGURE 1.2: HISTOGRAMS OF SELECTED DISTRIBUTIONS

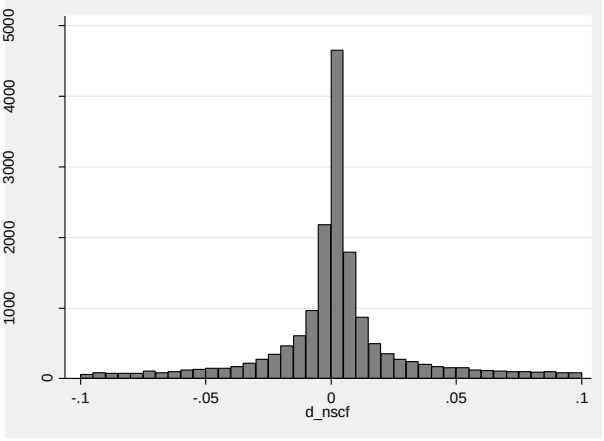
PANEL A: DIVIDEND CHANGES SCALED BY LAGGED TOTAL ASSETS (WITHOUT 0S)



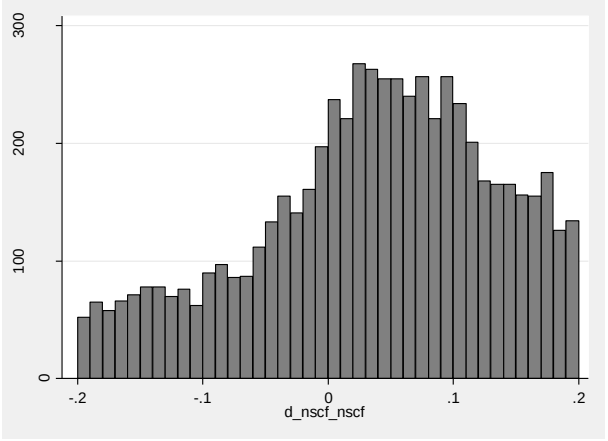
PANEL B: DIVIDEND CHANGES SCALED BY LAGGED DIVIDENDS (WITHOUT 0S)



PANEL C: NET SHAREHOLDER CASH FLOWS CHANGES SCALED BY LAGGED TOTAL ASSETS (WITHOUT 0S)



PANEL D: NET SHAREHOLDER CASH FLOWS CHANGES SCALED BY LAGGED NET SHAREHOLDER CASH FLOWS (WITHOUT 0S)



NOTES: This figure presents distributions of variables of interest. Panel A graphs D_DIV, panel B graphs D_DIV_DIV, panel C graphs D_NSCF and panel D graphs D_NSCF_NSCF, all without zero observations. D_DIV = change in dividends (WC04551) from year (t-1) to (t) scaled by lagged total assets (WC02999); D_DIV_DIV = change in dividends from year (t-1) to (t) scaled by lagged dividends; D_NSCF = change in net shareholder cash flows (= dividends + repurchases (WC04751) – issuances (WC04251)) from year (t-1) to (t) scaled by lagged total assets; D_NSCF_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged net shareholder cash flows.
For panels A and C, bin width is 0.005 with lower bound inclusion, i.e. "zero bin" includes x if $0 \leq x < 0.005$, "bin one" includes x if $0.005 \leq x < 0.01$, etc., and for panels B and D, bin width is 0.01 with lower bound inclusion, i.e. "zero bin" includes x if $0 \leq x < 0.01$, "bin one" includes x if $0.01 \leq x < 0.02$, etc.

Lastly, looking at pay-out changes relative to their lagged values (D_DIV_DIV and D_NSCF_NSCF, Panels B and D respectively), zero bin threshold mode remains obvious in dividend changes scaled by lagged dividends, but with a lot lesser difference compared to surrounding bins. In the case of D_NSCF_NSCF, zero bin practically blends in the

distribution and does not even seem to represent a threshold on the left (negative) side, the distribution itself not displaying any noticeable breaks whatsoever. This is once more suggestive that no systematic threshold attaining behaviour can be observed with regard to net shareholder cash flows.

Frequencies of dividend increases and net shareholder cash flows increases relative to their lagged values rise and/or remain high up to bins, denoting growth in the order of 10% (note that bin width is 0.01 in these two cases, as the denominators are considerably smaller than total assets used beforehand). Another interesting observation is bin(10) of D_DIV_DIV, denoting cases of dividend increase between 10% and 11% compared to the previous year's dividends. The bin in question appears to jut out of the distribution and is also statistically evaluated in the next section.

1.4 RESULTS

We attempt to formally confirm observations derived from histograms in the previous section with the use of the GRPV discontinuity of distribution test. TABLE 1.4 reports values of the GRPV test applied for all cases inspected earlier (with and without zero observations) and fully confirms our assumptions. In all six cases of zero values of variables included, zero bin represents a discontinuity from the remaining distribution, inferences being done at P-values far below 1% (critical values of the test in absolute terms for significance levels of 10%, 5% and 1% are 3.16, 4.47 and 10 respectively). The discontinuity is stronger in dividend-related variables compared to NSCF-related ones, implying that repurchases and issuances lessen the break to some extent by moving some observations away from zero bin. Scaling by total assets results in stronger breaks than scaling by lagged values of pay-out, suggesting that the choice of scaling variable also plays an important role in distribution analysis, as also suggested by previous research (Dechow, Richardson, & Tuna, 2003; Durtschi & Easton, 2005).

On the other hand, in cases where zero values of variables are excluded from distributions, discontinuity is still statistically confirmed in four out of six cases. The H_0 of continuity of distribution cannot be rejected in the first (DIV) and last case (D_NSCF_NSCF), as suggested and anticipated by the histograms in the preceding section, whereas other variables have results significant at the 1% level, although test values are considerably lower than before the exclusion of zeros. A comparison of the four variables representing scaled changes in either dividends or net shareholder cash flows shows consistently larger breaks in dividends. We thus regard them as the driving factor for threshold existence. The fact that breaks are lessened with the inclusion of repurchases and new share issuances implies that these are not used with the intent of reaching a NSCF-related threshold but rather for other purposes.

TABLE 1.4: GRPV DISCONTINUITY OF DISTRIBUTION TEST

	(1) ZERO OBSERVATIONS INCLUDED	(2) WITHOUT ZERO OBSERVATIONS
DIV	376.61	1.42
NSCF	115.39	-11.36
D_DIV	336.51	123.70
D_NSCF	124.24	62.61
D_DIV_DIV	73.02	21.16
D_NSCF_NSCF	39.97	1.95

NOTES: Reported are τ values of GRPV discontinuity of distribution test for zero bins of variables analysed. The first column reports test statistics computed including observations of zero in selected variables, and the second column reports test statistics computed without these observations.

With H_0*: the distribution function is continuous*, the values of τ at standard levels of significance are: at 10% $|\tau| = 3.16$, at 5% $|\tau| = 4.47$ and at 1% $|\tau| = 10$. As the number of observations in adjacent bins is required by the test, in the first row (case of DIV) bins on the left of zero (negative bins) are empty (there are no negative dividends) and are as such affecting test statistic computation.

DIV = dividends (WC04551) scaled by lagged total assets (WC02999); NSCF = (dividends + repurchases (WC04751) – issuances (WC04251)) = net shareholder cash flows scaled by lagged total assets; D_DIV = change in dividends from year (t-1) to (t) scaled by lagged total assets; D_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged total assets; D_DIV_DIV = change in dividends from year (t-1) to (t) scaled by lagged dividends; D_NSCF_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged net shareholder cash flows.

We therefore confirm breaks at zero bins in the distributions of scaled pay-outs, which is indicative of the existence of thresholds. The exclusion of zero observations has different meanings depending on the variable in question. The DIV variable is specific, as it is bounded to the left of zero, i.e. there are no negative cash dividends. Zero observations in this case are firms that do not pay dividends at all. Therefore, their exclusion is justified as they obviously do not try to attain any pay-out threshold. The majority of dividend pay-outs are concentrated in the first ten bins, i.e. up to 5% of previous year's total assets. Nevertheless, we keep the analysis of DIV in both versions as a reference. Similarly, in NSCF, it is practically never the case that the three components would sum up to exactly zero, meaning that zero observations are those of zero values in all three components and these again are validly excluded.[14] This is not as straightforward in scaled changes of dividends and net shareholder cash flows. D_DIV or D_DIV_DIV equal to zero may indicate a non-payer, but it can also indicate a no-change in dividends, keeping their level unchanged from the previous year. Analogously, D_NSCF and D_NSCF_NSCF values of zero can mean non-payers, no-changes in the sense that the firm only pays dividends and does not use repurchases and/or issuances or rare cases of the NSCF components summing exactly to zero.

We also separately evaluate bin(10) of the D_DIV_DIV distribution. The value of the test statistics of the GRPV test amounts to 6.22 and is significant at the 5% level. As the bin corresponds to a 10% to 11% increase of the dividends from the previous year, it also looks

[14] Actually, there are seven cases in which dividends, repurchases and issuances sum up to exactly zero, but only pairwise – in none of them all three at the same time.

like a convenient orientation value for possible future pay-out increases. The GRPV test value in bin(10) of the variable D_NSCF_NSCF is 0.33, limiting previous reasoning to cash dividend pay-outs only.

Focusing back on central bins, in TABLE 1.5 we investigate statistically significant (a 5% level is tested) differences between mean (median) values of discretionary accruals from the modified Jones model across bins. For each variable, with and without zeros, mean and median discretionary accruals from the model were computed for each bin in range from (-10) to (10), representing ±5% of lagged total assets or ±10% of lagged pay-outs, the difference due to different bin widths in the two approaches. Only the values for bins from (-2) to (2) are tabulated. We do this firstly because this is where our research interest lies, as these are the most likely places in the distributions of pay-outs where the discretionary component of accruals would be important. And secondly, because there are not many significant differences further away from the centres of distributions. Finally, we keep our analyses compact for brevity of exposition. Bin means (medians) of discretionary accruals are compared to the means (medians) of discretionary accruals in the next bin using a t-test for the means and the Wilcoxson rank-sum test for the medians. For example, a boldfaced mean of DIV in bin(0) (0.955) indicates that it is significantly different from the mean in bin(1) (0.032). Similarly, a boldfaced median for NSCF in bin(-1) (0.011) indicates that it is significantly different from the median in the following bin(0) (0.091).

Note that seemingly missing values are actually excluded for clarity. Variable DIV does not have negative bin observations (no negative dividends), while the results for bins (-2), (1) and (2) are not listed for versions of variables without zero observations because they are exactly the same as on the left-hand version. The versions only differ in the number of observations in the central bin (bin(0)) and possible differences only arise in comparisons of bin(-1) to bin(0) and of bin(0) to bin(1).

TABLE 1.5: MEANS AND MEDIANS OF DISCRETIONARY ACCRUALS BY BINS

BIN	MEAN	MEDIAN	MEAN	MEDIAN	MEAN	MEDIAN	MEAN	MEDIAN
	DIV		DIV (WITHOUT 0)		NSCF		NSCF (WITHOUT 0)	
-2					**0.169***	**0.056***		
-1					**0.114***	**0.011***	**0.114***	**0.011***
0	**0.955***	**0.128***	**0.006***	**-0.025***	**0.699***	**0.091***	0.011	**-0.026***
1	0.032	-0.012			0.027	-0.007		
2	0.038	-0.008			0.028	-0.010		
	D_DIV		D_DIV (WITHOUT 0)		D_NSCF		D_NSCF (WITHOUT 0)	
-2	**0.025***	-0.030			**0.063***	-0.018		
-1	**0.003***	**-0.035***	0.003	**-0.035***	**0.028***	**-0.020***	0.028	-0.020
0	**0.564***	**0.034***	**0.005***	**-0.023***	**0.347***	**0.004***	0.025	**-0.022***
1	**0.049***	**0.006***			**0.035***	**-0.007***		
2	0.099	**0.028***			0.071	0.007		
	D_DIV_DIV		D_DIV_DIV (WO 0)		D_NSCF_NSCF		D_NSCF_NSCF (WO 0)	
-2	-0.012	-0.039			0.056	-0.028		
-1	**-0.022***	**-0.051***	-0.022	-0.051	0.099	**-0.015***	0.099	-0.015
0	**0.054***	**-0.016***	-0.023	-0.043	0.102	**0.007***	-0.002	-0.036
1	-0.007	-0.037			0.051	-0.038		
2	-0.007	-0.035			0.015	-0.033		

NOTES: This table reports means and medians of discretionary accruals form the modified Jones model by central bins of distributions. Each variable has bin means reported in the first column and bin medians in the second column of its box and is firstly evaluated with all observations included and then with zero observations excluded ("WO 0" in the last variable row stands for "WITHOUT 0").

Bolded font and asterisk denote that respective means (medians) are different from means (medians) in the following bin at the 5% significance level, i.e. a bolded* mean (median) in bin(0) is different from the mean (median) in bin1 at 5%. Tests used were t-test for means and Wilcoxson rank-sum test for medians.

Modified Jones model is of the form: $NDACC = \alpha_1(1/TA_{t-1}) + \alpha_2(\Delta REV_t - \Delta REC_t) + \alpha_3(PPE_t)$. $NDACC$ are non-discretionary accruals, TA_{t-1} are lagged total assets (WC02999), ΔREV_t is the change in revenues (WC01001), scaled by lagged total assets, ΔREC_t is the change in receivables (WC02051), scaled by lagged total assets, and PPE_t is gross property plant and equipment (WC02301), scaled by lagged total assets. To estimate α_1, α_2 and α_3, total accruals are considered as the dependent variable and calculated as: $TACC = (\Delta CA_t - \Delta CL_t - \Delta Cash_t + \Delta STD_t - Dep_t)/TA_{t-1}$. ΔCA_t is the change in current assets (WC02201), ΔCL_t is the change in current liabilities (WC03101), $\Delta Cash_t$ is the change in cash and cash equivalents (WC02001), ΔSTD_t is the change in short term debt (WC03051), Dep_t is depreciation and amortisation charges (WC01151) and TA_{t-1} is lagged total assets. Finally, discretionary accruals are obtained as the difference between total accruals and non-discretionary accruals predicted by the model.

DIV = dividends (WC04551) scaled by lagged total assets; NSCF = (dividends + repurchases (WC04751) – issuances (WC04251)) = net shareholder cash flows scaled by lagged total assets; D_DIV = change in dividends from year (t-1) to (t) scaled by lagged total assets; D_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged total assets; D_DIV_DIV = change in dividends from year (t-1) to (t) scaled by lagged dividends; D_NSCF_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged net shareholder cash flows.

For variables DIV, NSCF, D_DIV and D_NSCF, bin width is 0.005 with lower bound inclusion, i.e. "zero bin" includes x if $0 \leq x < 0.005$, "bin one" includes x if $0.005 \leq x < 0.01$, etc., and for variables D_DIV_DIV and D_NSCF_NSCF, bin width is 0.01 with lower bound inclusion, i.e. "zero bin" includes x if $0 \leq x < 0.01$, "bin one" includes x if $0.01 \leq x < 0.02$, etc. Bins in the range from -10 to 10 were tested but are not tabulated. Mean

and median results of variables without zero observations are also not reported for bins -2, 1 and 2, as they are the same as those with zero observations included (the two versions differ only in the frequency of the zero bin).

In almost all instances, significant differences in both means and medians of discretionary accruals are found at bin(0) or bin(-1) – the two that compare the central bin(0) with the neighbouring bins. Bin means of discretionary accruals are generally much larger than medians of discretionary accruals as a consequence of skewed distributions and are usually biggest in bin(0), means of bin(0) in the first four variables being much bigger than means of other bins. Interestingly, excluding zero observations results in smaller bin(0) mean and median discretionary accruals compared to cases with all observations included, and with the last two variables (D_DIV_DIV and D_NSCF_NSCF) they even become insignificantly different to other bins' means and medians. Assuming that discretionary accruals are associated with some form of purposeful managerial actions and may be a tool to manage earnings or some other operating result by the management, their size and significance in central zero bins of distribution is at least indirect evidence of such actions.

The two signals combined, that of accruals and breaks in pay-out distributions, indicate that the thresholds identified in this study can be associated with some firms' management activity. As firms aim to meet their planned, announced or established levels of pay-out on one side and face anticipations of shareholders and potential investors on the other side, thresholds in the form of positive pay-outs or pay-out changes gain in importance. Not wanting to fail expectations, firms may make use of accrual manipulation to arrive at desired financial results that enable a suitable pay-out policy.

1.5 ADDITIONAL TESTS

To address the potential sensitivity of discontinuity tests to neighbouring bin values suggested by previous research (Bennet & Bradbury, 2007), we first recalculate GRPV test statistics using two adjacent bins on either side of bin(0) (i.e. bins -2, -1, 1 and 2) and report it in column 1 of TABLE 1.6. The only difference to the main test is that the break in NSCF without zero observations is now only significant at 5% compared to previous 1% significance. All the other variables' τ values are very similar to previously reported ones. We also re-calculate the GRPV test using only next-to-adjacent bins (i.e. -2 and 2) and the results (see APPENDIX 1.1) remain quantitatively and qualitatively substantially unchanged. This confirms the robustness of our earlier results to the details of test specifications.

Extending the analysis beyond the primary hypotheses, we then use the test statistics to study what happens with the breaks in the distributions in relation to specified cut-offs, identified as potentially important for pay-out time dynamics. In columns 2 and 3 of TABLE 1.6, we look at the pre- and post- 2008 financial crisis periods. The inferences are unchanged with an adjustment in significance to 5% for NSCF and D_DIV_DIV, both without zero observations. What we do observe comparing the two sub-periods is that for the years 2008 and following

all test values are smaller, mainly in the order of one half, compared to the pre-2008 period (apart from DIV and D_NSCF_NSCF, both without zero observations, which are insignificant as in the main test specification). Smaller values imply a less pronounced break in the distribution (although still highly significant), meaning less observations are concentrated in zero bins and more in the adjacent bins. This could be interpreted as some of the firms not pursuing or not being able to pursue pay-out thresholds in the crisis period given the harsher economic conditions they found themselves in.

TABLE 1.6: ADDITIONAL GRPV DISCONTINUITY OF DISTRIBUTION TESTS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	4 BINS	CRISIS EFFECT		IFRS USED		FINANCE ACT	
	USED	PRE-2008	2008&→	NO	YES	PRE-1997	1997&→
DIV	349.19	297.96	251.13	274.89	278.36	74.53	400.21
DIV (WO 0)	2.28	0.82	1.61	1.03	1.07	2.97	0.23
NSCF	124.50	90.59	75.17	86.61	78.64	33.14	112.96
NSCF (WO 0)	8.39	9.88	5.62	8.94	7.10	0.19	12.75
D_DIV	401.72	281.52	201.50	261.58	227.93	109.76	335.98
D_DIV (WO 0)	155.96	114.15	47.71	107.18	62.14	68.41	103.21
D_NSCF	158.15	108.84	61.19	105.74	65.54	51.50	115.40
D_NSCF (WO 0)	86.81	58.07	23.54	56.50	27.28	33.03	53.32
D_DIV_DIV	78.00	69.00	24.20	66.44	30.39	52.07	52.27
D_DIV_DIV (WO 0)	23.69	20.58	5.56	19.44	8.42	18.54	12.57
D_NSCF_NSCF	39.52	36.85	15.56	36.82	15.64	27.51	29.31
D_NSCF_NSCF (WO 0)	1.75	1.41	1.77	1.46	1.47	2.83	0.31

NOTES: Reported are τ values of GRPV discontinuity of distribution tests for zero bins of variables analysed with and without zero observations (the latter denoted by "WO 0" abbreviation). Column 1 reports statistics using 2 adjacent bins on either side of bin(0), columns 2 and 3 use 2008 as a cut-off year to analyse the effect of financial crisis, columns 4 and 5 analyse the effect of IFRS and column 6 and 7 use 1997 as a cut-off year to analyse the effect of change in legislation (Finance Act).

With H_0: *the distribution function is continuous*, the values of τ at standard levels of significance are: at 10% $|\tau| = 3.16$, at 5% $|\tau| = 4.47$ and at 1% $|\tau| = 10$. As the number of observations in adjacent bins is required by the test, in the first two rows (case of DIV) bins on the left of zero (negative bins) are empty (there are no negative dividends) and are as such affecting test statistic computation.

DIV = dividends (WC04551) scaled by lagged total assets (WC02999); NSCF = (dividends + repurchases (WC04751) – issuances (WC04251)) = net shareholder cash flows scaled by lagged total assets; D_DIV = change in dividends from year (t-1) to (t) scaled by lagged total assets; D_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged total assets; D_DIV_DIV = change in dividends from year (t-1) to (t) scaled by lagged dividends; D_NSCF_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged net shareholder cash flows.

Our next cut-off is IFRS implementation. International Financial Reporting Standards and their predecessors, International Accounting Standards, are mainly regarded as being of higher quality than existing local standards (Barth, Landsman, & Lang, 2008; Armstrong, Barth, Jagolinzer, & Riedl, 2010), although alternative views are also not uncommon (Soderstrom & Sun, 2007; Ahmed, Neel, & Wang, 2013), and they also directly affected accounting for dividends as noted under sample selection. IFRS are compulsory since 2005, and this appears as a ready candidate for assessing the standards' effects. We deem it a

second-best option, as before 2005 firms could voluntarily adopt IFRS and even after 2005 data show some financial statements in our sample as being prepared under UK GAAP. Our database allows us to identify the standards that the company used in preparing its reports and we thus classify 7,678 observations as prepared under IFRS. These mainly coincide with the period after 2005, but there is some overlapping with local standards, especially in the years 2004-2007. The results (columns 4 and 5 in TABLE 1.6) in terms of subsample comparisons are analogous to that for the crisis effect. IFRS observations exhibit notably lower test values than non-IFRS observations for all but two insignificant variables leading us to conjecture that IFRS usage is associated with "smoother" distributions. A potential explanation for this is the negative effect of stricter standards on firms' willingness and/or ability to achieve pay-out thresholds, positioning less of them in central bin(0).

We identify the last cut-off to be 1997, as pointed out by the dividend taxation literature. Namely, in order to end the discriminatory tax treatment in favour of dividend pay-outs compared to capital gains, the Finance Act of 1997 increased taxation of dividend income, primarily affecting pension funds that were the largest class of investors in UK equities.[15] Consequently, Bell and Jenkinson (2002) find a significant reduction in valuation of dividend income after the tax reform and initial evidence of reductions in dividend pay-out ratios, whereas Bond, Devereux and Kleem (2005) observe that it was the form of dividend payment that changed, with the level marginally affected. Our two subsamples comparison in columns 6 and 7 of TABLE 1.6 reveals considerably smaller (yet again, still above critical values) values of discontinuity tests for most of the significant variables in the pre-1997 years compared to the later period. A potential explanation would be that after the 1997 tax reform dividends were not as large as before but still present (due to other investors' interests, signalling and other reasons), which resulted in their concentration in the smallest positive bin(s) of our distributions, producing a higher value of the test statistic. It has to be acknowledged, however, that all these additional tests analyse only a specific factor possibly affecting pay-out dynamics, and that firms' distributional decisions in real life are based on many elements, the relative importance of which is changing with time. Moreover, even in our cases, there are overlapping effects, especially towards the end of the analysed time period.

1.6 CONCLUSION

This paper investigates the existence of pay-out-related thresholds as an extension of documented earnings management thresholds. With dividends and distinct net shareholder cash flows defined variables, discontinuities in their distributions are statistically analysed, employing a robust test that does not assume that the distributions of underlying variables are normal. The importance of pay-out policy for the firms' economic environment and for the

[15] More specifically, the 1997 Finance Act abolished repayment of dividend tax credits to tax-exempt investors, UK pension funds being the largest beneficiaries of the previous regulation.

firms' themselves (as a signalling mechanism, clientele and tax induced decisions, etc.) leads us to consider threshold analysis to be of considerable importance for our study.

We find evidence of breaks in distributions at suggested thresholds of zero or zero change of variables in question, supporting our reasoning that these are important for firms. Dividend thresholds are more pronounced than net shareholder cash flows thresholds, suggesting the dominating role of cash dividends over share buybacks and over the netting role of new shares' issuances. Although repurchases are almost as common as dividend pay-outs, their effect is much smaller. Adding share issuances in the calculation to arrive at net shareholder cash flows disperses the pay-out distributions and reduces the breaks. Hence, repurchases and issuances are relatively much less important drivers of targeted pay-out level in the broader sense and net shareholder cash flows do not represent a separate threshold independent of cash dividends.

Discretionary accruals as a proxy for earnings management are analysed at identified thresholds. We find significant differences and/or magnitudes of discretionary accruals at or in the closest proximity of central bins of distributions. This is another sign of their importance for firms as accruals are considered as a convenient and potentially strong earnings management tool. Additional analyses employ the discontinuity test to examine various sample partitions to arrive at more insightful results. We also find that a 10% dividend increase in the dividend paid is significant, suggesting the increase of dividends of 10% is common.

Known caveats relate to distributional analysis being questioned as an earnings management measure and, although supportive of our hypotheses and considered general, the accrual model employed is merely one of several accruals modes, and these have been found to produce results of different significance or even conclusions. In a related but not directly comparable research, Dechow et al. (2003) are not able to confirm that discretionary accruals are driving the breaks in earnings distributions and offer supplementary explanations. Nevertheless, we consider the evidence in this paper strong enough to stress the importance of firms' pay-out policy, shedding additional light on the effects of pay-out policy components.

Finally, we also identify some potential areas for future research. For example, it might be possible to derive more precise tests that would be able to distinguish the effects of the financial crisis and the effects of new standards where the two periods overlap significantly. This might be related to the use of more refined discretionary accruals models. These models might also be investigated independently of the breaks due to standards, financial crisis, etc. We also do not consider possible "real" earnings management (Roychowdhury, 2006), which might be a significant component of the overall management to achieve earnings and net shareholders' flows thresholds.

2 DOES FINANCIAL STATEMENT AUDIT REDUCE THE COST OF DEBT OF PRIVATE FIRMS?[16]

ABSTRACT

This study examines the effect of audit on small private firms' cost of debt. We use a sample of 1,949 small private firms operating in the period 2006-2010 with optional financial statement audit. High quality data allow us to construct a more precise interest rate measure than existing studies employ. Contrary to several existing studies, we find a robust central result that voluntary audit increases rather than decreases the cost of debt financing. Only if the voluntary audit is performed by a Big-4 auditor does the cost of debt decrease (or is smaller than for non-Big-4 auditees). The results are not sensitive to the estimation method (OLS, Heckman's two-step, PSM) and (sub-)sample selection. Additional analyses show that audited firms' earnings are less informative about future operating performance than earnings of their unaudited counterparts. Our results also indicate that results are sensitive to cost of debt definition and this might have affected the results reported in the existing literature.

KEYWORDS: private firms, voluntary audit, cost of debt, self-selection

JEL CLASSIFICATION: M42

[16] The paper is co-authored with Urška Kosi (Humboldt University Berlin) and Aljoša Valentinčič (University of Ljubljana) and has been presented at the European Accounting Association 36th Annual Congress (Paris, 2013) and at the 2013 American Accounting Association Annual Meeting (Anaheim).

2.1 INTRODUCTION

The importance of auditing for the cost of capital has been largely studied in the setting of public firms but is also gaining momentum in the context of private firms. Financial statements' certification by an outside party is generally seen as providing additional assurance about their quality and improves their credibility to outside users (Cassar, 2011; Dedman & Kausar, 2012). Auditing acts as a guarantee that the statements have been prepared in accordance with existing regulations and accounting principles and are adequately reflecting firms' underlying economic performance. Overall, audit verification should result in the reduction of the cost of capital relative to a non-audited firm, all other things equal. Assuming that the information set available to providers of capital is less rich than for large, publicly-quoted firms, voluntary audits as an information intermediary should thus be relatively more important in the case of (small) private firms even in the absence of mandatory audits of publicly-quoted firms. Although the roles of auditors are likely to be different in private firms, there are incentives that affect the decision to be audited and, as discussed by Cassar (2011), the private firm setting provides a relatively new framework for investigating and understanding the fundamental issues of accounting.

In a public firm setting, where auditing is mandatory, researches cannot observe the effects on the cost of debt *per se* but only firm characteristics associated with mandatory audits. A setting where audits are voluntary, however, allows researchers to observe directly the effects of (voluntary) audits on the cost of debt as an important economic outcome that affect firms. Traditionally, audits are valued by the capital market for their role as an information intermediary and for their insurance role (Mansi, Maxwell, & Miller, 2004). Audit helps alleviate information asymmetries by independently verifying the reliability and integrity of the financial reporting process to users of financial statements. Auditors also offer a risk guarantee because of the responsibility that the auditors normally carry in the case of audit failures. In a public firm setting, the authors find investors valuing the insurance role by requiring a lower required rate for return on corporate debt.

These roles might, however, be different for private firms (and private debt). First, financial statements are less likely to be used to alleviate information asymmetries between owners and managers (Ball & Shivakumar, Earnings quality in UK private firms: Comparative loss recognition timeliness, 2005; Garrod, Kosi, & Valentincic, Asset write-offs in the absence of agency problems, 2008; Kosi & Valentincic, 2013). Moreover, creditors may rely more on other information sources, e.g. private information gathered over time from previous relationship with a firm, its owners and the local community (Berger & Udell, 2006). The effectiveness of audits in private firms also depends on the litigation risk and a country's tax environment (Vander Bauwhede, Willekens, & Gaeremynck, 2003; Van Tendeloo & Vanstraelen, 2008; Cano-Rodríguez, 2010). Due to the lower level of litigation risk in the private firm setting and in Europe in general compared to the US (Francis J. R., 2004;

Szczesny & Valentincic, 2013), the insurance role of auditors might be less important than for larger and/or publicly-quoted firms.

Despite these limitations to the value of audits in a private firm setting, audits might still mitigate the relations between the owners and/or managers on one hand and creditors on the other, thereby lowering the monitoring costs of creditors (Collis, 2010). This may particularly be the case in private firms with simpler governance structures and absence of other corporate governance tools acting as control mechanisms. Alternatively, there can still be demand for audit even from the owner/manager as compensation for the loss of control because of an organisation's hierarchical structure (Abdel-Khalik, 1993). Due to "financial statement lending" (Berger & Udell, 2006), private firms must in any case have: (i) useful financial statements; and (ii) a strong financial position as reflected by the financial rations calculated from those statements.

We use a Slovenian setting that has a weakly developed capital market and is, as common in the continental Europe context, dominated by bank financing of firms. Banks are the main source of external financing, even more so for (small) private firms with practically no access to external equity markets. Cost of debt considerations are therefore central to private firm finance. An additional advantage of our setting is access to a domestic database with financial statement information on all firms operating in the economy and containing standardised reports for both public and private firms.[17] Compared to public firms that are required to publish their yearly accounts, financial statements for private firms are often not publicly available, especially at the level of detail that would allow researchers to construct a precise measure of the average interest rate faced by those firms.

We test our prediction that voluntary external audits significantly affect the cost of debt. However, the direction of the relation between voluntary audits and the cost of debt depends on reporting incentives, including the underlying reasons for the decision of audit. Firms are probably aware of the effect financial statement audit can have on their cost of debt. Having a true incentive to certify their financial statements as being of good quality and accurately reflecting their operations, they undergo audit to acquire debt capital at a lower lever than otherwise comparable firms of similar risk. Analogous to "serious adopters" of IAS (Daske, Hail, Leuz, & Verdi, 2013), these firms are termed "serious auditees", committed to higher transparency of their financial statements. There may, however, be another set of firms that submit their statements for audit only to label them as being of higher quality without a true decision for higher reporting quality. They hope that the providers of capital would only be interested in the audit label and would therefore be prepared to supply it at a lower rate. Such firms are termed "label auditees". If capital providers are in a position to differentiate between the two groups, serious and label auditees, the pricing of debt for them will also differ.

[17] The system of data collection is similar to the Belgian system in Europe and to the South Korean system in Asia.

To test our predictions, we employ a large sample of 1,949 small private firms operating in the period 2006-2010 in the Republic of Slovenia (EU). Our dependent variable, the interest rate, is constructed based on detailed financial statement data that allow us to construct a relatively precise measure of the cost of debt. We distinguish between "serious auditees" and "label auditees" based on the likely power the auditees can exert on the auditors to provide a favourable outcome. Contrary to several existing studies, we find a robust central result that voluntary audits increase rather than decrease the cost of debt financing. Only if voluntary audit is performed by a Big-4 auditor does the cost of debt decrease.

We contribute to the existing literature in at least three important ways. Firstly, contrary to existing literature (Kim, Simunic, Stein, & Yi, 2011; Minnis, 2011), we show that the providers of debt finance do not necessarily view voluntary financial statement audits as increasing transparency of private firms' financial statements and that voluntary audits do not necessarily reduce the cost of debt. Providers of debt capital differentiate between "serious" audits and "label" audits, rewarding the former with a decrease in cost of debt and penalising the latter with an increase in the cost of debt over and above an otherwise equal, unaudited firm. Secondly, we show that cost of debt effects are subject to endogeneity issues. We model the relation of the decision to be voluntarily audited as a function of economic determinants related to complexity of ownership, operations and financing. We then control for these determinants to in the cost of debt model and show that endogeneity may significantly affect the results if left uncontrolled for. Thirdly, we carefully control for self-selection into voluntary audits. We are careful to assume either that observable variables cause self-selection or, alternatively and more likely in a private firm setting, that other unobservable factors affect the decision to audit and the cost of debt outcome (Tucker, 2010). Fourthly, our data source contains more detailed financial statement data compared to several existing studies. We are thus able to reduce the measurement error in our dependent variable (the interest rate), in a relatively precise manner compared to prior studies.

The remainder of the paper is structured as follows. Section 2 describes previous research in the field and develops the hypotheses. Section 3 presents our research design, while section 4 describes the sample and its selection process. Section 5 presents the main results, section 6 continues with additional analyses and section 7 concludes.

2.2 PRIOR RESEARCH AND HYPOTHESES DEVELOPMENT

Existing literature investigates different determinants of the cost of debt and its association to various attributes of financial reporting. A common finding is that the cost of debt is reduced with higher financial reporting transparency (Francis, LaFond, Olsson, & Schipper, 2005; Bharath, Sunder, & Sunder, 2008; Bharath, Dahiya, Saunders, & Srinivasan, 2011; Florou, Kosi, & Pope, 2012). Moreover, much research on the economic effect of audits on cost of debt has been done with regard to external audits improving the credibility and reliability of financial reporting in a public firm setting with mandatory rather than voluntary audit

requirements. For instance, Chu, Mathieu and Mbagwu (2009) find that various audit-related information is important for banks' lending decisions. This establishes a correlation between various attributes of the firm and the economic outcome, the cost of debt. It does not, however, enable inference of causality.

Prior literature relates cost of debt to various characteristics of audit firms as measures of the audit quality these firms provide. These characteristics include, for instance, auditor size (Mansi et al., 2004; Pittman & Fortin, 2004; Cano-Rodríguez, 2010; Karjalainen, 2011), audit or non-audit fees (Brandon, Crabtree, & Maher, 2004; Dhaliwal, Gleason, Heitzman, & Melendrez, 2008) or audit tenure (Mansi et al., 2004; Chu et al., 2009; Kim, Song, & Tsui, 2012). In addition, studies find that the cost of debt is reduced if the audit is performed by more than one auditor, whereas higher cost of debt is associated with modified audit reports (Karjalainen, 2011). On the other hand, research on the effect of the audit *per se* is relatively scarce (Blackwell, Noland, & Winters, 1998; Kim et al., 2011; Minnis, 2011). Recent research investigating the setting with voluntary audit finds that private firms with voluntarily audited financial statements incur lower cost of debt (e.g. Kim et al., 2011; Minnis, 2011). Similarly, Spanish SMEs with mandatorily and voluntarily audited financial statements incur lower cost of debt (Huguet & Gandía, 2012). In a setting of small firms with mandatory audit, Big-4 auditors are also found to decrease the cost of debt (Karjalainen, 2011). The largest international audit firms (i.e. Big-4) are associated with higher audit quality due to various reasons. These include reputational concerns, better professional skills and bigger independence. Pittman and Fortin (2004) document lower cost of debt for young public firms that have retained their Big-4 auditor since their pre-public period. Similarly, Kim et al. (2012) find a smaller loan spread for both Big-4 audits and long-tenure audits. According to Allee and Yohn (2009), firms with an audit are also less likely to be denied loans.

However, not all research documents overwhelmingly positive effects of external auditing and/or Big-4 effects. For example, Allee and Yohn (2009) find no effect of auditing on the cost of debt, even after distinguishing between limited and unlimited liability firms. Cassar, Ittner and Cavalluzzo (2011) also find no influence of auditing on lending decisions. Huguet and Gandía (2012) and Kim et al. (2011) do not find lower cost of debt for private firms audited by Big-4 auditors compared to firms audited by non-Big-4 auditors. Most studies attribute the lack of significant effect of auditing on the cost of debt to differences in the institutional settings. For example, Piot and Missonier-Piera (2009) argue that French banks use accounting information as a monitoring mechanism less extensively and prefer contractual guarantees. Moreover, Fortin and Pittman (2007) attribute the results to differences in information needs between public and private firms.

Based on the discussion above, we are careful to formulate the following hypothesis stated in alternative form:

H1: Small private firms that voluntarily engage in external audits face a different (reduced) cost of debt financing than firms that do not submit their financial statements to external audit.

Firms may be aware of the effects of financial statement audit on the cost of debt, as discussed above. If they have positive NPV projects to execute but rely heavily on bank financing to finance these projects, they may have a true, firm-value maximising incentive to certify the financial statements to obtain debt capital at the lowest possible level, controlling for the underlying economic characteristics of these firms. Borrowing the concept of "serious adopters" of IAS versus "label adopters" developed by Daske et al. (2013), we refer to these firms as "serious auditees", meaning that these firms see financial statement audits as a commitment to higher transparency of their financial statements. However, there may also be firms that submit their financial statements to an external audit in an attempt to "dress up" their financial statements in the hope that capital providers will not be able to see through this "dressing up" process and would reduce the cost of debt below what would be expected given the true state of these firms (unobservable to external providers of capital, but observable to managers). We term these firms "label auditees". If the providers of capital are able to differentiate between "serious auditees" and "label auditees", we should be able to observe differential effects on economic outcomes, cost of debt being one of them. If providers of capital view the audit as a serious attempt to increase transparency, they might respond by decreasing the cost of debt compared to an otherwise identical but unaudited firm.

If the firm merely attempts to label the financial statements with a financial statement audit and the market sees through this label, we should observe no differential economic outcomes. However, if the market is aware that the information set for private firms is restricted, they may even react negatively. The mere attempt to label financial statements might be viewed as an attempt to mask the true performance of the firm, resulting thus in an increase in the cost of debt.

We distinguish between "serious auditees" and "label auditees" based on the likely power the auditees can exert on the auditors to provide a favourable outcome. Several studies in the public-firm domain show that Big-4 audits are associated with higher quality audits (see e.g. Francis J. R. (2004) for a review).[18] We reformulate these results and reason that both the Big-4 and non-Big-4 auditors incur similar losses in the event of a low-quality audit (e.g. reputational loss and potential exit), but that the gain from providing a favourable audit opinion to a small private firm "label auditee" is much larger in relative terms for non-Big-4 than for the Big-4 auditees. In other words, it is simply not reasonable for Big-4 auditors to risk potentially large losses to gain a relatively small audit fee compared to a non-Big-4 firm,

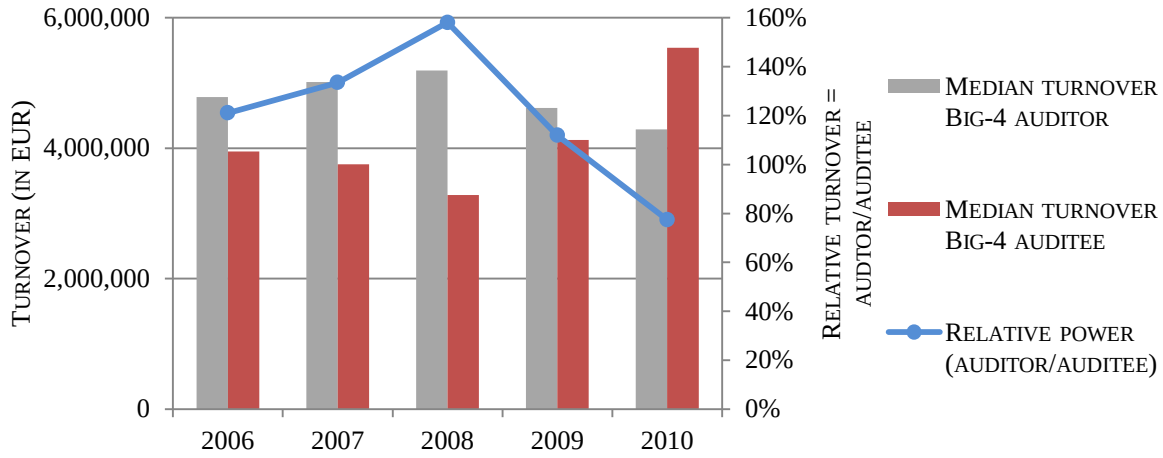
[18] We acknowledge that not all of these effects are due to higher-quality audits provided by a Big-4 auditor *per se* but may only be correlated with high audit quality (Khurana & Raman, 2004). The Big-4 vs. non-Big-4 distinction might also reflect client characteristics rather than Big-4 being of higher quality (Lawrence, Minutti-Meza, & Zhang, 2011).

where the audit fee from a private firm might represent a significant part of the revenue of a non-Big-4 auditor. Non-Big-4 auditors are more willing to risk the reputational loss to gain a potentially relatively large audit fee.

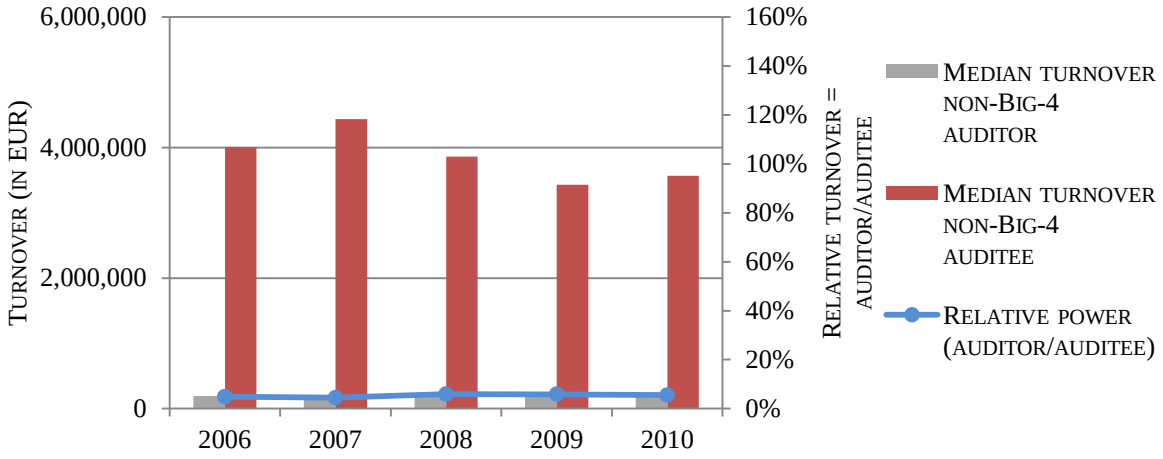
To illustrate the relative positions of both Big-4 and non-Big-4 auditors and auditees, we plot in FIGURE 2.1 the relative turnover of auditees versus auditors for both groups. We use the median of all groups as inputs for our illustration.[19] While the Big-4 auditors' median turnover exceeds the Big-4 auditees' median turnover by a significant margin (i.e. the ratio is well above 100% in all sample years but 2010), the ratio of the median non-Big-4 auditor turnover relative to the median non-Big-4 auditee only averages at about 5%. The relative power of a non-Big-4 auditor versus its auditee is thus relatively minuscule.

FIGURE 2.1: MEDIAN TURNOVER OF AUDITORS VERSUS THEIR AUDITEES

PANEL A: COMPARISON OF BIG-4 AUDITORS AND THEIR AUDITEES



PANEL B: COMPARISON OF NON-BIG-4 AUDITORS AND THEIR AUDITEES

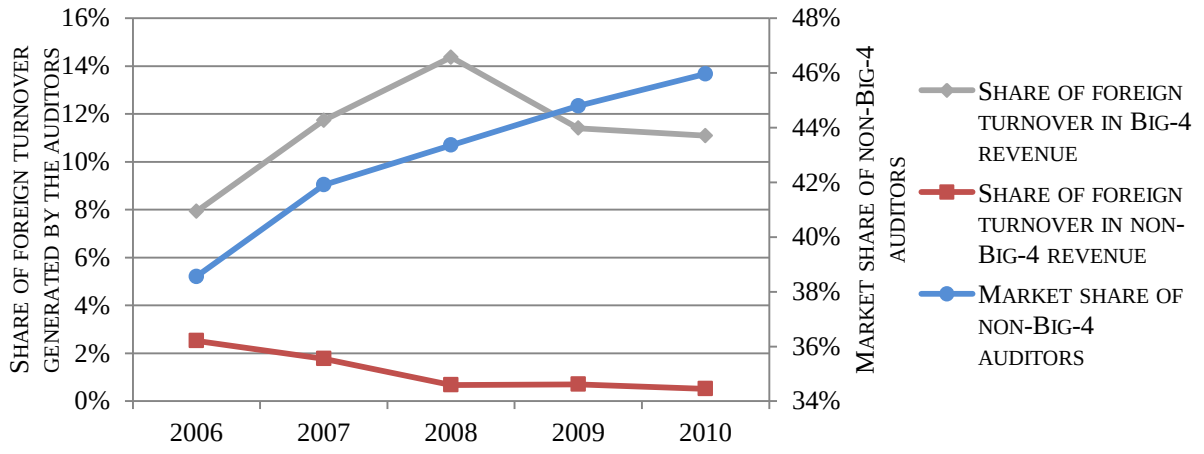


NOTES: This figure compares the median turnovers of Big-4 auditors and their auditees in Panel A and median turnovers of non-Big-4 auditors and their auditees in Panel B.

[19] We explicitly acknowledge that auditor turnover is only a proxy for total audit fee collected from the clients. Auditors' revenue may include other sources of revenue (e.g. non-audit service fees). The audit fee collected is thus less or equal to total turnover of an auditor.

The relatively weak position of non-Big-4 auditors is further compounded by their confinement to the domestic audit sector. Only a minor (and decreasing) proportion of non-Big-4 auditors' revenue is obtained from non-domestic markets. This indicates the lack of possibilities to diversify to foreign markets, which would arguably in part reduce the pressure from relatively stronger clients of non-Big-4 auditors. In FIGURE 2.2, we show the proportion of foreign-sourced turnover for Big-4 and non-Big-4 auditors during our sample period. The figure also shows that the share of non-Big-4 turnover as a percentage of total auditors' turnover is monotonically increasing. This is consistent with greater labelling demand in the period of financial crisis.

FIGURE 2.2: SHARE OF FOREIGN REVENUE AND MARKET SHARE



NOTES: This figure presents the share of foreign revenue in total revenues for both Big-4 and non-Big-4 auditor groups with the scale on the left-hand side. Market share of non-Big-4 auditors is also presented relating to the right-hand side scale. Market share is proxied by the share of non-Big-4 auditor income in total auditor income.

Based on the preceding illustrations and discussion, we state the following hypothesis in alternative form:

H2: Perceived higher quality audit, proxied by a Big-4 auditor, incrementally reduces the cost of debt for small private firms.

To control for other factors potentially affecting cost of debt in private firms, we include a number of additional control variables. The usefulness of traditional roles of auditing in private firms is likely to be different compared to public firms, as these firms are very different in terms of agency conflicts and costs. Agency theory posits lower agency costs in the single owner-manager case, with the costs increasing in divergence from this state (Jensen & Meckling, 1976; Ang, Cole, & Lin, 2000; Garrod et al., 2008; Kosi & Valentincic, 2013). In a private-family-firm setting, Niskanen, Karjalainen and Niskanen (2010) conjecture that higher ownership dispersion increases agency costs and this leads to increased likelihood of

hiring a higher-quality (Big-4) auditor. On the other hand, increased managerial ownership results in a smaller probability of hiring a Big-4 auditor. We thus include a proxy for the complexity of ownership and ownership dispersion in our analyses.

Another important difference between private and public firms is their perceived financial reporting transparency. Prior research has documented that earnings of private firms are of lower quality compared to public firms' reported earnings (Ball & Shivakumar, 2005; Burgstahler, Hail, & Leuz, 2006). Therefore, banks, as the main external capital providers to (especially smaller) private firms, may choose to put more weight on private information gathered through their relationships with their borrowers (Chu et al., 2009) in comparison to accounting information. Common measures for the closeness of the firm-bank relationship are the proportion of bank-loan financing in total external financing and the number of bank relationships. In general, small private firms have no need for many bank relationships as one bank is usually capable of supporting their operations. In line with this argument, Petersen and Rajan (1994) find that borrowing from multiple lenders increases the price of debt and reduces its availability. Multiple-source borrowing weakens each individual firm-bank relationship as the bank tries to be the only lender to a firm, thus increasing its ability to better control the firm's actions.

2.3 RESEARCH DESIGN

Being aware of the presence of self-selection and consequently selection bias in our setting, we design the research methodology using Heckman's (1979) two-stage approach. Selection issues in accounting research occur if observations are not randomly distributed into various groups, in our case these being audited and unaudited firms. Firms that self-select into voluntary audits may differ in some (known or unknown) important aspect to an unaudited firm. Similarly, private firms that appear to have adopted a voluntary audit may be forced into this selection for at least two reasons: (i) banks might require external financial statement certification, forcing thus private firms into an audit process that appears "voluntary" to the researcher; (ii) private firms may be subsidiaries of other, larger firms that require the audit of their daughter firms as part of their own audit processes. These firms would again appear "voluntary" to the researcher. Our research design reflects these issues right from the start.

In the defining characteristic of the Heckman estimation, we acknowledge there are other potentially important but unobserved factors in addition to the ones we identify and are able to collect in our study.[20] Cassar (2011) lists and discusses several potential factors that might affect Minnis's (2011) findings and, due to our similar private firm setting, are likely to be analogous alternative unobservable factors that might potentially have an effect on voluntary audit decision and the cost of debt. In our analysis, we observe the cost of debt for firms that

[20] For them to cause estimation bias, these unobservable factors must affect both selection (voluntary audit decision) and our outcome variable of interest (the interest rate on debt). If a factor were to affect only one of the two, it would not be a source of such bias (Tucker, 2010).

voluntarily decided for an audit and the cost of debt for those firms that decided not to be audited. What we cannot observe are the counterfactual outcomes of the interest rate on debt for audited firms had they not chosen to be audited. Similarly, we cannot observe the interest rate on debt for unaudited firms had they chosen to be audited. Therefore, we are unable to directly estimate the effect of audit on the cost of debt. Observed results have to be used as a proxy, but if this proxy is not close to the counterfactual outcomes, this results in selection bias.

In forma terms, we are interested in the following relationship:

$$Y_i = \alpha + X_i\beta + A_i\gamma + \varepsilon_i \tag{2.1}$$

where Y_i is the cost of debt for firm i, X_i is a vector of independent variables for firm i (β is a vector of coefficients) and A_i is an indicator variable for voluntary audit. But, as described above, we can only observe firms in equations (2.2) and (2.3):

$$Y_{1,i} = \alpha_1 + X_i\beta + \varepsilon_{1,i} \quad (\text{if } A_i = 1) \tag{2.2}$$
$$Y_{0,i} = \alpha_0 + X_i\beta + \varepsilon_{0,i} \quad (\text{if } A_i = 0) \tag{2.3}$$
$$A_i^* = Z_i\beta^* + \upsilon_i \tag{2.4}$$

where A_i= 1 if $A_i^* \geq 0$, A_i = 0 if $A_i^* < 0$, A_i^* is a continuous latent variable not observable to researches (we only observe the values of A_i as its consequence) and Z_i is a vector of variables affecting audit choice.

Heckman's approach consists of first estimating a selection model for the probability to undergo "treatment" (in our case this is a voluntary decision for audit) and then calculating the inverse Mills ratio (henceforth *IMR*) as a bias correction term. As firms' decision to be audited may be assumed to be endogenous to some extent, simple OLS regression on the effect of audit on the cost of debt, i.e. equation (2.1), would yield inconsistent results as the audit indicator dummy (A_i) would be correlated with OLS error terms (ε_i) because of the correlation between the error terms in the selection and second-stage equations. Including the *IMR* correction term as an additional variable in the second stage regression (estimating our desired effects) controls for such correlation and produces consistent estimates of the audit dummy coefficient.[21] Following extant literature (Chaney, Jeter, & Shivakumar, 2004; Tucker, 2010; Lennox, Francis, & Wang, 2012), we calculate *IMR* separately for treated (audited) and untreated (unaudited) observations as:

[21] Estimation using *IMR* is subject to the following conditions: first stage selection has to be modelled in probit, second stage regression has to be modelled in a linear regression and the unobservables in the two stages have to be binormally distributed (Tucker, 2010).

$$IMR_i = \begin{cases} \varphi\left(Z_i\widehat{\beta^*}\right)/\phi\left(Z_i\widehat{\beta^*}\right) & (\text{if } A_i = 1) \\ -\varphi\left(Z_i\widehat{\beta^*}\right)/\left(1-\phi\left(Z_i\widehat{\beta^*}\right)\right) & (\text{if } A_i = 0) \end{cases} \tag{2.5}$$

where $\varphi(\cdot)$ is the probability density function of a standard normal distribution, $\phi(\cdot)$ is the cumulative density function of a standard normal distribution and $Z_i\widehat{\beta^*}$ is the fitted value from the probit model of equation (2.4). Our final second-stage model therefore includes the computed *IMR* to correct for self-selection and its potential significance is an indication of the presence of self-selection:

$$Y_i = \alpha + X_i\beta + A_i\gamma + IMR_i\delta + w_i \tag{2.6}$$

The empirical specifications that enable us to test our hypotheses are as follows. The estimated probit selection model for voluntary audit decision is of the form:

$$\begin{aligned} V\_AUDIT_{i,t} = {} & \alpha_0 + \alpha_1 JSC_{i,t} + \alpha_2 L\_LP_{i,t} + \alpha_3 L\_NP_{i,t} + \alpha_4 B\_ACCOUNT_{i,t} \\ & + \alpha_5 B\_LOAN_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{2.7}$$

We identify variables that affect firms' decision to be audited but expect them to have little or no impact on the interest rate.[22] *JSC* distinguishes between firms that have a legal status of a joint stock company, whereas the great majority of the remaining firms are limited liability companies.[23] We expect *JSC* firms to voluntarily audit their financial statements more often as their legal status, similarly to public firms, allows for more complex corporate governance mechanisms that are then used to tackle agency conflicts on a larger scale. *L_LP* and *L_NP* are natural logarithms of the number of legal person and natural person owners of a firm.[24] A legal person is simply the mother firm that has an ownership stake in the observed daughter firm, implying that potentially neither the general accounting and financing policies nor the decision to audit is independent of the mother firm (legal person owner). A natural person is a physical owner of the firm. The existence of a legal person owner indicates more complex ownership structures and potentially larger agency issues. Similarly, the more owners the firm has (both natural and legal persons), the more severe are the associated agency conflicts. As control is more difficult and costly for each individual owner, an external audit can provide an effective supervision mechanism. We expect the positive effect to be stronger for legal person ownership than natural person ownership, since the former are usually more detached from day-to-day management issues in small private firms (the inverse case appears in large public

[22] Justifiable exclusion of variables in first-stage equation is recognised as a common problem in selection model application (Lennox et al., 2012).

[23] There are 294 joint stock companies in our sample, 5,583 limited liability companies and 8 companies that report a different legal status.

[24] Because of their skewed discrete distributions, we are using natural logarithms of *NP* (*L_NP*) and *LP* (*L_LP*) throughout the analysis. Main analysis results with their basic forms, i.e. *NP* and *LP*, provide comparable significant results but do perform somewhat poorer in sensitivity tests. Nevertheless, we find it more informative to report descriptive statistics for the non-logarithmic values of the two in TABLE 2.3.

firms, where (larger) legal person owners would be more involved in firms' governance than individual, natural person, shareholders).

We employ the total number of bank accounts a firm has at the end of the fiscal year (*B_ACCOUNT*) as a proxy for multiple borrowing options. The set of borrowing options might be associated with a decision for audit, but its effect is ambiguous. On one hand, a small number of bank accounts could indicate that a firm does not have many borrowing alternatives and sees the audit (as a label or not) as a way to improve its access to capital.[25] On the other hand, firms with a large number of bank accounts could be the ones that are instantly looking for new loan options if existing credit lines shrink, again increasing the probability of audit. The number of bank accounts can also be affected by the scope of the firm's operations, and *SIZE* acts as a rough measure of the complexity of firm operations (the correlation coefficient with *B_ACCOUNT* is 0.24; see TABLE 2.4 below). Finally, *B_LOAN* is a measure of bank financing in total assets. A higher ratio of loan financing may imply a bigger bank interest for the activities of the borrower, as relatively more funds are committed to it and an external audit serves as a verification channel. However, banks also have superior information gathering and processing abilities (Diamond, 1991; Bharath et al., 2008), which can offer substitute and potentially better information than the insight gained from an audit report, especially if the relationship is a longer standing one with the bank being the only lender to a specific firm (such a situation being plausible in the context of small private firms). Hence, banks may, instead of relying upon an outside audit label, use more reliable information gathered through private information channels developed during close cooperation with their borrowers. This implies that the likelihood of a voluntary audit decreases in *B_LOAN*.

After estimating the selection model, we calculate the inverse Mills ratios as set out in equation (2.5) and include them as an additional explanatory variable in our second-stage model to control for self-selection of firms into voluntary audit.[26]

$$\begin{aligned} IRATE_{i,t+1} = {} & \alpha_0 + \alpha_1 V\_AUDIT_{i,t} + \alpha_2 BIG4_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 SALESG_{i,t} \\ & + \alpha_5 ICOV_{i,t} + \alpha_6 PPE_{i,t} + \alpha_7 LEV_{i,t} + \alpha_8 WC_{i,t} + \alpha_9 PROF_{i,t} \\ & + \alpha_{10} N\_EQ_{i,t} + \alpha_{11} N\_EQ\_BL_{i,t} + \alpha_{12} IMR_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{2.8}$$

The dependent variable, *IRATE*, is an estimated interest rate on debt for *t+1* incurred by firm *i*.[27] It is measured as the sum of bank- and bond-related financial expenditures in year *t*+1,

[25] Alternatively, a firm with only one bank account (the most common situation in small private firms) could be forced into "voluntary" audit by its lending bank due to distrust about financial reports and practices of the former.

[26] The main and all subsequent models are also estimated by normal OLS, i.e. without the *IMR* correction term, for comparison purposes, and the results (displayed only in TABLE 2.6, otherwise unreported), although of varying magnitudes, are similar direction-wise, confirming our findings.

divided by the average of short- and long-term financial obligations towards banks in years *t* and *t*+1. This is the most detailed specification we can construct given our dataset and we find it relatively more precise than the measures of interest rate in prior studies (Pittman & Fortin, 2004; Karjalainen, 2011; Minnis, 2011).

Our main test variables indicate whether a firm is voluntarily audited and whether the auditor is a Big-4 audit firm or not. *V_AUDIT* is a dummy variable that equals 1 for firms that have been audited and 0 otherwise. Although all audits in our main sample are voluntary, we specifically denote it as such so as to be able to compare it to mandatory audit in the supplementary analysis. *BIG*4 is a dummy variable that equals 1 for firms that have been audited by one of the Big-4 audit firms and 0 otherwise. The *BIG*4 dummy is effectively a multiplicative dummy with the *V_AUDIT* dummy (i.e. the *BIG*4 dummy can only equal one if *V_AUDIT* is equal to one).

We include a set of control variables that have been identified in existing research (e.g. Mansi et al., 2004; Pittman & Fortin, 2004; Karjalainen, 2011; Minnis, 2011) to be related to the cost of debt to be able to isolate the effect of our main test variables on the cost of debt. *SIZE* is defined as the natural logarithm of total assets, and its effect is predicted to be negative as larger firms are found to be less risky due to their higher visibility and reputation. Size has also been found (next to age) to have a moderating effect on the audit-cost-of-debt relationship (Blackwell et al., 1998; Pittman & Fortin, 2004). To control for firms' growth options, we use *SALESG*, a ratio of change in sales compared to previous year's sales. Interest coverage (*ICOV*) controls for firm's capability of repaying debt obligations and is calculated as the sum of bank- and bond-related financial obligations to EBIDTA; we expect it to be positively related to the cost of debt. *PPE* is defined as property plant and equipment scaled by total assets and represents possible collateral in debt contracts, thus reducing riskiness of the loan; we expect it to be negatively related to the cost of debt. Leverage (*LEV*) is defined as liabilities divided by total assets, and working capital (*WC*) is calculated as the difference between current assets and current liabilities scaled by total assets. As the latter is indicative of higher liquidity, we expect it to have a negative effect on the interest rate. *PROF* represents profitability, measured as the sum of EBIT and write-offs to total assets, and firms with a higher *PROF* ratio are better capable to service their debt, therefore a negative effect on *IRATE* is expected. *N_EQ* is a dummy variable that equals 1 if a firm reports negative book value of equity and 0 otherwise. It indicates firms in financial distress, which are expected to incur higher interest rates. Another dummy variable, *N_EQ_BL*, indicates firms with a negative book value of equity that have existing loans, as these may be treated differently by the banks. Finally, our model controls for industry- and year-fixed effects. This has the added benefit of controlling for correlated omitted variables that are unobservable but firm-specific and time-invariant. Detailed definitions of variables are presented in TABLE 2.1.

[27] Similar to Minnis (2011), we are using the future (t+1) interest rate as we consider its effects to be fully revealed in at least the following year or, conversely, because its time-(t)-form is likely to contain stale information.

TABLE 2.1: VARIABLE DEFINITIONS

VARIABLE	DEFINITION
DEPENDENT VARIABLE	
IRATE	= interest rate for year t+1, incurred in year t, measured as the sum of bank- and bond-related financial expenditures in year t+1, divided by the average of short- and long-term financial obligations towards banks (interest bearing debt) in years t and t+1
INDEPENDENT VARIABLES	
V_AUDIT	= an indicator variable, equalling 1 if the firm has been audited but is not required to do so by law and 0 otherwise
M_AUDIT	= an indicator variable, equalling 1 if the firm has been audited because it is required to do so by law and 0 otherwise (variable not used in main analysis but in supplementary tests)
BIG4	= an indicator variable, equalling 1 if the firm has been audited by a Big-4 audit firm (KPMG, PwC, E&Y or D&T) and 0 otherwise
JSC	= an indicator variable, equalling 1 if the firm's legal status is a joint stock company and 0 otherwise
NP	= number of natural persons owning the firm
LP	= number of legal persons owning the firm
B_ACCOUNT	= number of opened bank accounts at the end of the year
B_LOAN	= bank loan scaled by total assets
SIZE	= natural logarithm of total assets
SALESG	= sales growth, measured as the ratio of change in sales to previous year's sales
ICOV	= interest coverage, measured as the ratio of the sum of bank- and bond-related financial expenditures to EBITDA
PPE	= property, plant, and equipment scaled by total assets
LEV	= leverage, measured as a ratio of liabilities to total assets
WC	= working capital, measured as the difference between current assets and current liabilities, scaled by total assets
PROF	= profitability, measured as the sum of EBIT and write-offs scaled by total assets
N_EQ	= an indicator variable, equalling 1 if the firm is reporting negative equity and 0 otherwise

NOTES: In addition to the variables presented above, and not reported in the descriptive statistics and correlations table, there are interaction terms between indicator variables used in regressions where required. Specifically, N_EQ is interacted with a bank loan indicator into N_EQ_BL, as is the BIG4 variable with V_AUDIT and M_AUDIT into BIG4_V_A and BIG4_M_A respectively.

We perform supplementary analyses with regard to subgroups in our main sample, its extensions and different interest rate variable specifications. We first follow Minnis (2011) to estimate how informative current-period earnings are for future cash flows and then, as in Kosi and Valentincic (2013), look at two earnings management proxies, all for pairs of audited vs. non-audited and Big-4-audited vs. non-Big-4-audited subsamples.

If audited financial statements are of higher quality, they should be a better predictor of future cash flows than non-audited financial statements and thus be useful for assessing the

borrowers' ability to repay a loan (Minnis, 2011; Kosi & Valentincic, 2013). We estimate the following equation:[28]

$$CFO_{t+1} = \alpha_0 + \alpha_1 NI_t + \varepsilon_t \quad (2.9)$$

where CFO_{t+1} is operating cash flow in period *t*+1, and NI_t is net income. If earnings informativeness for future cash flows is greater in one subsample compared to another, we should observe a bigger α_1 coefficient in that group. Similarly, if net income is decomposed into cash flows from operations (CFO_t) and accruals (ACC_t), we should observe higher α_2 and α_3 coefficients from the equation:

$$CFO_{t+1} = \alpha_0 + \alpha_2 CFO_t + \alpha_2 ACC_t + \varepsilon_t \quad (2.10)$$

Next, we calculate two measures designed to capture the extent of earnings management. EM1 is the ratio of absolute total accruals to operating cash flows: $|ACC_{it}|/CFO_{it}$ and EM2 is the Spearman correlation between total accruals and operating cash flows, multiplied by (-1): $-\rho(CFO_{it}, ACC_{it})$. Higher values of EM1, the median for each group, are indicative of higher values of total accruals compared to operating cash flows and thus higher earnings management and lower earnings quality. Similarly, higher values of EM2 indicate more earnings smoothing and thus lower earnings quality as total accruals and operating cash flows move more closely together (in opposite directions).

In sensitivity analyses, we additionally inspect the effect of crisis and ownership on our findings and regarding sample selection we increase our sample by adding larger private firms above the audit threshold, as perceived audit quality, proxied by a Big-4 auditor, has been found to have a greater effect for larger private firms (Karjalainen, 2011). In this case, we can compare the effects of voluntary and mandatory audit by including an additional dummy variable, *M_AUDIT*, indicating firm-years with legal mandatory audit. Finally, we look at different definitions to estimate the interest rate on debt and the consequences this has on our findings.

2.4 SAMPLE SELECTION AND DESCRIPTION

For the purpose of our research, we obtain data from the Agency of the Republic of Slovenia for Public Legal Records and Related Services (henceforth AJPES). All firms, regardless of size, operating in Slovenia are required by law to submit their financial statements to AJPES, and these data are made available for research purposes. Our analysis includes small private firms operating in the period from 2006 to 2010. We choose the year 2006 as the starting

[28] Industry and year-fixed effect are included in both equations (2.9) and (2.10), and they are also estimated once more with the inclusion of *IMR* as a selection bias correcting term but the results remain unchanged.

point because of the change in accounting standards that came into effect in 2006, making observations from prior years less comparable.[29]

From the population of Slovenian firms in the sample period, we first exclude publicly listed firms and then distribute the remaining private firms into four size groups: large, medium, small and micro firms. The criteria that denote the particular size of the firm is defined by the Slovenian Companies Act (Official Gazette of the Republic of Slovenia, no. 42/2006 (60/2006 popr.), 26/2007-ZSDU-B, 33/2007-ZSReg-B, 67/2007-ZTFI (100/2007 popr.), 10/2008, 68/2008, henceforth Companies Act) in terms of the number of employees, net sales revenue and total assets. It follows the quantitative criteria set by EU regulations (Fourth Council Directive 78/660/EEC and its amendments up to Directive 2006/46/EC). Size groups are especially important for our analysis, as the Companies Act further defines that (in addition to all publicly listed firms) large and medium private firms must have their annual reports audited, whereas this is optional for the small and micro firms.[30] However, we do not include micro firms in our analysis as they are very unlikely to be audited.[31]

We therefore use small private firms with a voluntary choice to engage in an external audit as our sample. The financial data of these firms are complemented with ownership information and audit data provided by *Bisnode d.o.o.*, a private business information provider, and data on bank accounts, additionally provided by AJPES.[32] The sample selection process is presented in TABLE 2.2. We first exclude observations with a fiscal year shorter than 12 months and those with changes in their legal status as they are not representative of a normal small private firm. We then remove firms from the financial sector and utility services and firms with missing financial data. Finally, we exclude observations with variable values below the 1st percentile and/or above the 99th percentile to mitigate measurement noise present as a consequence of the variables being constructed as ratios.[33] We end up with 6,516 firm-year observations for 2,112 unique small private firms. Out of these, 631 have a

[29] More precisely, balance sheet and income statement items are reported in more detail since 2006 and others have been reclassified. Many of them are from the financial obligations section and directly concern our dependent variable calculation, making longer time series not comparable. As firms had to additionally report their 2005 statements "meaningfully" resembling the new standards in 2006, we can use these data for calculations requiring yearly changes and thus keep 2006 as our starting year despite longer data requirements.

[30] The criteria that denote firm size are defined in article 55 of the Companies Act, whereas article 57 defines the auditing requirements. In particular, private firms are not required to undergo mandatory audit if they fulfil at least two of the following three criteria: average number of employees must not exceed 50, sales revenues must not exceed €7,300,000 and total assets must not exceed €3,650,000. The latter two conditions were amended to €8,800,000 and €4,400,000 respectively by the amendment of the Companies Act in 2008 following European Directive 2006/46/EC.

[31] According to our data, out of 211,370 firm-year observations of micro firms, only 894 have voluntarily performed an audit. We also allow for the possibility that audit data for this smallest, micro-sized group are not complete, as it would seem reasonable that not all firms in this specific set are covered by our data source.

[32] Ownership and audit data were only provided until 2010, hence this is the upper limit of the time series in our sample.

[33] Unbounded continuous variables (*ICOV*, *SIZE*, *SALESG*, *WC* and *PROF*) have outliers removed at the 1st and 99th percentile, while continuous variables with a natural border (*IRATE*, *PPE* and *LEV*) have outliers removed only on one side, at the unlimited (upper) side. We deem upper and/or lower one percentile correction sufficient as we want to keep as much of our observations as possible.

calculated interest rate of zero, meaning that they did not report any bank- and/or bond-related financial expenditures in the studied year, and the remaining 5,885 observations (1,949 unique firms) have a positive value of *IRATE*. We use the latter sample for our main analysis, as we are primarily interested in the relation between voluntary audit and the interest rate level.

TABLE 2.2: SAMPLE CONSTRUCTION PROCEDURE

firm-year observations of small private firms in the period 2006 – 2010	11,308
- observations of firms not operating for 12 consecutive months	- 73
- observations with a legal structure change within a given year	- 89
- observations of financial and utility firms	- 576
- observations with incomplete data required for the analysis	- 3,270
- outlier observations	- 784
final sample firm-year observations (2,112 distinct firms)	6,516
observations with IRATE = 0	631
observations with IRATE > 0 (1,949 distinct firms)	5,885

NOTES: This table presents the sample selection process. Starting sample of small private firms is obtained from AJPES and identified following the Slovenian Companies Act, which defines firms that do not have to undergo mandatory audit. Further, micro-sized firms are not included, as they are practically never audited. All financial industry related firms (i.e. financial and insurance activities, real estate) as well as utilities (electricity, gas and steam supply firms) are excluded due to their distinct balance sheet and operating properties.

TABLE 2.3 presents the descriptive statistics of our sample, separately for observations with and without voluntary audit. Out of 5,885 firm-year observations, 7.6% (449) are audited. While there is no statistically significant bivariate difference between the interest rate of the two groups, more audited firms are registered as joint stock companies; they are, on average, owned by a larger number of natural and legal persons, have more bank accounts and are larger in size.[34] Firm-level descriptives in Panel B also reveal that audited firms also have more employees and, interestingly, despite being significantly larger in terms of total revenue and earnings before interest and tax, pay significantly less tax at the median. Audited firms also have less property plant and equipment, lower leverage, less working capital and also lower profitability than their unaudited peers. All these differences are statistically significant at a level of 5% or lower.

[34] The average calculated interest rate of 5.9% for both groups is somewhat smaller than in U.S. studies (Allee & Yohn, 2009; Minnis, 2011) but larger than in Finland (Karjalainen, 2011).

TABLE 2.3: DESCRIPTIVE STATISTICS

PANEL A: VARIABLES								
VARIABLE	**MEAN**	**MIN**	**25%**	**MEDIAN**	**75%**	**MAX**	**SD**	**N**
NON-AUDITED OBSERVATIONS (N=5,436)								
IRATE	0.059	0.000	0.039	0.054	0.068	0.384	0.038	5436
BIG4	0	0	0	0	0	0	0	5436
JSC	**0.038**	0	0	**0**	0	1	0.191	5436
NP	**3.509**	0	1	**2**	3	253	10.257	5436
LP	**0.798**	0	0	**0**	1	52	1.662	5436
B_ACCOUNT	**2.219**	1	1	**2**	3	13	1.137	5436
B_LOAN	0.249	0.000	0.103	**0.220**	0.366	0.929	0.180	5436
SIZE	**14.869**	13.299	14.512	**14.837**	15.201	16.961	0.583	5436
SALESG	0.030	-0.707	-0.082	0.000	0.139	1.309	0.248	5436
ICOV	0.171	-1.472	0.034	0.106	0.250	2.238	0.273	5436
PPE	**0.389**	0.000	0.210	**0.383**	0.555	0.926	0.226	5436
LEV	**0.670**	0.017	0.537	**0.699**	0.827	1.207	0.204	5436
WC	**0.071**	-0.581	-0.049	**0.064**	0.190	0.633	0.196	5436
PROF	**0.058**	-0.206	0.022	**0.045**	0.085	0.345	0.066	5436
N_EQ	0.013	0	0	0	0	1	0.115	5436
AUDITED OBSERVATIONS (N=449)								
IRATE	0.059	0.000	0.042	0.054	0.066	0.332	0.036	449
BIG4	0.278	0	0	0	1	1	0.449	449
JSC	**0.198**	0	0	**0**	0	1	0.399	449
NP	**6.178**	0	0	**1**	2	231	24.231	449
LP	**1.900**	0	1	**1**	2	25	2.364	449
B_ACCOUNT	**2.339**	1	2	**2**	3	8	1.194	449
B_LOAN	0.233	0.000	0.084	**0.183**	0.350	0.836	0.192	449
SIZE	**15.368**	13.335	14.825	**15.217**	15.883	17.018	0.732	449
SALESG	0.027	-0.596	-0.071	0.000	0.089	1.299	0.253	449
ICOV	0.165	-1.441	0.023	0.100	0.242	2.217	0.357	449
PPE	**0.364**	0.000	0.162	**0.352**	0.537	0.926	0.245	449
LEV	**0.583**	0.005	0.430	**0.591**	0.765	1.124	0.233	449
WC	**0.026**	-0.572	-0.110	**0.025**	0.162	0.633	0.231	449
PROF	**0.045**	-0.208	0.008	**0.039**	0.077	0.336	0.073	449
N_EQ	0.016	0	0	0	0	1	0.124	449

(TABLE CONTINUES)

TABLE 2.3 (CONTINUED)

PANEL B: FIRM-YEAR CHARACTERISTICS

	MEAN	MIN	25%	MEDIAN	75%	MAX	SD	N
NON-AUDITED OBSERVATIONS (N=5,436)								
TA	3,447,422	596,652	2,006,657	2,777,412	3,995,538	23,200,000	2,545,022	5,436
EQ	1,049,840	-2,466,170	393,419	754,764	1,335,285	17,200,000	1,169,986	5,436
FD	1,245,774	0	366,685	813,767	1,582,502	17,500,000	1,501,352	5,436
TR	3,812,515	115,121	2,334,236	3,278,067	4,768,492	25,900,000	2,257,072	5,436
EBIT	3,885,792	182,646	2,405,740	3,338,183	4,839,467	26,800,000	2,264,568	5,436
TAX	28,880	0	394	11,283	35,992	650,604	46,677	5,436
NI	112,833	0	11,361	51,194	145,343	2,602,835	166,902	5,436
EMPL	30	0	15	23	37	533	26	5,436
AUDITED OBSERVATIONS (N=449)								
TA	6,275,998	618,387	2,743,449	4,061,100	7,901,437	24,600,000	5,329,978	449
EQ	2,394,794	-722,677	751,098	1,379,737	2,604,420	22,800,000	3,181,040	449
FD	2,303,223	0	478,935	1,140,900	3,052,275	19,600,000	2,989,723	449
TR	4,563,995	53,522	2,522,693	3,792,166	5,802,373	39,200,000	3,285,587	449
EBIT	4,760,592	269,479	2,791,817	4,095,148	6,038,253	39,200,000	3,248,932	449
TAX	40,032	0	0	7,277	45,483	499,718	71,913	449
NI	206,417	0	7,126	68,767	262,976	2,282,644	334,060	449
EMPL	43	0	22	36	53	229	36	449

NOTES: Summary statistics are presented in this table. Observations are partitioned with respect to the *V_AUDIT* variable, i.e. had firm-observations been (voluntarily) audited or not.

Panel A reports statistics for variables used in the analysis. Means with differences significant at the 5% level (two-tailed t-test) are presented in bold as are medians of variables with 5% significance of Wilcoxon rank-sum test. Variable BIG4 is excluded from these analyses, as it is potentially present only in the subsample of audited observations. See TABLE 2.1 for variable definitions.

Panel B reports firm-year characteristics of the observations in the sample. TA = total assets, EQ = equity, FD = sum of short-term and long-term financial debt, TR = total revenue, EBIT = earnings before interest and taxes, TAX = taxes, NI = net income; EMPL = average number of employees (based on reported working hours). All amounts, other than EMPL, are presented in euros.

As already discussed above, more dispersed ownership connected with legal status and bigger size is associated with audited firms following agency theory, whereas a labelling interpretation could be presented for the remaining differences. Firms with less property, plant and equipment have less collateral to pledge for long-term financing, while substantially less working capital also limits their liquidity. In addition, they are also less profitable and therefore an audit label could be seen as a way to lower their cost of debt otherwise adversely affected by the described characteristics.

TABLE 2.4: CORRELATIONS

	IRATE	V_A	BIG4	JSC	NP	LP	B_A	B_L	SIZE	S_G	ICOV	PPE	LEV	WC	PROF	N_EQ
IRATE		0.01	**-0.03**	0.01	**-0.04**	-0.02	**0.03**	**-0.08**	**-0.09**	**0.08**	**0.10**	**-0.10**	**0.14**	**-0.11**	-0.02	0.01
V_AUDIT	0.00		**0.51**	**0.20**	**-0.13**	**0.21**	**0.03**	**-0.03**	**0.18**	-0.02	-0.02	**-0.03**	**-0.10**	**-0.05**	**-0.05**	0.01
BIG4	**-0.03**	**0.51**		**0.07**	**-0.11**	**0.14**	0.00	-0.02	**0.09**	0.00	-0.02	-0.01	**-0.06**	-0.01	-0.02	0.01
JSC	0.00	**0.20**	**0.07**		**-0.18**	**0.30**	0.00	-0.03	**0.15**	-0.02	0.00	**0.05**	**-0.12**	**-0.05**	**-0.10**	0.01
NP	-0.02	**0.06**	-0.02	**0.04**		**-0.16**	**0.04**	**0.03**	**-0.10**	**-0.10**	**0.03**	0.01	**-0.05**	**0.05**	-0.02	**-0.04**
LP	**-0.03**	**0.17**	**0.11**	**0.29**	**0.22**		**0.07**	**-0.09**	**0.14**	**-0.05**	**-0.06**	**-0.03**	**-0.15**	0.02	**-0.03**	-0.01
B_ACCOUNT	0.00	**0.03**	0.00	0.01	0.00	**0.06**		**0.23**	**0.23**	-0.03	**0.19**	-0.02	**0.12**	**-0.05**	**-0.05**	0.00
B_LOAN	**-0.15**	-0.02	-0.01	-0.02	**-0.03**	**-0.06**	**0.24**		**0.21**	**-0.06**	**0.60**	**0.14**	**0.40**	**-0.25**	**-0.09**	**0.03**
SIZE	**-0.08**	**0.22**	**0.12**	**0.17**	-0.02	**0.16**	**0.24**	**0.22**		**0.08**	**0.17**	**0.12**	0.01	**-0.10**	**-0.05**	-0.02
SALESG	**0.06**	0.00	0.01	-0.01	**-0.05**	**-0.06**	-0.02	**-0.06**	**0.08**		**-0.07**	0.00	**0.04**	0.00	**0.24**	**-0.04**
ICOV	0.02	-0.01	-0.02	0.02	-0.01	0.00	**0.16**	**0.40**	**0.14**	**-0.05**		-0.02	**0.36**	**-0.21**	**-0.26**	-0.02
PPE	**-0.06**	**-0.03**	-0.01	**0.06**	**0.04**	0.02	**-0.04**	**0.14**	**0.11**	-0.01	**-0.05**		**-0.11**	**-0.37**	**-0.10**	**-0.03**
LEV	**0.08**	**-0.11**	**-0.07**	**-0.13**	**-0.12**	**-0.15**	**0.11**	**0.43**	-0.02	**0.05**	**0.24**	**-0.11**		**-0.47**	**-0.20**	**0.19**
WC	**-0.06**	**-0.06**	-0.02	**-0.06**	0.03	0.00	**-0.04**	**-0.24**	**-0.09**	0.00	**-0.13**	**-0.37**	**-0.49**		**0.26**	**-0.14**
PROF	-0.01	**-0.05**	-0.02	**-0.08**	**-0.08**	**-0.07**	**-0.05**	**-0.13**	**-0.05**	**0.20**	**-0.13**	**-0.12**	**-0.24**	**0.29**		**-0.12**
N_EQ	0.00	0.01	0.01	0.01	-0.02	-0.01	0.00	**0.05**	-0.02	**-0.03**	-0.02	-0.03	**0.23**	**-0.18**	**-0.15**	

NOTES: Table presents Spearman (pairwise Pearson) correlation coefficients above (below) the diagonal for the 5,885 observations in the main sample. Coefficients within a significance level of 5% are bolded. Variables' names had to be further abbreviated in the first row due to space limitations. Namely, V_A stands for V_AUDIT, B_A stands for B_ACCOUNT, B_L stands for B_LOAN and S_G stands for SALESG. See TABLE 2.1 for variable definitions.

Correlation coefficients presented in TABLE 2.4 do not indicate severe multicollinearity problems between the regressors. Among the main test variables, the highest correlation (0.51) is between *BIG4* and *V_AUDIT* dummies that have to be correlated to some extent by default because of their construction. The remaining correlations between the variables are all smaller (in absolute terms), with the exception of the Spearman coefficient between *B_LOAN* and *ICOV* (0.60), but the two variables are not used simultaneously as the former is used in the first step and the latter in the second step of Heckman estimation.

2.5 RESULTS

In the first step of our analysis, we estimate a probit model to check the expected relations between a firm's choice to be audited and our selection variables (the model also includes industry- and year- fixed effects). Afterwards, we use predictions from the model to calculate the inverse Mills ratio as described in the research design section. In this way, we can observe the effects of selection variables on audit choice in our setting and TABLE 2.5 presents the results. In line with agency theory (Jensen & Meckling, 1976), we find that the likelihood of voluntary audit increases with legal person ownership. An increase in *L_LP* means more dispersed ownership, and resulting agency frictions increase the likelihood of performing financial statement audit. Small private firms with legal status of a joint stock company are also more likely to decide for voluntary audit than their limited liability counterparts, as the legal status of the former is suitable for more complex corporate managing than the latter. This is also accompanied by the moderately strong correlation between *JSC* and *LP* (in both normal and logarithmic form) of around 0.30. By contrast, natural person ownership is not significantly associated with the voluntary audit decision as also *B_ACCOUNT* and *B_LOAN* variables are not, the former with a positive and the latter with a negative sign.[35]

[35] The last insignificant results are a direct consequence of robust standard errors employed also in the probit estimation. Without the correction in standards errors, all the variables have significant effects.

TABLE 2.5: PROBIT REGRESSION

DEPENDENT VARIABLE: V_AUDIT		
	COEFFICIENT	STANDARD ERROR
INDEPENDENT VARIABLES		
JSC	0.512***	(0.158)
L_NP	-0.102	(0.069)
L_LP	0.443***	(0.073)
B_ACCOUNT	0.051	(0.037)
B_LOAN	-0.291	(0.231)
CONSTANT	0.135	(0.601)
INDUSTRY CONTROLS	YES	
YEAR CONTROLS	YES	
OBSERVATIONS	5,885	

NOTES: This table presents probit regression results on the likelihood of private firms voluntarily deciding for an audit. Coefficient estimates are reported in the first column, and robust standards errors clustered at the firm level are reported in parentheses in the second column. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively. Because of their skewed discrete distributions, we are using natural logarithms of *NP* (*L_NP*) and *LP* (*L_LP*) throughout the analysis. See TABLE 2.1 for variable definitions.

Our main results are presented in TABLE 2.6. In the first two columns, we estimate simple OLS models along with the standard controls for comparison purposes with our Heckman estimation.[36] Full OLS model (column 1) incorporates all the variables from the first and second stages together, while the basic OLS model in column 2 only includes variables used in the second stage. Column 3 reports the main Heckman second stage estimation for the suggested explanatory variables along with *IMR*, the inverse Mills ratio calculated form the first stage probit estimation to account for the effect of other unobservable factors on *IRATE*. Signs of the main variables in question remain the same over all models, while there is a change of significance with some. Robust standard errors clustered at the firm level are used in all regressions to mitigate serial correlation and heteroskedasticiy concerns existing in such a setting (Petersen, 2009).[37]

As a central finding, the coefficient on *V_AUDIT* is positive and significant in all model specifications, even gaining in magnitude and significance in the second stage estimation (0.021). We interpret this as strong evidence that voluntary audit, after controlling for other observable and unobservable factors, does not decrease the interest rate of small private firms but rather increases it. We attribute this finding to voluntary audit of small private firms, on average, not being recognised as a signal of higher financial reporting transparency by banks. However, if a small private firm is audited by a Big-4 auditor, this has a significantly negative effect on the interest rate. The coefficient on *BIG4* in the first two models even seems to

[36] Likewise, all the following results reported for the Heckman second-step model form were also estimated with the two OLS models and the results are comparable.

[37] Recent literature (Gow, Ormazabal, & Taylor, 2010; Thompson, 2011) advises for clustering based on firm and time, but simulations suggest that this works well only if we have at least 25 observations in both dimensions (Thompson, 2011), making it more applicable to monthly or daily data used in finance research. Hence, we follow the advice of Petersen (2009) by including time dummies and clustering on firms.

outweigh the positive effect of *V_AUDIT* in total and decrease the overall cost of debt, while this is not the case in the main model (-0.011).[38] Thus, only a voluntary audit performed by a Big-4 auditor is perceived as a credible signal of higher overall financial reporting transparency. The remaining, i.e. non-Big-4, audits are perceived as adopting a label without increased incentives for transparent financial reporting. The positive coefficient therefore implies that the creditors see through this label adoption and do not award the firms with lower cost of debt. Analyses in this and the following sensitivity section now only focus on our main Heckman second stage model, but additional estimations with full and basic OLS yield similar results as in the case of TABLE 2.6.

[38] Wald test on the sum of the two coefficients equalling zero is significant at the 10% level for the two OLS models but not for the main model (F-value of 2.00).

TABLE 2.6: MAIN RESULTS

DEPENDENT VARIABLE: IRATE			
	(1)	(2)	(3)
	OLS FULL	OLS BASIC	HECKMAN 2ND STAGE
INDEPENDENT VARIABLES			
V_AUDIT	0.005**	0.006**	0.021***
	(0.002)	(0.002)	(0.008)
BIG4	-0.009***	-0.010***	-0.011***
	(0.003)	(0.003)	(0.003)
JSC	0.002		
	(0.003)		
L_NP	-0.001		
	(0.001)		
L_LP	-0.000		
	(0.001)		
B_ACCOUNT	0.002***		
	(0.000)		
B_LOAN	-0.047***		
	(0.004)		
SIZE	-0.003***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)
SALESG	0.001	0.004	0.004
	(0.002)	(0.002)	(0.002)
ICOV	0.011***	0.004**	0.004**
	(0.002)	(0.002)	(0.002)
PPE	-0.001	-0.010***	-0.009***
	(0.003)	(0.003)	(0.003)
LEV	0.021***	0.003	0.004
	(0.004)	(0.004)	(0.004)
WC	-0.007**	-0.011***	-0.011***
	(0.003)	(0.003)	(0.003)
PROF	-0.014	-0.018**	-0.017*
	(0.009)	(0.008)	(0.008)
N_EQ	0.061**	0.073***	0.072**
	(0.029)	(0.028)	(0.028)
N_EQ_BL	-0.073**	-0.083***	-0.083***
	(0.029)	(0.028)	(0.028)
IMR			-0.008**
			(0.004)
CONSTANT	0.096***	0.134***	0.123***
	(0.020)	(0.017)	(0.018)
INDUSTRY CONTROLS	YES	YES	YES
YEAR CONTROLS	YES	YES	YES
OBSERVATIONS	5,885	5,885	5,885
R-SQUARED	0.113	0.081	0.082

NOTES: This table presents regression results for the main sample. Full OLS model is estimated first and the basic OLS model is reported in the second column. Third column reports the Heckman 2nd step estimation with included inverse Mills ratio from the 1st stage. N_EQ_BL is an interaction variable between N_EQ and bank loan indicator. Because of their skewed discrete distributions, we are using natural logarithms of NP (L_NP) and

LP (L_LP) throughout the analysis. Robust standards errors clustered at the firm level are reported in parentheses. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively. See TABLE 2.1 for variable definitions.

The results for the rest of control variables are as follows. As expected, size is inversely related to interest rate (-0.005) and confirms that bigger firms can get more favourable lending conditions. The coefficient on *PPE* is significantly negative (-0.009), as more of it could be used for more collateral, in effect lowering the required interest rate. Similarly, *WC* displays a negative coefficient (-0.011) as it signals higher liquidity. The significant coefficients on *ICOV* (0.004) and *N_EQ* (0.072) point in the expected positive direction (note the definition of *ICOV* variable as a ratio of financial expenditures to EBITDA and not vice versa so that the expected sign is positive), and *PROF* exhibits a negative effect (-0.017) on the interest rate in line with more profitable firms expected to receive better lending conditions. The coefficient on *N_EQ_BL* (-0.083) appears puzzling at first sight, but it can be explained as the firms characterised by this dummy are probably facing adverse financial conditions and are having debts reprogrammed by their banks. This process would often include a reduction of the interest rate on existing debts (and greater control by the bank(s)).[39] Lastly, the coefficient on *IMR* is significant and negative (-0.008), implying that the error terms in selection and second-step equations are negatively correlated and the self-selection correction was justified.

TABLE 2.7 displays results of earnings' informativeness and earnings management analysis for the two pairs of subsamples, audited vs. non-audited observations and, among audited observations, Big-4-audited vs. non-Big-4-audited observations. Forecast relevance of current net income for future operating cash flow (α_1) is higher, both in magnitude and significance, for non-audited firms than for audited firms, and among the latter, forecast relevance is higher for firms audited by a Big-4 auditor. This supports the reasoning that audit performed by a Big-4 auditor is associated with more informative earnings, while firms audited by non-Big-4 auditors do not display any significant association between net income and future operating cash flows. Both audit groups combined thus perform worse than the non-audited group, once more suggesting that (non-Big-4) audit is associated with the labelling incentive rather than with the true desire of quality increase in reported financial statements. Findings are confirmed when current net income is split into cash flows from operations and accruals, both again regressed on future cash flows from operations. The coefficients are larger and more significant in non-audited compared to audited firms and in Big-4-audited compared to

[39] Due to their construction, *N_EQ* and *N_EQ_BL* dummies are highly correlated, which results in their high variance inflation factors (VIFs) of almost 20 compared to the next VIF of 1.9 for WC (VIFs for other variables are lower with the exception of *IMR* and *V_AUDIT*, the treatment indicator variable, which is, according to Tucker (2010), not a weakness of the selection model but a consequence of *IMR*'s construction). Consequently, we estimate the main model with one or the other excluded and the coefficients turn out to be (-0.011) for *N_EQ_BL* and (-0.007, non-significant) for *N_EQ* (other VIFs, except *IMR* and *V_AUDIT*, at most 1.9 in both cases). Hence, not including both simultaneously results in loss of explanatory properties as the included variable possibly incorporates the effect of both, offering a less in-depth view of interest rate dynamics for concerned firms.

non-Big-4-audited firms, the only exception being coefficient α_2 for Big-4-auditees, which is entirely insignificant.

TABLE 2.7: INFORMATIVENESS OF EARNINGS AND EARNINGS MANAGEMENT

PANEL A: FORECAST RELEVANCE OF EARNINGS AND EARNINGS' COMPONENTS

	NI REGRESSION	CFO AND ACC REGRESSION	
	α_1	α_2	α_3
NON-AUDITED OBSERVATIONS (N=4,705)	0.540***	0.554***	0.521***
AUDITED OBSERVATIONS (N=353)	0.270*	0.236*	0.358**
AUDITED BY A NON-BIG4 AUDITOR (N=253)	0.237	0.227	0.276
AUDITED BY A BIG4 AUDITOR (N=100)	0.443**	0.277	0.578***

PANEL B: EARNINGS MANAGEMENT MEASURES

	EM1	EM2
NON-AUDITED OBSERVATIONS (N=5,436)	0.627	0.858
AUDITED OBSERVATIONS (N=449)	0.619	0.765
AUDITED BY A NON-BIG4 AUDITOR (N=324)	0.623	0.773
AUDITED BY A BIG4 AUDITOR (N=125)	0.578	0.739

NOTES: Panel A presents coefficient estimates of net income or its components, cash flows and accruals, predicting future cash flows from the following equations, estimated with industry- and year-fixed effects and robust standards errors clustered at the firm level: $CFO_{t+1} = \alpha_0 + \alpha_1 NI_t + \varepsilon_t$ and $CFO_{t+1} = \alpha_0 + \alpha_2 CFO_t + \alpha_3 ACC_t + \varepsilon_t$. The number of observations is reduced compared to Panel B because of one year ahead data requirements. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively.

Panel B presents earnings management proxies. EM1 is the median ratio of absolute total accruals scaled by operating cash flow: $|ACC_{it}|/CFO_{it}$, and EM2 is Spearman correlation between total accruals and operating cash flow, multiplied by -1: $-\rho(CFO, ACC)$.

NI is net income scaled by total assets, ACC is total accruals scaled by total assets and calculated as: $(\Delta current\ assets - \Delta cash) - (\Delta current\ liabilities - \Delta shortterm\ debt) - depreciation$, and CFO is cash flow from operations calculated as net income minus total accruals. Both panels include two comparisons. First, they compare non-audited and audited observations, and second, audited observations are separated into ones audited by a non-Big4 auditor and the ones audited by a Big4 auditor.

The two earnings management measures show contradictory results. On one hand, higher values of EM1, the ratio of absolute total accruals to operating cash flows, and EM2, the correlation between accruals and operating cash flows, are found in non-audited observations (the difference in EM1 being very small), associating them with more earnings management, while, inside the audit subsample, higher values of both measures are found in non-Big-4-audited observations. Hence, the first comparison speaks against our findings thus far, and the second comparison is in line with previous results.

2.6 ADDITIONAL TESTS

2.6.1 SENSITIVITY ANALYSES OF THE MAIN RESULTS

We perform a number of additional analyses and sensitivity tests. We first consider the potential effect of the financial crisis, where banks have become more cautious in granting loans as the financial environment conditions have worsened considerably during our sample period. An audit label would no longer be a sufficient sign of a firm's reporting quality, and the positive effect of *V_AUDIT* would be stronger in crisis period compared to the earlier years. Columns 1 and 2 in TABLE 2.8 confirm this reasoning. We split our sample along the time dimension into pre-2008 and 2008-and-post subsamples and estimate them with the main model. There are some changes in effects of control variables, indicating a shift of focus related to debt financing decisions, but our main results are corroborated for the crisis period. *V_AUDIT* is positive and significant (0.025), *BIG4* is negative and significant (-0.009) and *IMR* is also significantly negative, indicating the need for selection bias control.

To address concerns that some of the small firms in our sample are subsidiaries and might opt for an audit because their parent firm would require it (and thus not electing for a voluntary decision because of their internal reasons) or that some firms could negotiate lower interest rates because of their ownership association with a bigger (parent) firm, we split the sample by legal person ownership. We acknowledge that this is a crude proxy, as direct data on subsidiaries are not directly available. However, this split still gives interesting results. Approximately half of the firms (52%) in our sample are owned by natural persons only (no-LP group) and the other half has at least one legal person owner (LP group). The two subsamples are estimated with the main model in columns 3 and 4 of TABLE 2.8. While there is a huge positive effect of *V_AUDIT* for the no-LP group, the effect persists in the LP group as well. Interestingly, the negative effect of *BIG4* on *IRATE* is not significant for firms in the no-LP group, suggesting that audit of any type is not beneficial for their cost of debt. Some of the effects of control variables also differ among the groups, with *ICOV* and *N_EQ* being important for the cost of debt for no-LP firms and *PPE* benefiting borrowing costs of LP firms. *IMR* in the latter group is not significant, potentially revealing that a simple OLS estimation in this case would not be biased, but its insignificance can also be a result of multicollinearity.[40]

[40] Because of its construction, *IMR* can be correlated with the independent variables in the second stage, and an insignificant *IMR* does not automatically mean that there is no self-selection problem and that it can be dropped from the model (Lennox et al., 2012).

TABLE 2.8: CRISIS EFFECT, LEGAL PERSON OWNERSHIP AND Z-SCORE

DEPENDENT VARIABLE: IRATE					
	(1)	(2)	(3)	(4)	(5)
	PRE-2008	2008 AND POST	NO LP OWNERSHIP	LP OWNERSHIP	Z-SCORE
INDEPENDENT VARIABLES					
V_AUDIT	0.015	0.025***	0.142***	0.023**	0.021***
	(0.012)	(0.009)	(0.037)	(0.010)	(0.008)
BIG4	-0.015***	-0.009**	-0.008	-0.012***	-0.011***
	(0.006)	(0.004)	(0.010)	(0.004)	(0.003)
SIZE	-0.004*	-0.006***	-0.006***	-0.005***	-0.006***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
SALESG	0.006	0.003	0.005	0.002	0.004*
	(0.007)	(0.002)	(0.003)	(0.003)	(0.002)
ICOV	0.004	0.003*	0.009***	-0.000	0.004**
	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)
PPE	0.005	-0.017***	-0.003	-0.013***	-0.010***
	(0.006)	(0.003)	(0.004)	(0.005)	(0.003)
LEV	0.017***	-0.002	0.004	0.004	0.003
	(0.006)	(0.004)	(0.006)	(0.005)	(0.004)
WC	0.003	-0.019***	-0.012**	-0.010**	-0.011***
	(0.006)	(0.004)	(0.005)	(0.005)	(0.003)
PROF	-0.010	-0.021**	-0.015	-0.023*	-0.014
	(0.016)	(0.009)	(0.012)	(0.012)	(0.009)
N_EQ	0.142***	0.047*	0.126***	0.016	0.072**
	(0.003)	(0.028)	(0.013)	(0.014)	(0.028)
N_EQ_BL	-0.158***	-0.054*	-0.134***	-0.030**	-0.083***
	(0.005)	(0.028)	(0.013)	(0.014)	(0.029)
IMR	-0.005	-0.010**	-0.062***	-0.008	-0.008**
	(0.006)	(0.005)	(0.016)	(0.005)	(0.004)
Z-SCORE					-0.001
					(0.001)
CONSTANT	0.120***	0.128***	0.114***	0.132***	0.132***
	(0.036)	(0.017)	(0.022)	(0.022)	(0.019)
INDUSTRY CONTROLS	YES	YES	YES	YES	YES
YEAR CONTROLS	YES	YES	YES	YES	YES
OBSERVATIONS	2,070	3,815	3,079	2,806	5,885
R-SQUARED	0.042	0.047	0.102	0.089	0.082

NOTES: This table presents additional regression results. These are estimations of the main Heckman 2nd step model (column 3 in TABLE 2.6) for different sensitivity tests. Columns 1 and 2 use 2008 as a cut-off year to analyse the effect of the financial crisis. Column 3 analyses small private firms that are not owned by a legal person, and column 4 analyses the subsample of small private firms owned by at least one legal person. In column 5, Altman Z-score is introduced to the main model. Robust standards errors clustered at the firm level are reported in parentheses. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively. See TABLE 2.1 for variable definitions.

Altman Z-score is calculated in its private firms' form: $Z = 0.717\,WC + 0.847\,RE + 3.107\,EBIT + 0.420\,BV + 0.998\,SALES$, where WC is working capital scaled by total assets, RE is retained earnings scaled by total assets, EBIT is earinings before taxes and interest scaled by total assets, BV is book value scaled by total liabilities and SALES is sales scaled by total assets.

In column 5 of TABLE 2.8, we include Altman's Z-score as an additional control variable. We expect that the Z-score at least partially identifies firms in financial distress and isolate the effects financial distress has on the cost of debt from the other explanatory variables. The Z-score formulas developed by Altman (1968), Altman, Haldeman and Narayanan (1977) and subsequent modifications use a combination of financial ratios to arrive at a score illustrative of a firm's financial health. In all specifications, a higher score is representative of a sounder financial position and a lower score indicates a higher likelihood of bankruptcy in the near future. We use the version of Altman's model applicable to non-listed firms in the following form (Altman, 2000):[41]

$$Z = 0.717\,WC + 0.847\,RE + 3.107\,EBIT + 0.420\,BV + 0.998\,SALES \qquad (2.11)$$

where *WC* is working capital scaled by total assets, *RE* is retained earnings scaled by total assets, *EBIT* is earnings before taxes and interest scaled by total assets, *BV* is book value scaled by total liabilities and *SALES* is sales scaled by total assets.

The estimated coefficient on *Z-SCORE* is not statistically significant, and the inclusion of *Z-SCORE* does not change the inferences of the main model. Additionally, we estimate a second Z-score model, applicable for general firms, with the first four coefficients being 6.56, 3.26, 6.72 and 1.05 respectively and no last (sales) component. The results for this Z-score are qualitatively identical, with practically no changes to other variables.

We perform two more tests that are tabulated in APPENDIX 2.1. In the first one, we use the earnings management measure EM1 (ratio of absolute total accruals scaled by operating cash flow) defined earlier and include it in the main model along with interactions with *V_AUDIT* and *BIG4* indicators to try to capture the effect of earnings management on the cost of debt. The main results remain unchanged and the interaction coefficients in question are either insignificant or statistically significant but with a negligible economic significance (with a positive sign when interacted with *V_AUDIT* and a negative sign when interacted with *BIG4*). As revealed by the comparison between and inside audited groups in the previous section, there is probably a lack of variation in EM1 that is also reflected in this analysis.

Our second test is concerned with audit and/or auditor switching behaviour, including switches of auditors (Schwartz & Menon, 1985), initiations and discontinuations. Specifically, we are interested in whether there is an effect on *IRATE* if: (i) the firm is being audited for the first time, (ii) if it ceases to be audited, or (iii) if it changes its auditor. Firms opting for an audit for the first time could see their cost of debt reduced because of higher financial reporting quality. Alternatively, there might be an increase in the cost of debt in line with our findings thus far had a new audit not come from a Big-4 auditor. Firms choosing not to be

[41] The model for private firms is not identical to the model for public firms. It is re-estimated after assuming that market value of equity equals book value of equity (i.e. that the market-to-book ratio equals one).

audited anymore after a previous year audit are expected to have their borrowing costs increased, while a decision to change an auditor could be driven by dissatisfaction with the audit process or outcome, again having a negative tone to it. Out of 3,936 possible year-on-year audit changes in our sample (defined by individual firms' time series), there are very few such incidences. 34 firms switched from no audit to audit, 58 firms switched from audit to no audit and 30 switched their auditor. All were marked with separate dummy variables reflecting these changes in audit status and were included in the main model. All these variables turned out to be statistically insignificant, leaving the main results unchanged. Direction-wise (and ignoring statistical significance), an initiation of audit has a decreasing effect on *IRATE*, contrary to the other two situations.

As the interest rate variable is difficult to measure and is constructed from aggregated financial statements, we also test alternative definitions of it. For comparison with prior literature (e.g. Pittman & Fortin, 2004; Karjalainen, 2011; Kim et al., 2011; Minnis, 2011), we employ two additional definitions that are analysed in TABLE 2.9, columns 3 and 4. Both are wider in numerator and one also in denominator compared to our primary measure and estimated for the sample of small private firms. Specification 2 of the interest rate variable is defined as a ratio of financial expenditures from financial obligations in year t+1 to the average of short- and long-term financial obligations in years t and t+1 (i.e. including debt other than bank, including loans from other firms, parent firms, etc.), and specification 3 of the interest rate variable is calculated as the sum of bank-, bond- and leasing-related financial expenditures in year t+1, divided by the average of short- and long-term financial obligations towards banks in years t and t+1 (due to data inputs required for these specifications, the number of observations varies). The coefficient estimate of *V_AUDIT* is insignificant in the second and unreasonably big in the third specification, while *BIG4* is also negatively significant only in the latter specification. Many of the control variables lose significance in the third specification, whereas they mostly follow the effects from the main model when *IRATE* is specified with specification 2. This underscores the importance of a precise definition of the variables and cautions the researchers in drawing inferences from definitions of interest rate that are rough proxies for the average interest rate charged by banks and other financial lenders.

2.6.2 INCLUSION OF MANDATORY AUDITS

We then expand the sample of small private firms with optional auditing status with private firms above the mandatory audit threshold (denoted as mandatory firms) and analyse the combined sample. The results are shown in the first column of TABLE 2.9 and the sub- sample consisting of mandatory audit firms only in the second column of TABLE 2.9. Consequently, we have to introduce a new indicator variable into the model, *M_AUDIT*, which indicates mandatory firms' observations for which we have audit data.[42] Although less significant, the

[42] When combining our private firm database with audit data, some observations in the mandatory audit-threshold group (medium and big private firms) were left unmatched. We excluded those observations

positive effect of *V_AUDIT* (0.022) persists in the combined sample, while mandatory audit is associated with a significantly negative effect (-0.003) on the interest rate. Hence, being above the mandatory threshold is, on average, beneficial for the firm's borrowing costs. In contrast, audit by a Big-4 auditor is not additionally associated with reduced interest rate in general in the combined sample, but only if such an auditor is chosen in a voluntary audit decision is a negative effect observed (-0.011). Our main results regarding the effects of control variables remain unchanged direction- and statistical significance-wise, while in the subsample of only mandatory audit firms, *SALESG* displays a negative effect on *IRATE* and the effect of *PROF* is not significant anymore.

although they had all the necessary data to compute our variables of interest except the one for audit. While we could code them as *M_AUDIT* based on legal threshold definition, we could not identify whether they were audited by a Big-4 auditor or not and therefore decided to eliminate them from the sample in question.

TABLE 2.9: MANDATORY AUDIT FIRMS AND WIDER IRATE SPECIFICATION

DEPENDENT VARIABLE: IRATE				
	(1) VOLUNTARY AND MANDATORY FIRMS	(2) MANDATORY AUDIT FIRMS ONLY	(3) IRATE SPECIFICATION 2	(4) IRATE SPECIFICATION 3
INDEPENDENT VARIABLES				
V_AUDIT	0.022*		0.001	0.193***
	(0.012)		(0.016)	(0.045)
M_AUDIT	-0.003**			
	(0.001)			
BIG4_V_A	-0.011***		-0.005	-0.028***
	(0.003)		(0.004)	(0.010)
BIG4_M_A	0.000	-0.000		
	(0.001)	(0.001)		
SIZE	-0.003***	-0.001**	-0.005***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.003)
SALESG	0.002	-0.003*	0.004*	0.012*
	(0.002)	(0.002)	(0.002)	(0.007)
ICOV	0.003***	0.003***	0.007***	0.006
	(0.001)	(0.001)	(0.002)	(0.007)
PPE	-0.010***	-0.008***	-0.010***	0.012
	(0.002)	(0.003)	(0.003)	(0.012)
LEV	0.004	0.003	-0.009**	0.025*
	(0.003)	(0.004)	(0.004)	(0.014)
WC	-0.013***	-0.017***	-0.011***	-0.002
	(0.003)	(0.004)	(0.004)	(0.014)
PROF	-0.016**	-0.012	-0.007	0.022
	(0.007)	(0.008)	(0.009)	(0.029)
N_EQ	0.074**	0.011**	0.011	0.039
	(0.029)	(0.005)	(0.015)	(0.030)
N_EQ_BL	-0.080***		-0.019	-0.034
	(0.029)		(0.015)	(0.035)
IMR	-0.009	0.009	0.001	-0.087***
	(0.005)	(0.013)	(0.007)	(0.021)
CONSTANT	0.118***	0.083***	0.138***	0.269***
	(0.012)	(0.013)	(0.018)	(0.087)
INDUSTRY CONTROLS	YES	YES	YES	YES
YEAR CONTROLS	YES	YES	YES	YES
OBSERVATIONS	8,966	3,081	6,979	6,237
R-SQUARED	0.091	0.139	0.049	0.037

NOTES: This table presents additional regression results. These are estimations of the main Heckman 2nd step model (column 3 in TABLE 2.6) for different sensitivity tests. Column 1 analyses small and big private firms (that have to undergo mandatory audit), and column 2 analyses big private firms only. Column 3 analyses small private firms with IRATE specification 2, and column 4 analyses small private firms with IRATE specification 3.

Specification 2 defines IRATE as financial expenditures from financial obligations in year t+1, divided by the average of short- and long-term financial obligations in years t and t+1. Specification 3 defines IRATE as bank-, bond- and leasing-related financial expenditures in year t+1, divided by the average of short- and long-term

financial obligations towards banks in years t and t+1. All samples do not include observations with calculated IRATE=0.
M_AUDIT is an indicator variable for mandatory audit, BIG4_V_A and BIG4_M_A are interaction variables between BIG4 and V_AUDIT and M_AUDIT respectively. Interaction dummy N_EQ_BL was excluded in column 2 due to collinearity. Robust standards errors clustered at the firm level are reported in parentheses. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively. See TABLE 2.1 for variable definitions.

2.6.3 SELECTION BIAS AND MITIGATION OF ECONOMETRIC CONSEQUENCES

Lastly, we address the effects of selection bias. We base our main results on Heckman's two stage procedure. This is equivalent to assuming that there are other potentially important factors above those that we identify and collect in this study that affect the audit decision and its consequences. We are aware that there are two possible approaches to address selection bias: Heckman's two stage procedure and propensity score matching, although they are not direct substitutes as they address different grounds for selection bias (Tucker, 2010). Existing literature also warns about the sensitivity of the Heckman model to sample composition and model specification issues that can critically affect research findings (Stolzenberg & Relles, 1997[43]; Clatworthy, Makepeace, & Peel, 2009; Lennox et al., 2012).

We thus additionally perform our analyses based on propensity score matching, an approach of estimating causal treatment effects stemming from the work of Rosenbaum and Rubin (1983). Using a module in Stata authored by Leuven and Sianesi (2003), we match observations on all the covariates in our set (case 1) and then once more, excluding selection variables used in the first stage Heckman approach (case 2). Probit-calculated propensity scores represent the probability of "treatment" – in our case this is the decision of a firm to voluntarily undergo an audit – given the observed characteristics. Then, for each treated unit, we find an untreated observation that is most similar to it according to the covariates, i.e. the propensity score (Wooldridge, 2010). Matching is performed on nearest neighbour without replacement on common support (within the minimum and maximum of control firms' propensity scores), as we want to arrive at a balanced sample consisting of half voluntary audited firms and half unaudited firms. Under the key assumption that differs from our main Heckman analysis – namely, that selection bias can be explained only by the observables defined in the former or latter case – we inspect the average treatment effect on the treated group (ATT) in terms of *IRATE* as well as estimate an OLS regression (with standard industry- and year-fixed effects and clustered robust standards errors) on the matched sample analogous to estimations in column 1 (case 1) and column 2 (case 2) of TABLE 2.6. At the same time, we check the goodness of match variable-wise with a t-test of equality of means both before and after matching.[44]

[43] Using simulations, the authors (1997) even find that Heckman's two-stage estimator can worsen estimates unless selection bias is severe and samples are big enough, although sample selection is known to exist and none of the model's assumptions are violated.
[44] As this is not our central analysis, an example of results for case 2 (basic set of variables) is tabulated in APPENDIX 2.2.

ATT is not significant in any of the cases, and the regression on the fully matched sample of 898 observations (we have 449 audited observations to start with, all being on common support) does not show a significant impact of *V_AUDIT*, whereas *BIG4* has the expected significant effect (-0.013). However, this baseline case does not result in good matches. Means of variables are not comparable, all but two t-tests are rejected at the 5% level, and the bias is actually increasing after the matching, thus indicating that the approach has to be modified. To improve the match, i.e. to avoid "bad" matches of observations with substantially different propensity scores, we employ calipers, maximum absolute distances between treated and control observations (Caliendo & Kopeinig, 2008). That does result in a minor loss of observations, as we require the matches to be in a pre-specified range but, on the other hand, it drastically improves the quality of matching. Already with a caliper of 0.01, we have, for case 1, a matched sample of 843 firms (421 audited – a loss of 28 observations, and 422 unaudited – evidently, two of the latter are on a borderline score and both are considered) that are on common support, and none of the t-tests on the equality of means is significant at the 5% level. OLS regression on this matched sample confirms the previously established significant effects of *V_AUDIT* (0.005) and *BIG4* (-0.012) on the firms' cost of debt, with most of the other controls being insignificant. Results are comparable in case 2 matching (see APPENDIX 2.2), with some differences only in control variables. Decreasing the caliper (to 0.005, 0.001, etc.) provides even more significant results, accompanied by an increasing number of observations that fall outside the set range, thus reducing our matched sample size. Propensity score matching analysis thus additionally supports our main findings, although assuming selection on observables only.

2.7 CONCLUSION

The aim of this study is to analyse the effect of voluntary audit on the cost of debt of small private firms. We employ a specific setting of private firms where audit is voluntary up to a certain legally determined threshold and mandatory for larger private firms. By using very detailed financial data, we are able to add to existing literature on private firms with additional empirical evidence of the effects of audit *per se* using a relatively more precise specification of the dependent variable, i.e. the interest rate. We also employ clear econometric procedures, as suggested by Tucker (2010), to ensure that our results are not affected by the (wrong) choice of econometric procedures rather than to underlying economics.

Our tests show that outside party verification of financial statements is generally not valued by lenders in a voluntary setting. The only exception is voluntary audit by a Big-4 auditor that has a reducing effect on firms' cost of debt, while a mandatory (above-threshold) audit by a Big-4 auditor does not affect borrowing costs of private firms. Moreover, voluntary audit by a non-Big-4 auditor is significantly positively associated with the interest rate. This result is confirmed in a series of sensitivity tests and even using an approach utilising different

underlying assumptions about the decision to voluntarily audit and the economic consequence of this decision (the cost of debt). We attribute this finding as indicating that a non-Big-4 audit is generally treated as "adopting a label" and penalised by creditors. Big-4 voluntary audits are more likely to be related to improved overall financial reporting transparency. In turn, higher incentives for transparent reporting are awarded with lower cost of debt relative to non-Big-4 auditees. The issue that we leave for further research is why the cost of debt is higher for all auditees (including the Big-4), despite the conjecture that Big-4 auditees are "serious adopters". One potential explanation might be higher risk of audited firms. Due to short time series and diversification issues, it is difficult to envisage an efficient measure of the operating and financial risk of private firms.

Our findings are subject to some limitations. Although a part of the common EU accounting regulatory framework, this is a single-county analysis carrying all the country-specific factors that may be different even from other EU members, thus making results less comparable and generalisable. Nevertheless, other findings are consistent with extant research, while the somewhat unpredicted ones may point to areas that need additional scrutiny in the literature; for example, how does the decision on how to measure the cost of debt affect research outcomes or that it is not self-evident that audit reduces firms' borrowing costs.

3 ACCOUNTING BETA OF PRIVATE FIRMS AND ITS USEFULNESS[45]

ABSTRACT

In this paper, the longstanding concept of accounting beta is revisited, applying it on a large sample of private firms. We estimate different versions of accounting beta based on separate accounting return measures. Usefulness of beta estimations is then assessed through the association with performance measures in the next year. While the estimated values of accounting betas appear in reasonable levels, we find only limited evidence of them being a representative measure of risk, as different specifications yield dissimilar results.

KEYWORDS: private firms, accounting beta, cost of equity

JEL CLASSIFICATION: G11, G12, M41

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3.1 INTRODUCTION AND MOTIVATION

Assessment of risk is one of the most important aspects of any firm analysis. Estimated risk is the input in determining required returns that further constitute the cost of capital, a concept ubiquitous in corporate finance. Cost of capital as the discount rate is important for all: the firm itself (e.g. in capital budgeting and allocation, financing decisions, before going public), its stakeholders (owners, lenders, suppliers) and other agents in the financial market, as they use it to weigh their investment and other business decisions. The economic worth of an asset or a decision is evaluated in terms of the present value of its expected cash flows, and the discount rate reflecting time value adjustments is characterised by the risk involved. Hence, if risk is not properly accounted for it can lead to sub-optimal or even harmful choices. Required rate of return consists of the risk-free rate (compensation to investors for delaying current consumption in exchange for future consumption), which is constantly changing due to market forces but is the same for all economic agents, and the risk premium that depends on individual characteristics and operating risk of the firm.

Risk is commonly represented by beta, which, by one definition, expresses risk that is added by the stock (firm) to a well-diversified market portfolio or, in other words, measures the relative sensitivity of a given stock against an average stock, i.e. the market as a whole.[46] Beta is referenced against its theoretical average value of one, with betas above one indicating variability higher than that of the market (stock is more risky) and betas below one indicating lower-than-market variability (stock is less risky). Negative beta values signify countering market movements, the relative amount of which is determined by actual beta value. Clearly, this reasoning applies to assessing riskiness of publicly traded firms with existing stock market data, and the corresponding risk measures are termed market betas.

We are, however, interested in assessing the risk of private firms that dominate every economy yet have only limited publicly available data, if any. Most importantly, these are not publicly traded and so their betas cannot be computed as outlined above. Still, risk assessment may be as important for private firms as it is for public firms. Although operating on a smaller scale, they have to take business decisions and consider financing needs like their public counterparts. Given the relative difficulty of private firms to obtain outside financing and highly limited access to capital markets, inaccurate estimation of their risk can have decisive consequences. A concept analogous to market beta and applicable to private firms is accounting beta.[47] The same reasoning of the relation between individual and market returns is used with the calculation now employing accounting financial data. One must then define

[46] In statistical terms, beta is the covariance of the stock's return with market return, standardised by the variance of the market portfolio.

[47] Another way to estimate private firm betas (and also divisional betas of large public firms that have diversified operations in various sectors) is the pure play method. Under this approach, firms similar to the one (or division) studied are identified in the stock market and their market betas are averaged into a proxy of the beta in question. Since it is usually quite difficult to find a matching publicly traded firm (in terms of business, size and capital structure), this approach is not very precise.

the accounting measure of return that will be used and the market return against which it will be evaluated. Due to data availability (annual financial statements), only yearly returns can be calculated what considerably limits the number of observations available per firm for beta estimation.[48]

Noting that relatively little research has been done in the domain of accounting betas (compared to market betas) and even more so applying it to the private sector, we re-examine the concept in search of potential informational merit this risk measure can bring for private firms. Using a Slovenian database of private firms' detailed financial reports, we first construct accounting measures of return from which we then estimate accounting betas for the longest time span available. We then relate calculated betas to selected performance indicators in order to test their usefulness for expectations in the future period. Accounting return measure and sample size are varied in order to assess the effect of inputs for accounting beta calculation. The purpose of this paper is therefore firstly to estimate accounting betas from private firms' data and secondly to evaluate beta usefulness according to the following hypothesis:

H1: Private firms' accounting beta estimates are significantly related to future performance indicators (loss, Z-score, ROE, change in net income, TATR, EBIT).

The structure of this paper is as follows. Section 2 provides an overview of related literature. Section 3 develops our research design, while Section 4 describes the sample and its properties. The main results are presented in Section 5, followed by sensitivity tests in Section 6. Section 7 concludes.

3.2 RELATED LITERATURE

According to the Capital Asset Pricing Model (CAPM) put forward by Sharpe (1964) to become the norm in financial risk analysis, risk is separated into two components, systematic and unsystematic. As all unsystematic risk can be eliminated with diversification of the investment portfolio, it is only the systematic risk affecting the whole market that is important. Beta, reflecting the systematic risk of the share (firm), is thus of central importance in risk assessment.

Following Ball and Brown's (1969) paper on implications of portfolio theory for accounting, there has been extant research relating various accounting data to market measures of risk (Beaver, Kettler, & Scholes, 1970; Gonedes, 1973; Beaver & Manegold, 1975; Bildersee, 1975; Baran, Lakonishok, & Ofer, 1980). The premise of these investigations was that accounting data are considered to be a summary of a firm's operations and decisions and as

[48] In contrast, when estimating market beta, the researches face an opposite challenge. Choosing between monthly, weekly or even daily returns (dependent also on the liquidity of the stock) over a span of many years, a trade-off has to be addressed between using more observations or using only recent, more relevant data.

such also contain information on the risk associated with the firm. Hill and Stone (1980) built on such previous research with establishing the accounting beta's construction as analogous to market beta. Although studies measured accounting betas in different ways and differed as to the extent of association between accounting and market betas, they commonly confirmed it existed. As stated by Beaver et al. (1970), accounting data were thus found to reflect the determinants of different riskiness between stocks that were otherwise reflected in their market prices, and Bowman (1979) provided a theoretical basis for such empirical instigations in deriving the relationship between systematic risk and accounting beta. Leverage was also highly investigated as influencing systematic risk ever since Hamada (1969; 1972) established its effect, signifying that a firm can influence its leveraged beta through changes in the composition of its financing. Further, Mandelker and Rhee (1984) derived the relation to be dependent on operating and financial leverage stemming from accounting numbers, although the intrinsic business risk measure still includes a market input. The latter was recently refined by Garrod and Mramor (2004) to eliminate the firm-specific market measure of return what allows accounting numbers to be used to the greatest degree possible.

The survey of financial experts by Dukes, Bowlin and Ma (1996) regarding the valuation approaches used in practice for closely-held firms with insufficient or non-existing stock data reveals that the pure play method employing betas of comparable firms was highly preferred over accounting beta. Still, the authors encouraged further research on application of accounting betas as well as on proxies useful for valuation in order to permit and facilitate their wider application.

Despite that, research on accounting betas has been modest in recent years. Almisher and Kish (2000) and Almisher, Buell and Kish (2002) have, for example, utilising initial public offerings data, managed to confirm that accounting beta is associated with initial return of the IPOs, and it as such a good proxy for ex ante uncertainty. Evidently, one of the important applications of accounting beta (next to its use in the private firms' context) is also in valuation of private firms planning to go public. As discussed, other uses include specific project risk estimation or divisional risk assessment. Kulkarni, Powers and Shannon (1991) have employed the accounting approach in estimating the required rate of return for specific divisions of large firms operating in different industries, since the general (market) beta is of little use in internal decision-making due to diversification of operations.

The concept of beta has also seen its share of criticism and doubt. While the market beta was suggested to be inadequate in explaining required returns (Fama & Fench, 1992; 1993), accounting beta shares its methodological shortcomings. Historical data are used for its calculation, and as such beta reflects the condition of the firm in the past, although it is used to assess current riskiness or the cost of capital in the future (Damodaran, 2002). In addition, small firms' betas face yet another problem. In theory, beta represents only the systematic risk portion that cannot be diversified away, while with small firms one cannot assume considerable diversification to completely eliminate the effect of non-systematic risk factors

on operating and financing decisions of such small businesses (Palliam, 2005). Similarly, St-Pierre and Bahri (2006) conclude that accounting beta cannot be used as an overall risk measure for small firms, as even the best and most credible financial statements that support it are not capable of reflecting all risk factors that affect them. These are – considering size, sensitivity and level of operations along with non-diversification – even more pronounced and are revealed in financial statements with a lag, when it can already be too late for proper actions to be taken. Despite such caveats that accompany estimation of accounting betas, we believe that they contain enough information and predictive power for them to be reasonably employed in the analysis of private firm risk as follows in the empirical part of the paper.

3.3 RESEARCH DESIGN

The first step in our analysis is selecting the accounting measure of return to use instead of stock market return not existing for private firms. Following prior research (Hill & Stone, 1980), we use return on equity (ROE) as a quotient between net income and lagged equity, i.e. $ROE_{i,t} = \frac{NI_{i,t}}{EQ_{i,t-1}}$.[49] We choose lagged (and not current or average) equity for the denominator, as such a definition follows directly from the residual earnings model used for valuation (Penman, 2010). The second input necessary for beta estimation is the measure of market return, which we analogously calculate as $ROE_{m,t} = \frac{NI_{ind-year,t}}{EQ_{ind-year,t-1}}$. To arrive at a measure more closely related to a firm's business of operations, we do not compute market return solely on a yearly basis but rather calculate ROEs for industry-year clusters.

Individual returns are then regressed firm-wise on market returns using robust standard errors, where r_i is a firm's individual return and r_m is industry-year market return. Estimated coefficient β_{acc} is then our accounting beta for a given firm.

$$r_i = \alpha_0 + \beta_{acc} r_m + \epsilon_i \tag{3.1}$$

As beta is measuring the sensitivity of individual returns to market returns, it is theoretically defined as the covariance of individual returns with market returns scaled (for standardisation) by the variance of market return: $\beta_i = \frac{cov(r_i, r_m)}{var(r_m)}$ or, rearranging, as the correlation coefficient of individual and market returns multiplied by the ratio of individual and market returns' standard deviations: $\beta_i = \rho(r_i, r_m) \times \frac{\sigma(r_i)}{\sigma(r_m)}$. We confirm that the latter definitions give an identical beta estimate as the regression from equation (3.1) for individual firm-regressions and sample as a whole.

[49] Researches have also used other measures of accounting return, for example return on investment or scaled earnings before extraordinary items (Aaker & Jacobson, 1987; Jacobson, 1987). In sensitivity analysis, we use scaled EBIT as an alternative accounting return measure.

Following the findings of Levy (1971) and Blume (1975) that both, extremely low and extremely high, betas exhibit a tendency to gradually move towards the grand mean (i.e. 1) in time, adjustments to the regression-obtained historical betas are frequently made.[50] These new adjusted betas are a better predictor of future betas than the backward-looking-only historical betas. Brigham and Ehrhardt (2005) note the following modification, which we use to adjust our accounting betas.[51]

$$\beta_{adj} = 0.33\beta_{acc} + 0.67 \tag{3.2}$$

Alternatively, literature (St-Pierre & Bahri, 2006) offers another way of calculating accounting beta. It is determined as a quotient of the change in individual return over the change in market return – in case of ROE being our accounting measure of return: $\beta_i = \frac{\Delta ROE_i}{\Delta ROE_m}$. This is a highly unstable measure as it is computed on a yearly basis with only two pieces of data (on the other hand, this results in a much larger number of estimated betas compared to the upper estimation). Changes in return, especially in the numerator, can be substantive, even more so because private firms of smaller size and possible unstable operations are also investigated, and these observations can cause such estimates of beta to have excessively low/high values.

After obtaining beta estimates, we then test their usefulness with several performance indicators. Firstly, firm beta values are used to assess the likelihood of future loss in a probit regression. Secondly, we check the association between betas and another indirect measure of firm risk, Altman's Z-score. The score, computed from several financial ratios, has been derived first only for public firms (Altman, 1968) but then modified also for private (non-listed) firms without the need for market data inputs (Altman, 2000). Ratios are given corresponding weights, and the resulting score values are categorised into three groups representing the expected financial health of the firm. Bankruptcy in the near future is predicted for firms with a low score and a larger score indicates a sounder firm.

$$Z = 0.717\,WC + 0.847\,RE + 3.107\,EBIT + 0.420\,BV + 0.998\,SALES \tag{3.3}$$

Where WC is working capital scaled by total assets, RE is retained earnings scaled by total assets, EBIT is earinings before taxes and interest scaled by total assets, BV is book value of equity scaled by total liabilities and SALES is sales scaled by total assets.

Third is a set of financial ratios in the future period, for which we are interested whether they relate to beta (from current period). These are ROE as already defined above, change in net

[50] Admittedly, the referenced findings were related to beta in a portfolio context, but adjustments are being done also at the individual firm level.

[51] Such adjustments are, at least to a certain degree, arbitrary and differ among financial services providers. Still, all have the same purpose of facilitating beta mean reversion. For example, Penman (2010) reports the adjustment coefficient to be 0.65 and the constant 0.35, again resulting in a mean of 1 on average.

income scaled by equity value, total assets turnover ratio (TATR) as sales over total assets and lastly operating return on assets as EBIT over total assets. Each of the ratios is informative in its own merit and a potential association with a firm's beta would increase the usefulness of the latter for assessing future firm performance. In sensitivity tests, we first perform specific sample splits, then repeat the analyses for an alternative accounting measure of return and lastly consider an expanded sample to our original one.

3.4 SAMPLE SELECTION

The data source for our analysis is the Agency of the Republic of Slovenia for Public Legal Records and Related Services (henceforth AJPES). AJPES collects financial statement information of all firms operating in Slovenia that have to file it by law. This dataset can then be used for research purposes. High quality data are available from 2001 onwards, and as we require lagged and future values for our analyses, we determine our sample to encompass the 2002-2010 time period.[52] Firstly, publicly listed firms are excluded from the population and then we also exclude micro-sized private firms. The latter are excluded because for these firms, although prevailing in number, it is more difficult to argue for the usefulness and exactness of such risk analysis as many of them are single owner-manager firms, and their relatively small amounts of total assets and equity facilitate possible extreme ratio calculations not comparable to those from private firms of more substantial size. We therefore study accounting beta of private firms from size small upwards but do include micro firms in sensitivity checks.[53]

The sample selection procedure is presented in TABLE 3.1. From the starting sample of 39,518 private firm-years, we firstly exclude observations of firms that were not operating for 12 months and the ones with a legal structure change within a year as those typically represent mergers or some sort of restructurings. Firms from financial and utility sectors are excluded, as is standard in the literature due to their specific operating characteristics. As our main measure of accounting return is ROE, observations that have missing equity are deleted since ROE could not be calculated for them. Additionally, negative equity firms are also excluded as they would confuse ROE calculation – a quotient of negative equity in conjunction with (likely) negative net income would be positive, distorting our computation more than this

[52] Data for 2012 were not yet available at the time of data collection, and 2011 data are used for future performance measures.

[53] A note is necessary on the size classification of firms. Article 55 of the Slovenian Companies Act defines the criteria based on which firms are classified into size groups of micro, small, medium and large firms. In particular, firms that fulfil at least two of the following criteria are considered micro firms: number of employees does not exceed 10, sales revenues do not exceed €2,000,000 and total assets do not exceed €2,000,000. Prior to 2006, the legislation defined only three size groups, with the smallest containing both micro and small firms, therefore we have to proxy for the micro firms in the first half of our sample. We do this using the number of employees criterion that does not change over the entire period, since the criteria relating to sales revenues and total assets are revised every few years to reflect inflation and/or requirements from EU legislation. Nevertheless, using an additional arbitrary cut-off (based on comparably smaller cut-offs also for larger firms defined in legislation from 2001 onwards) of €1,000,000 for the two value-defined criteria in the period 2001-2005 does not substantially change our size classification.

exclusion. Lastly, observations with no total assets and/or sales are dropped, since these do not seem to be operating at all.

TABLE 3.1: SAMPLE SELECTION

firm-year observations of private firms in the period 2002-2010	39,518
- observations of firms not operating for 12 consecutive months	394
- observations with a legal structure change within a year	376
- observations of financial and utility firms	1,383
- observations with negative or missing equity	2,030
- observations with zero total assets or sales	19
firm-year observations available for accounting return calculations	35,316
- observations with missing ROE	3,936
- outlier observations	626
firm-year observations available for accounting beta calculations (6,320 distinct firms)	30,754

NOTES: This table presents the sample selection process. Starting sample of small private firms is obtained from AJPES and identified following the Slovenian Companies Act. All financial industry related firms (i.e. financial and insurance activities, real estate) as well as utilities (electricity, gas and steam supply firms) are excluded due to their distinct balance sheet and operating properties. After ROE calculation, 1% of outliers at the top and bottom of distribution are removed.

ROE is calculated for the remaining sample and, due to the lagged equity definition, the first observation in every firm's time series in incomputable. Finally, top/bottom 1% outliers are excluded to mitigate extreme ratio calculations resulting from potential measurement error or drastic year-to-year changes in equity or net income. Out of the remaining 30,754 firm-year observations for 6,320 distinct firms, there are 1,399 firms with a full time series, i.e. uninterrupted yearly data from 2002 to 2010, and, on the other hand, there are 1,193 firms with one yearly observation only. These differences are important for our beta computation as we want to have the time series as long as possible to obtain more reliable estimates.

Descriptive statistics of private firm characteristics presented in TABLE 3.2 show that the average firm from our sample would be considered of medium size (given the criteria currently in place and noting that these were lower in earlier years), whereas the median firm would be of small size.[54] This is consistent with the predominating number of small firms in our sample (21,086), followed by medium firms (7,390) and large private firms (2,278). The minimum observation of zero employees is the result of this item being methodologically computed from reported working hours and rounding of the result.[55]

[54] The data before 2006 (Slovenia joined the Eurozone in 2007 and each year firms have to report their previous financial data as well) were recalculated from Slovenian tolars to euros.

[55] The biggest non-publicly listed firms according to the following statistics are: for total assets DARS (2009), for sales Revoz (2010), for cash on balance sheet Sava tires (2009), for EBIT and NI Lek (2006) and for the number of employees Slovenske železnice (2006). The lowest EBIT comes from DARS (2003) and the biggest loss comes from Slovenske železnice (2003). We acknowledge that, given their size and complexity, these observations are not representative of a typical private firm under study in our sample but are retained in the sample, as the primary exclusion criterion is public listing of a firm.

TABLE 3.2: DESCRIPTIVE STATISTICS

N = 30,754							
	MEAN	**MIN**	**25%**	**MEDIAN**	**75%**	**MAX**	**SD**
TA	10,500,000	4,885	1,186,242	2,760,931	6,686,171	5,910,000,000	81,600,000
CA	4,098,586	1,348	527,550	1,312,353	3,165,402	524,000,000	12,700,000
SAL	10,100,000	75	1,421,190	3,202,969	7,449,228	1,320,000,000	35,500,000
CASH	242,379	0	9,573	41,475	150,781	62,300,000	1,185,457
EBIT	406,951	-93,300,000	14,104	93,175	316,650	136,000,000	2,524,081
NI	280,749	-58,400,000	6,372	50,833	216,410	115,000,000	2,073,920
EMPL	81	0	17	30	68	7,971	228

NOTES: This table presents descriptive statistics of firm characteristics for our sample. TA = total assets; CA = current assets; SAL = sales revenues; CASH = balance sheet cash item; EBIT = earnings before interest and taxes; NI = net income; EMPL = average number of employees (based on reported working hours). Descriptives, other than EMPL, are presented in euros.

3.5 RESULTS

Computed accounting returns and estimated accounting betas are presented in TABLE 3.3. The median ROE for our private firms sample is 8.5%, with the mean at 15%. Higher value of the mean is partially a consequence of the ROE construction, as lagged equity is generally smaller than the average of lagged and current equity or current equity alone.[56] Regarding market returns, the statistics are informative only to the extent industry-year clusters are viewed as equally weighted. Each of the 144 industry-year market returns (there are 19 industries in the classification used, three are excluded in the sample selection process, hence, returns are computed for the remaining 16 for each of the nine years in our sample) is considered as an individual observation, and the median industry-year ROE-based market return is 5.4%.

[56] Alternatively, if ROE is defined as a quotient of net income and equity from the same period, median return remains relatively unchanged at 8.3%, but the average return falls to 9.7% with more extreme observations now at the lower side (e.g. a minimum of -2.34).

TABLE 3.3: RETURN MEASURES AND ACCOUNTING BETAS

	MEAN	MIN	25%	MEDIAN	75%	MAX	SD	N
ACCOUNTING RETURN								
r_i	0.150	-0.796	0.014	0.085	0.228	2.286	0.304	30754
r_m	0.057	-0.228	0.015	0.054	0.086	0.952	0.097	144
ACCOUNTING BETA								
β_{acc}	-0.42	-73.97	-1.29	0.31	2.22	38.94	8.72	5157
β_{adj}	0.53	-23.74	0.25	0.77	1.40	13.52	2.88	5157
ACCOUNTING BETA$_{2010}$ AFTER WINSORISATION (BETA USEFULNESS ANALYSIS)								
β_{acc}	0.75	-3	-0.26	0.71	2.43	3	1.77	2730
β_{adj}	1.00	-3	0.59	0.90	1.47	3	1.04	2730
ALTERNATIVE BETA								
β_{acc}	-1.49	-457.98	-3.56	0.12	3.79	416.43	51.93	23393

NOTES: This table presents statistics for accounting return measures and betas calculated from them. Individual accounting return r_i is calculated as $ROE_{i,t} = \frac{NI_{i,t}}{EQ_{i,t-1}}$ for every observation, and market accounting return r_m is calculated as $ROE_{m,t} = \frac{NI_{ind-year,t}}{EQ_{ind-year,t-1}}$ for every industry-year combination. Accounting beta β_{acc} is the slope coefficient from the equation $r_i = \alpha_0 + \beta_{acc} r_m + \epsilon_i$ estimated firm-wise with robust standard errors. Adjusted beta β_{adj} is the calculated historical accounting beta corrected with the formula $\beta_{adj} = 0.33\beta_{acc} + 0.67$. Extreme values of betas are then winsorised at -/+3. Lastly, alternative beta is calculated observation-wise as $\beta_i = \frac{\Delta ROE_i}{\Delta ROE_m}$.

The first of the betas reported, β_{acc}, is the accounting beta estimated through equation (3.1) for every firm. As already noted, the lengths of firms' time series used for beta estimations differ, with the longest possible term of nine years represented by 22% of distinct firms accounts for almost 41% of firm-year observations in our sample. Since only yearly data can be used for accounting return calculations, the shortness of available time series is acknowledged as a drawback of our analysis in comparison to stock market beta analyses that are using weekly or even daily (if the share is liquid) data, forming incomparably longer time series. Given the lack of reliability associated with such series lengths, we exclude 1% of top/bottom observations with extreme beta values.[57]

The second beta reported, β_{adj}, is our accounting beta adjusted for mean reversion as proposed by equation (3.2). This has an effect of contracting the distribution, with mean approaching the median and both moving towards the value of 1. The next two rows present statistics for accounting and adjusted betas used for our usefulness analysis in the year 2010. We decide for the 2010 analysis for the calculated betas to have as long a history as possible and not to include any year-specific factors influencing our dependent variables of interest.

[57] Concerning the limiting effect yearly calculations have on the estimation of accounting beta, some studies have completely excluded time series of five-years or less of data (Aaker & Jacobson, 1987). This is also reflected in our analysis as all of the betas excluded as outliers had a time series length of 4 or less.

Moreover, we winsorise extreme observations of beta at the values of +/-3 to mitigate the effect of remaining outliers. The last row of TABLE 3.3 reports results of alternative beta calculation as a quotient of changes in individual and market returns. Even after exclusion of outliers at the 1% level, such beta estimates prove highly dispersed and not useful for additional analyses for the reasons already discussed in the research design section.

Accounting beta usefulness is firstly assessed in a probit regression with a loss dummy as the dependent variable. If our calculated beta is indeed a good measure of riskiness of private firms, it could be indicative of higher probability of a loss such riskier firms face, especially in unfavourable economic circumstances such as those of the financial crisis in recent years. Panel A of TABLE 3.4 gives strong support for this conjecture. Beta values show a strong association to the likelihood of future loss at levels of statistical significance below 1%. Time series of different lengths available for beta calculation are used with the rightmost column using only betas with the complete 9-year series (2002-2010), the column to the left additionally using betas with 8-year series available for their estimation, etc. As the probit coefficients increase with the time series requirement (and accordingly smaller numbers of eligible observations), we interpret that as a more informative beta measure corresponding to beta being more precisely estimated with more inputs available.

In the second performance test (Panel B of TABLE 3.4), we relate accounting beta to Altman Z-score for private firms. Both being measures that reflect firm riskiness in specific ways, we expect a negative relation to exist between the two because higher values of Z-score indicate a financially sounder firm, and lower values of Z-score imply an impending risk of bankruptcy in the near future. Although the sign of their relation is as expected for all time series variants, marginal significance is obtained in only one of the regressions, not providing evidence of beta being useful in predicting the Z-score.

TABLE 3.4: ACCOUNTING BETA USEFULNESS

PANEL A: PROBIT REGRESSION, DEPENDENT VARIABLE = FUTURE LOSS									
	LENGTH ≥ 1	LENGTH ≥ 2	LENGTH ≥ 3	LENGTH ≥ 4	LENGTH ≥ 5	LENGTH ≥ 6	LENGTH ≥ 7	LENGTH ≥ 8	LENGTH ≥ 9
BETA	0.059***	0.075***	0.082***	0.089***	0.093***	0.108***	0.110***	0.117***	0.103***
	(0.019)	(0.019)	(0.021)	(0.023)	(0.023)	(0.025)	(0.026)	(0.027)	(0.028)
CONSTANT	-1.138**	-1.035*	-1.032*	-1.029*	-1.027*	-1.021*	-1.021*	-1.018*	-1.023*
	(0.573)	(0.590)	(0.591)	(0.591)	(0.591)	(0.593)	(0.593)	(0.594)	(0.592)
OBSERVATIONS	2,490	2,388	2,148	1,916	1,824	1,640	1,525	1,391	1,285

PANEL B: DEPENDENT VARIABLE = ALTMAN Z-SCORE FOR PRIVATE FIRMS									
	LENGTH ≥ 1	LENGTH ≥ 2	LENGTH ≥ 3	LENGTH ≥ 4	LENGTH ≥ 5	LENGTH ≥ 6	LENGTH ≥ 7	LENGTH ≥ 8	LENGTH ≥ 9
BETA	-0.001	-0.000	-0.007	-0.019	-0.027	-0.048*	-0.046	-0.038	-0.026
	(0.021)	(0.022)	(0.024)	(0.025)	(0.026)	(0.027)	(0.029)	(0.030)	(0.032)
CONSTANT	1.604***	1.604***	1.678***	1.523***	1.537***	1.575***	3.273***	1.558***	2.186***
	(0.227)	(0.227)	(0.262)	(0.410)	(0.415)	(0.426)	(0.597)	(0.422)	(0.252)
OBSERVATIONS	2,730	2,600	2,327	2,078	1,978	1,781	1,656	1,512	1,399
R-SQUARED	0.046	0.046	0.057	0.061	0.061	0.064	0.058	0.058	0.056

PANEL C: DEPENDENT VARIABLE = FUTURE ROE									
	LENGTH ≥ 1	LENGTH ≥ 2	LENGTH ≥ 3	LENGTH ≥ 4	LENGTH ≥ 5	LENGTH ≥ 6	LENGTH ≥ 7	LENGTH ≥ 8	LENGTH ≥ 9
BETA	-0.017***	-0.018***	-0.018***	-0.014***	-0.014***	-0.016***	-0.016***	-0.016**	-0.011
	(0.006)	(0.006)	(0.007)	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
CONSTANT	1.024***	0.004	0.005	0.006	-0.057	-0.055	-0.054	-0.054	-0.063*
	(0.003)	(0.049)	(0.049)	(0.048)	(0.037)	(0.038)	(0.039)	(0.039)	(0.036)
OBSERVATIONS	2,491	2,388	2,148	1,919	1,827	1,643	1,528	1,394	1,288
R-SQUARED	0.016	0.016	0.012	0.012	0.011	0.010	0.011	0.011	0.008

(TABLE CONTINUES)

TABLE 3.4 (CONTINUED)

PANEL D: DEPENDENT VARIABLE = FUTURE CHANGE IN NI

	LENGTH ≥ 1	LENGTH ≥ 2	LENGTH ≥ 3	LENGTH ≥ 4	LENGTH ≥ 5	LENGTH ≥ 6	LENGTH ≥ 7	LENGTH ≥ 8	LENGTH ≥ 9
BETA	0.069*	0.030*	0.021***	0.022***	0.024***	0.025***	0.026***	0.024**	0.019**
	(0.041)	(0.016)	(0.007)	(0.008)	(0.009)	(0.009)	(0.010)	(0.011)	(0.009)
CONSTANT	-0.023	-0.045	-0.049	-0.049	-0.072	-0.073	-0.076	-0.072	-0.063
	(0.023)	(0.054)	(0.053)	(0.053)	(0.046)	(0.046)	(0.047)	(0.047)	(0.043)
OBSERVATIONS	2,491	2,388	2,148	1,919	1,827	1,643	1,528	1,394	1,288
R-SQUARED	0.005	0.004	0.006	0.006	0.007	0.008	0.008	0.006	0.006

NOTES: This table reports tests of beta usefulness, estimating the effect of accounting beta in 2010 on several performance indicators. Panel A evaluates a probit regression, where the dependent variable is coded 1 if firm had a loss in 2011 and 0 otherwise. In Panels B through D, accounting beta usefulness is estimated with a regression $y_i = \alpha_0 + \alpha_1\beta_i + \varepsilon_i$, where in Panel B y_i is Altman Z-score for private firms, in Panel C y_i is ROE in 2011 and in Panel D y_i is (equity-scaled) change in NI from 2010 to 2011.

Altman Z-score for private firms is calculated as: $Z = 0.717\,WC + 0.847\,RE + 3.107\,EBIT + 0.420\,BV + 0.998\,SALES$, where WC is working capital scaled by total assets, RE is retained earnings scaled by total assets, EBIT is earnings before taxes and interest scaled by total assets, BV is book value of equity scaled by total liabilities and SALES is sales scaled by total assets.

All tests are performed for varying time series lengths, representing the number of years that were available to compute a firm's accounting beta in 2010. Industry controls and robust standard errors (reported in parentheses) are included in all estimations. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively.

Last in our beta-performance analysis are the selected ratios – ROE, change in (scaled) net income, total assets turnover ratio and operating return on assets – of the four, only the first two are reported in Panels C and D of TABLE 3.4, and the regressions for other two are excluded for insignificance and brevity.[58] We would expect firms with a higher beta to be, on average, more profitable, resulting in a higher future ROE, but our estimations show the opposite. Beta is reducing future ROE in all but the longest time series, which is another surprising result. On the other hand, this finding is corroborating the findings from Panel A that beta is positively related to the likelihood of a future loss.

One explanation for the negative relationship between beta and future ROE could be the negative state of the economy in which case firms with higher betas would incur an even bigger decline. Although the Slovenian GDP did not fall in 2011 but experienced a modest growth of 0.7%, falling ROEs could already be foreshadowing a decline of 2.5% in 2012 (both growth rates from Eurostat). Interested in specific beta values that would be causing such a relationship, we distribute betas (with the longest time series, i.e. 9 years) into deciles and assess their separate effects on future ROE. We find no significant results, partly also due to only around 130 observations in each decile (there are 1,288 firms with the longest time series available for their beta calculation). We perform another separation on beta, this time based on arbitrary cut-offs of -1, 0 and 1 to obtain 4 groups of theoretically different-risk firms, but we similarly obtain no results of significant importance.[59]

Another possible reason for the average negative relation could be the dominating effect of loss over profit firms. For that reason, we re-estimate the beta-ROE regressions separately for firms incurring a loss in 2011 (e.g. 219 firms in case of the longest time series) and the ones that had a profit in 2011 (1,069 firms with length $\geq$ 9). The results turn out mainly insignificant and inconclusive, thus such an explanation does not appear to be valid. Still, ROE results could be driven by the income – and consequently future ROE – decreasing firms that still operated with a profit in 2011. Inclusion of financial debt, defined as the sum of short- and long-term financial obligations towards banks over total assets, also does not change the results. Financial debt has a significantly negative effect on future ROE and scaled EBIT, whereas it is insignificant for the other two performance measures. Beta's effect on ROE remains negative, and the effect on change in net income remains positive as described below.

[58] While the TATR appears to be completely unrelated to beta, results for operating return on assets follow the ones for ROE but in a substantially less significant and consistent manner.

[59] The first group with beta values between -3 and -1 consists of 161 firms, the second group with beta values between -1 and 0 comprises 249 firms, the third group with beta values between 0 and 1 includes 377 firms and there are 501 firms in the fourth group with beta values between 1 and 3 (the sum again equalling 1,288 available observations with longest possible beta estimations). Boundary inclusion is not important as no firm has an accounting beta equalling exactly -1, 0 or 1.

Interestingly, results from Panel D show a different situation. Contradictory to Panel C, beta has a significantly positive effect on the change in net income from 2010 to 2011. This could be explained as riskier firms experiencing larger increases in profits but is not in line with the evidence presented thus far. Based on the analysis, an alternative explanation to the expected would therefore state: higher risk firms characterised by a larger accounting beta expect lower profitability but with bigger changes in net income than their lower risk counterparts with lower accounting betas. Correlation coefficients (not reported) between variables analysed generally confirm established relationships, beta having a significant positive correlation to future loss, a negative one to future ROE and a positive one to future change in net income (all correlations are significant at the 5% level for both Pearson and Spearman coefficients). What adds to the entanglement is the positive correlation between ROE and change in net income, which would have been initially expected but is indirectly contradicted by the performance analyses.

3.6 SENSITIVITY ANALYSES

3.6.1 ADJUSTED BETA

Our first sensitivity check is repeating the analysis using the adjusted accounting beta. Given that the adjustment condenses the distribution of beta with the average now equalling exactly one, we would expect more consistent results as the observations with larger betas (up to +/-3, which are winosorisation cut-offs) get their effect diminished. Although not presenting the table for conciseness, we find by and large confirming results of somewhat higher coefficient values. Probit regression is highly significant and increasing in time series length, Z-score relation is insignificant, future ROE is negatively and future change in net income is positively associated to adjusted beta values. The coefficient in future ROE regression with the longest time series (length ≥ 9) is again the only one not significant anymore. Finally, adjusted beta proves uninformative for TATR and operating return on assets.

3.6.2 DIFFERENT RETURN MEASURE

We defined ROE to be our primary accounting measure of return. Now we change it to EBIT scaled by lagged total assets (retaining the lagged value of the denominator for better comparability with the ROE measure) and investigate whether this causes any changes in our analysis. Panel A of TABLE 3.5 presents statistics for newly defined accounting returns and betas estimated from them (henceforth denoted as EBIT betas; for distinction we term our original beta estimations as ROE betas). As expected, both mean and median are smaller for EBIT-defined returns, amounting to 6% and 4.4% for individual returns and 3.2% and 3.3% for industry-year-specific market returns respectively. Estimated accounting EBIT betas are, on average, larger and less dispersed than ROE betas, which is accordingly reflected in the adjusted EBIT betas as well, while the final winsorised beta subsample for usefulness analysis in 2010 is practically no different than that of ROE betas.

TABLE 3.5: ADDITIONAL RETURN MEASURES AND ACCOUNTING BETAS

PANEL A: ORIGINAL SAMPLE, SCALED EBIT AS ACCOUNTING RETURN MEASURE								
	MEAN	**MIN**	**25%**	**MEDIAN**	**75%**	**MAX**	**SD**	**N**
ACCOUNTING RETURN								
r_i	0.060	-0.221	0.011	0.044	0.096	0.510	0.092	30754
r_m	0.032	-0.094	0.012	0.033	0.053	0.127	0.031	144
ACCOUNTING BETA								
β_{acc}	0.38	-29.37	-0.93	0.46	2.02	29.77	5.06	5154
β_{adj}	0.80	-9.02	0.36	0.82	1.34	10.49	1.67	5154
ACCOUNTING BETA$_{2010}$ AFTER WINSORISATION (BETA USEFULNESS ANALYSIS)								
β_{acc}	0.77	-3	-0.17	0.72	2.05	3	1.61	2738
β_{adj}	0.98	-3	0.62	0.91	1.35	3	0.81	2738
ALTERNATIVE BETA								
β_{adj}	0.41	-70.66	-3.01	0.33	3.87	70.90	13.40	23378

PANEL B: EXPANDED SAMPLE, ROE AS ACCOUNTING RETURN MEASURE								
	MEAN	**MIN**	**25%**	**MEDIAN**	**75%**	**MAX**	**SD**	**N**
ACCOUNTING RETURN								
r_i	0.168	-0.847	0.007	0.069	0.232	3.758	0.436	246788
r_m	0.066	-0.185	0.022	0.069	0.103	0.443	0.069	144
ACCOUNTING BETA								
β_{acc}	0.59	-59.01	-1.23	0.44	3.00	51.00	9.56	37632
β_{adj}	0.86	-18.80	0.26	0.81	1.66	17.50	3.15	37632
ACCOUNTING BETA$_{2010}$ AFTER WINSORISATION (BETA USEFULNESS ANALYSIS)								
β_{acc}	0.64	-3	-0.59	0.64	3	3	2.00	27181
β_{adj}	0.96	-3	0.48	0.88	1.67	3	1.30	27181
ALTERNATIVE BETA								
β_{adj}	-0.57	-211.37	-3.89	0.11	4.48	186.71	29.50	192084

NOTES: This table presents statistics for additional accounting return measures and betas calculated from them. Panel A uses scaled EBIT as an accounting return measure for the original sample, and Panel B uses ROE as an accounting return measure for the expanded sample including micro-sized firms. Individual accounting return r_i is calculated for every observation as $EBIT_{i,t}^{scaled} = \frac{EBIT_{i,t}}{TA_{i,t-1}}$ in Panel A and as $ROE_{i,t} = \frac{NI_{i,t}}{EQ_{i,t-1}}$ in Panel B. Market accounting return r_m is calculated as $EBIT_{m,t}^{scaled} = \frac{EBIT_{ind-year,t}}{TA_{ind-year,t-1}}$ in Panel A and as $ROE_{m,t} = \frac{NI_{ind-year,t}}{EQ_{ind-year,t-1}}$ in Panel B for every industry-year combination. Accounting beta β_{acc} is the slope coefficient from the equation $r_i = \alpha_0 + \beta_{acc} r_m + \epsilon_i$ estimated firm-wise with robust standard errors. Adjusted beta β_{adj} is the calculated historical accounting beta corrected with the formula $\beta_{adj} = 0.33\beta_{acc} + 0.67$. Extreme values of betas are then winsorised at -/+3. Lastly, alternative beta is calculated observation-wise as $\beta_i = \frac{\Delta ROE_i}{\Delta ROE_m}$.

Based on the similarities between EBIT and ROE betas, we would expect the usefulness of EBIT beta to be closely reflecting the usefulness of ROE beta. TABLE 3.6 lists the selected results in a condensed format. Probit regression coefficients confirm a significant positive likelihood of a future loss occurring with higher EBIT beta. Second, Altman Z-score for private firms proves insignificant as in ROE beta, but we report EBIT beta to have a positive effect on an alternative Z-score definition, i.e. that of non-manufacturing firms.[60] This is another modification of the original Altman model that again does not use stock market data as well as drops the last term (sales over total assets) to minimise the potential industry effect (Altman, 2000). Due to changed structure, Z-score is estimated with different coefficients (see notes to TABLE 3.6 for its definition) but the concept of higher score representing financially healthier firms remains. Thus, a strong positive coefficient on EBIT beta is puzzling, as it relates riskier firms to a lower probability of bankruptcy in the future. It is true that this Z-score definition was not developed primarily for private firms and that our sample also includes firms from the manufacturing industry, but a strongly significant positive effect found in all time series variants is still highly unexpected.

TABLE 3.6: ACCOUNTING BETA USEFULNESS FOR EBIT-DEFINED BETA, SELECTED RESULTS

	PANEL A: PROBIT REGRESSION, DEPENDENT VARIABLE = FUTURE LOSS			**PANEL B: DEPENDENT VARIABLE = ALTMAN Z-SCORE FOR NON-MANUFACTURING FIRMS**		
	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9
BETA	0.052***	0.083***	0.084***	0.219***	0.216***	0.286**
	(0.020)	(0.025)	(0.031)	(0.076)	(0.084)	(0.113)
CONSTANT	-1.169**	-1.073*	-1.073*	2.040**	5.611***	1.144***
	(0.572)	(0.589)	(0.589)	(0.821)	(0.034)	(0.362)
OBSERVATIONS	2,490	1,923	1,279	2,738	1,991	1,390
R-SQUARED	/	/	/	0.018	0.023	0.028
	PANEL C: DEPENDENT VARIABLE = FUTURE SALES			**PANEL D: DEPENDENT VARIABLE = FUTURE EBIT**		
	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9
BETA	-0.730*	-0.667**	-0.856*	-0.004***	-0.006***	-0.006***
	(0.384)	(0.337)	(0.464)	(0.001)	(0.001)	(0.002)
CONSTANT	7.004***	6.979***	0.231	0.290***	0.291***	0.039***
	(0.155)	(0.136)	(0.817)	(0.001)	(0.001)	(0.015)
OBSERVATIONS	2,491	1,837	1,284	2,491	1,837	1,284
R-SQUARED	0.013	0.015	0.012	0.036	0.051	0.048

NOTES: This table reports tests of EBIT-defined beta usefulness, estimating the effect of accounting beta in 2010 on several performance indicators. Panel A evaluates a probit regression, where the dependent variable is coded 1 if firm had a loss in 2011 and 0 otherwise. In Panels B through D, accounting beta usefulness is estimated with a regression $y_i = \alpha_0 + \alpha_1 \beta_i + \varepsilon_i$, where in Panel B y_i is Altman Z-score for non-manufacturing firms, in Panel C y_i is sales to total assets ratio in 2011 and in Panel D y_i is (total-assets-scaled) EBIT in 2011.

Altman Z-score for non-manufacturing firms is calculated as: $Z = 6.56\,WC + 3.26\,RE + 6.72\,EBIT + 1.05\,BV$, where WC is working capital scaled by total assets, RE is retained earnings scaled by total assets,

[60] This Z-score variant is also investigated for ROE beta but is not reported due to insignificance.

EBIT is earnings before taxes and interest scaled by total assets and BV is book value of equity scaled by total liabilities.
All tests are performed for varying time series lengths, representing the number of years that were available to compute a firm's accounting beta in 2010, but only the results for longest (≥9), medium (≥5) and shortest (≥1, all observations) minimum time series length requirement are reported for brevity. Industry controls and robust standard errors (reported in parentheses) are included in all estimations. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively.

Turning to performance ratios, EBIT beta again displays different characteristics than ROE beta. Not providing conclusive results for future ROE and confirming the positive effect of EBIT beta on the future change in net income, we list the previously unreported statistics for the remaining two ratios. We find a consistent, marginally significant negative effect of EBIT beta on sales turnover, implying that riskier firms have lower sales proportionate to total assets. Lastly, EBIT beta has a highly significant negative effect on future operating profitability, facilitating a similar discussion to that of ROE beta's effect on future ROE. Adjusted values of EBIT beta entirely follow the findings described, with the coefficients only gaining in size and significance.

3.6.3 SAMPLE EXPANSION

Our last sensitivity test concerns expansion of the sample with the previously excluded micro-sized firms. As these are the most numerous segment of the population of firms, this drastically increases sample size and the amount of observations available at every beta-determined time length. Since betas enter regressions as independent equally weighted observations, any differences to previous results may be attributable to the inclusion of micro firms. We again choose ROE as our accounting measure of return, and to distinguish them in discussion, we term the main results from the previous chapter as relating to main beta and the latter results of the expanded sample as relating to expanded beta (both thus being estimated based on ROE-defined accounting returns).

Accounting return and expanded beta statistics are displayed in Panel B of TABLE 3.5. Only the median individual return (6.9%) is smaller compared to the original sample, with the higher mean individual return (16.8%) and both central measures of industry-year market returns (mean and median of 6.6% and 6.9% respectively) likely reflecting higher growth and profitability of micro firms on average. Both the median and especially the mean of expanded beta are closer to the theoretical value of 1 than for main beta, and despite that seven times more expanded betas are estimated, most of them for higher-variability micro firms, the extremes and standard deviation are not too different to those of main beta.[61] Still, there is a higher proportion of large expanded beta values as more than the top quarter get winsorised at the value of 3. This admittedly affects beta usefulness results, but winsorisation is retained for methodological coherence with the main analysis.

[61] It is true, however, that a 1% top and bottom outlier exclusion in expanded beta effectively eliminates a much higher number of extreme observations due to increased sample size.

TABLE 3.7: ACCOUNTING BETA USEFULNESS FOR ROE-DEFINED BETA ON AN EXPANDED SAMPLE, SELECTED RESULTS

	PANEL A: PROBIT REGRESSION, DEPENDENT VARIABLE = FUTURE LOSS			**PANEL B: DEPENDENT VARIABLE = ALTMAN Z-SCORE FOR PRIVATE FIRMS**		
	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9
BETA	0.025***	0.036***	0.045***	-0.697**	-0.733*	-0.519
	(0.005)	(0.006)	(0.007)	(0.308)	(0.406)	(0.316)
CONSTANT	-0.691***	-0.638***	-0.634***	2.443***	2.460***	1.941***
	(0.080)	(0.088)	(0.107)	(0.494)	(0.566)	(0.388)
OBSERVATIONS	25,238	18,757	13,696	27,004	19,743	14,271
R-SQUARED	/	/	/	0.001	0.001	0.002

	PANEL C: DEPENDENT VARIABLE = FUTURE ROE			**PANEL D: DEPENDENT VARIABLE = FUTURE CHANGE IN NI**		
	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9
BETA	-0.009***	-0.005**	-0.005**	0.347	0.530	0.826
	(0.002)	(0.002)	(0.002)	(0.220)	(0.356)	(0.581)
CONSTANT	0.002	-0.012	0.006	-0.186	-0.222	-0.129
	(0.034)	(0.038)	(0.035)	(0.146)	(0.218)	(0.372)
OBSERVATIONS	25,240	18,758	13,697	25,240	18,758	13,697
R-SQUARED	0.003	0.004	0.004	0.000	0.000	0.001

NOTES: This table reports tests of ROE-defined beta usefulness on an expanded sample, estimating the effect of accounting beta in 2010 on several performance indicators. Panel A evaluates a probit regression, where the dependent variable is coded 1 if firm had a loss in 2011 and 0 otherwise. In Panels B through D, accounting beta usefulness is estimated with a regression $y_i = \alpha_0 + \alpha_1\beta_i + \varepsilon_i$, where in Panel B y_i is Altman Z-score for private firms, in Panel C y_i is ROE in 2011 and in Panel D y_i is (equity-scaled) change in NI from 2010 to 2011.
Altman Z-score for private firms is calculated as: $Z = 0.717\,WC + 0.847\,RE + 3.107\,EBIT + 0.420\,BV + 0.998\,SALES$, where WC is working capital scaled by total assets, RE is retained earnings scaled by total assets, EBIT is earnings before taxes and interest scaled by total assets, BV is book value of equity scaled by total liabilities and SALES is sales scaled by total assets.
All tests are performed for varying time series lengths, representing the number of years that were available to compute a firm's accounting beta in 2010, but only the results for longest (≥9), medium (≥5) and shortest (≥1, all observations) minimum time series length requirement are reported for brevity. Industry controls and robust standard errors (reported in parentheses) are included in all estimations. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively.

Selected results of expanded beta usefulness analyses are reported in TABLE 3.7. We confirm the first main finding, as expanded beta is positively associated with the likelihood of a future loss, with high significance. We also document a theoretically expected significant negative effect of expanded beta on both the Z-score for private firms and Z-score for non-manufacturing firms (the latter not reported) for all time series lengths but the last one. Expanded beta also retains its negative effect on future ROE but is found insignificant in affecting future net income change. The expanded sample thus presents both strongest results and findings without contradictions and as such appears to deliver the most reliable beta

estimates. It appears that either the increased number of observations available adding to the reliability and power of the estimates outweighs the expected less reliable and more variable inputs from micro-firms, or the presumption of micro firms as not being entirely suitable for beta estimation is flawed in the first place. The remaining two performance ratios are not dependent on expanded beta as was the case with main beta. Finally, adjusted expanded beta usefulness reported in APPENDIX 3.1 is similar to unadjusted expanded beta, with notably weaker results in Z-scores.

3.7 CONCLUSION

In this paper, we first estimate accounting betas for private firms and then asses their usefulness. Although being an established and well researched measure of relative risk for publicly listed firms, little work has been done on betas in the context of private firms, mainly due to the lack of data availability. Still, potential uses of accounting betas are known and range from riskiness and cost of capital assessment for private firms to valuation of IPOs. Moreover, such betas can also be used in bigger public firms when applied to specific divisions that constitute a diversified firm.

Utilising a high quality domestic database, we estimate three different private firms' betas from accounting returns with the intent of testing their explanatory power on selected performance measures. Beta estimates reported are fairly reasonable, taking into account the relatively higher variability of operations in the sector of private firms. Regarding the usefulness analysis, the results are not univocal and differ to a certain extent depending on the accounting return measure used or sample specification.

We do find a consistent likelihood-increasing effect of accounting beta on future loss, while a related bankruptcy measure does not provide convincing results. What is more, we document a contradictory effect of beta on future return on equity and net income changes, which remains unexplained even after supplementary analyses are performed. Choice of accounting return does have an effect on the usefulness of the estimated beta, as does the inclusion of the smallest private firms in the sample, which, interestingly, improves the results. With noted exceptions, beta effects are stronger and more reliable if a longer time series of data is used for its estimation. In sum, we can provide only partial evidence of accounting beta usefulness, and additional research would be required to completely unfold the unclear relationships.

Standard considerations about beta estimation apply also to our investigation. Historical betas estimated from past –market or accounting– returns reflect their past volatility but are used for assessing risk in the future, thus implying the assumption of relative volatility remaining the same. Alternatively, one can use fundamental betas based on firm characteristics, but historical betas are still used in such process. Multifactor risk models incorporate a separate beta for each factor that must be identified as a source of non-diversifiable risk (Brigham & Ehrhardt, 2005). Another important caveat is also the relatively short time span available for

accounting beta estimations, as we can only use yearly accounting returns as inputs, making estimations susceptible to a potentially large estimation error. Another point a researcher can consider is the correction of returns for the risk-free rate before beta estimating regressions are run, where the choice of the proxy for the latter is dependent on the returns studied.

CONCLUSION

Under the general heading of assessing the information set provided to economic agents through financial statements, the three papers in this PhD thesis investigate various aspects of their usefulness. As the purpose of financial statements is in enabling an increased understanding of the financial situation of the firm and facilitating/improving decisions of stakeholders, we identify topics of interest for both shareholders and debtholders. While the first paper studies a public-firms related issue of pay-outs and discretionary accruals, the second and third move to the less researched domain of private firms, making use of a detailed domestic database representing a relative comparative advantage to extant research. The effects of audit on the cost of debt and risk assessment through accounting beta are matters of importance for private firm financing, currently receiving different amounts of attention in the research literature.

In the first of the papers, we investigate the existence and magnitude of pay-out related thresholds of UK publicly listed firms, since pay-out policy still, despite the relative downward trend, seems to be an important consideration for firm-investor relations. Dividends and separately constructed net shareholder cash flows as the sum of dividends, repurchases and share issuances define our pay-out variables that are found to have discontinuities at expected zero values in the distribution. This indicates that firms are concerned with their pay-outs and put more weight on the dividend-only approach to pay-out policy targeting, since these produce stronger breaks than net shareholder cash flows. For this purpose, a test from the literature, designed for earnings management studies but not yet used in previous research, is applied. It allows for robust inferences and requires no underlying assumptions in comparison to other existing tests. Moreover, the test is applied to additionally study effects of events potentially affecting pay-out policies of UK firms (i.e. financial crisis, standards and legislation change) and is successful in confirming these breaks. An established earnings management proxy of discretionary accruals is then related to primary distribution analysis and significant differences in discretionary accruals are found at the breaks in distributions, further confirming that these present an important consideration for the firms in question. Accruals, calculated from financial statements and coupled with distributional analysis, confirm the existence of thresholds affecting pay-out policies of public firms.

The second paper moves the focus to a private firm setting, where capital market scrutiny, pressure and information channels are not present, thus making financial statements an even more important information source. With debt financing being predominant among private firms, we consider its cost (the average interest rate, calculated on a relatively more precise level than in comparable research) in relation to audit as an independent outside verification of corporate financial reporting. We identify a sample of small private firms with no legal requirement to undergo an audit so that we can study the effect of the voluntary decision (and signal) to be audited. Contrary to existing research, we find that, in general, voluntarily audited financial statements of private firms are not considered to be valuable to providers of

debt capital. Firms' cost of debt is marginally reduced only if the audit is performed by a Big-4 auditor, providing the reaffirming role of quality outside appraiser. We explain the otherwise positive association between non-Big-4 audited statements and the cost of debt with a labelling concept, where firms merely attempt to obtain an audit label, expecting a beneficial effect on their borrowing costs without a real commitment to quality financial reporting. Additional analysis of the informativeness of their earnings further confirms this argument. Creditors realise the "labelling intention" of such firms and penalise them with a higher cost of debt, taking only Big-4 audits as credible. Special care is taken in using appropriate estimation procedures, supplemented by the matching approach in the sensitivity analysis, in order to rule out self-selection often claimed to be driving the relationships in such settings. Thus, financial statements of small private firms are only deemed to be of quality for lenders if they are audited by a trustworthy Big-4 auditor.

The third paper examines accounting beta, a private firm substitute for market beta as a measure of firm systematic risk. Again, in the informationally poorer environment of private firms, financial statement data are used to supplement missing market data needed for its estimation. Being useful for cost of capital assessment, capital budgeting and investment decisions, IPO valuation and division performance evaluation, the potential benefits of a reliable accounting beta estimate are large. Again, the detailed domestic database is put to use, and we first define accounting return for the firm and "the market", from which we then estimate accounting betas. Relating them to simple performance indicators such as possible future loss, risk of bankruptcy, future accounting return, etc., we assess its usefulness as an indicator of risk. Results of these association assessments are mixed. While the accounting beta is indicative of a future loss, it produces results of different significance, and sometimes even direction, for other performance measures depending on the definition of accounting return or sample specification. Thus, we can confirm only partial usefulness of accounting beta, which may be in part a consequence of limited data availability or a more complex relation with performance indicators.

Although care is taken to mitigate some of the known caveats in the research undertaken, we are not able to address them in fullness and acknowledge them as limitations accordingly. Various accrual models are available for evaluation, which could result in different discretionary accruals in central bins of pay-out distributions and, despite its widespread use, distributional threshold analysis is still questioned as a valid research instrument by a strand of literature. The advantage of a country-specific high quality data source has its downside in being representative of a single country only and generalisability of the findings can be validly questioned. Accounting betas can be estimated from yearly accounts only, in turn making it much more difficult to obtain reliable estimates given the available history of private firm data. We also acknowledge the concept of beta itself being a historical measure not entirely in line with its use for current and future risk assessment.

In sum, we present several new findings in the fields studied and therefore contribute to understanding the effects firms' decisions or characteristics have on either the pay-out policy, their cost of debt or risk assessment. Financial statements prove informative for a wide range of purposes but not without consideration for the circumstances firms find themselves in. Since the novel results presented call for additional scrutiny, we do our best to address the issues raised while developing the papers and expect further examination of these topics in the future. Considering our results convincing, but not conclusive, we also identify several interesting research questions that we leave for future research.

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APPENDICES

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APPENDIX 1.1: GRPV DISCONTINUITY OF DISTRIBUTION TEST, AVERAGE OF NEXT-TO-ADJACENT BINS (-2) AND (2)

	ZERO OBSERVATIONS INCLUDED	WITHOUT ZERO OBSERVATIONS
DIV	326.33	-5.56
NSCF	134.98	-5.15
D_DIV	512.44	208.65
D_NSCF	214.77	125.90
D_DIV_DIV	83.69	26.54
D_NSCF_NSCF	39.08	1.54

NOTES: Reported are τ values of GRPV discontinuity of distribution test for zero bins of variables analysed. The first column reports test statistics computed including observations of zero in selected variables, and the second column reports test statistics computed without these observations. Next-to-adjacent bins to bin(0), i.e. bins (-2) and (2), are used in the calculation.

With H_0*: the distribution function is continuous*, the values of τ at standard levels of significance are: at 10% $|\tau| = 3.16$, at 5% $|\tau| = 4.47$ and at 1% $|\tau| = 10$. As the number of observations in adjacent bins is required by the test, in the first row (case of DIV) bins on the left of zero (negative bins) are empty (there are no negative dividends) and are as such affecting test statistic computation.

DIV = dividends (WC04551) scaled by lagged total assets (WC02999); NSCF = (dividends + repurchases (WC04751) – issuances (WC04251)) = net shareholder cash flows scaled by lagged total assets; D_DIV = change in dividends from year (t-1) to (t) scaled by lagged total assets; D_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged total assets; D_DIV_DIV = change in dividends from year (t-1) to (t) scaled by lagged dividends; D_NSCF_NSCF = change in net shareholder cash flows from year (t-1) to (t) scaled by lagged net shareholder cash flows.

APPENDIX 2.1: EFFECTS OF EARNINGS MANAGEMENT AND AUDITOR SWITCHING BEHAVIOUR

DEPENDENT VARIABLE: IRATE			
	(1)	(2)	(3)
	EM1 INTERACTIONS	WITHOUT OUTLIERS IN EM1	AUDITOR SWITCHING
INDEPENDENT VARIABLES			
V_AUDIT	0.021***	0.022***	0.021***
	(0.008)	(0.008)	(0.008)
BIG4	-0.011***	-0.009***	-0.011***
	(0.003)	(0.003)	(0.003)
EM1	-0.000	0.001	
	(0.000)	(0.000)	
EM1_V_AUDIT	0.000***	-0.001	
	(0.000)	(0.001)	
EM1_BIG4	-0.000**	-0.002	
	(0.000)	(0.002)	
NA_A			-0.003
			(0.004)
A_NA			0.001
			(0.004)
A_A			0.002
			(0.005)
SIZE	-0.005***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)
SALESG	0.004	0.003	0.004
	(0.002)	(0.002)	(0.002)
ICOV	0.004**	0.004**	0.004**
	(0.002)	(0.002)	(0.002)
PPE	-0.009***	-0.010***	-0.009***
	(0.003)	(0.003)	(0.003)
LEV	0.004	0.005	0.004
	(0.004)	(0.004)	(0.004)
WC	-0.011***	-0.011***	-0.011***
	(0.003)	(0.004)	(0.003)
PROF	-0.017**	-0.015*	-0.017*
	(0.008)	(0.009)	(0.008)
N_EQ	0.072**	0.071**	0.072**
	(0.028)	(0.028)	(0.028)
N_EQ_BL	-0.083***	-0.082***	-0.083***
	(0.029)	(0.028)	(0.028)
IMR	-0.008**	-0.008**	-0.008**
	(0.004)	(0.004)	(0.004)
CONSTANT	0.123***	0.128***	0.123***
	(0.018)	(0.017)	(0.018)
INDUSTRY CONTROLS	YES	YES	YES
YEAR CONTROLS	YES	YES	YES
OBSERVATIONS	5,885	5,769	5,885
R-SQUARED	0.082	0.083	0.082

NOTES: This table presents additional regression results. These are estimations of the main Heckman 2nd step model (column 3 in TABLE 2.6) for different sensitivity tests. Columns 1 and 2 analyse the effect of earnings management measure EM1, the first column including all observations and the second column presenting the estimation with 1% top/bottom outliers in EM1 removed. Column 3 analyses the effect of auditor switching behaviour.

EM1 is the median ratio of absolute total accruals scaled by operating cash flow: $|ACC_{it}|/CFO_{it}$. ACC is total accruals scaled by total assets and calculated as: $(\Delta current\ assets - \Delta cash) - (\Delta current\ liabilities - \Delta shortterm\ debt) - depreciation$, and CFO is cash flow from operations calculated as net income minus total accruals.

EM1_V_AUDIT and EM1_BIG4 are interaction variables between EM1 variable and V_AUDIT and BIG4 indicators respectively. NA_A is an indicator variable, denoting a switch from no audit to audit, A_NA is an indicator variable, denoting a switch from audit to no audit and A_A is an indicator variable, denoting a switch in auditor. Robust standards errors clustered at the firm level are reported in parentheses. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively. See TABLE 2.1 for other variable definitions.

APPENDIX 2.2: PROPENSITY SCORE MATCHING AND MODEL ESTIMATION

CALIPER = 0.1		(1)	(2)	(3)
		MEAN VALUES		OLS ESTIMATION
VARIABLES		TREATED	CONTROL	DEPENDENT VARIABLE: IRATE
V_AUDIT				0.007**
				(0.003)
BIG4				-0.012***
				(0.003)
SIZE	UNMATCHED	15.368***	14.869	-0.003*
	MATCHED	15.286	15.295	(0.002)
SALESG	UNMATCHED	0.027	0.030	0.000
	MATCHED	0.030*	0.004	(0.004)
ICOV	UNMATCHED	0.165	0.171	-0.004
	MATCHED	0.164	0.152	(0.003)
PPE	UNMATCHED	0.364**	0.389	-0.022***
	MATCHED	0.385	0.401	(0.006)
LEV	UNMATCHED	0.583***	0.670	0.008
	MATCHED	0.594	0.605	(0.007)
WC	UNMATCHED	0.026***	0.071	-0.006
	MATCHED	0.035	0.024	(0.008)
PROF	UNMATCHED	0.045***	0.058	-0.046**
	MATCHED	0.047	0.050	(0.021)
N_EQ	UNMATCHED	0.016	0.013	-0.027***
	MATCHED	0.014	0.010	(0.008)
N_EQ_BL	UNMATCHED	0.016	0.013	
	MATCHED	0.014	0.010	
CONSTANT				0.124***
				(0.032)
INDUSTRY CONTROLS				YES
YEAR CONTROLS				YES
OBSERVATIONS				838
R-SQUARED				0.115

NOTES: This table presents propensity score matching results and basic OLS model estimation on a matched sample. Columns 1 and 2 present means of variables for treated (audited) and control (unaudited) groups respectively. First row relating to each variable presents and compares means of the two groups before matching and the second row presents the comparison after matching. T-test for equality of means is computed for each pair.

Matching is performed on nearest neighbour without replacement, using common support and a caliper of 0.1. The resulting matched sample of 419 audited and 419 unaudited observations is then estimated using standard OLS in column 3. Robust standards errors clustered at the firm level are reported in parentheses. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively for both, the t-test of means and coefficient estimates. See TABLE 2.1 for variable definitions.

APPENDIX 3.1: ACCOUNTING BETA USEFULNESS FOR ROE-DEFINED ADJUSTED BETA ON AN EXPANDED SAMPLE, SELECTED RESULTS

	PANEL A: PROBIT REGRESSION, DEPENDENT VARIABLE = FUTURE LOSS			**PANEL B: DEPENDENT VARIABLE = ALTMAN Z-SCORE FOR PRIVATE FIRMS**		
	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9
BETA	0.033***	0.057***	0.078***	-0.775*	-1.257	-1.464
	(0.007)	(0.011)	(0.014)	(0.397)	(0.806)	(1.253)
CONSTANT	-0.711***	-0.673***	-0.689***	2.778***	3.167***	2.840***
	(0.080)	(0.088)	(0.108)	(0.558)	(0.834)	(0.978)
OBSERVATIONS	25,238	18,757	13,696	27,004	19,743	14,271
R-SQUARED	/	/	/	0.001	0.001	0.002

	PANEL C: DEPENDENT VARIABLE = FUTURE ROE			**PANEL D: DEPENDENT VARIABLE = FUTURE CHANGE IN NI**		
	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9	LENGTH ≥ 1	LENGTH ≥ 5	LENGTH ≥ 9
BETA	-0.016***	-0.008**	-0.010**	0.492*	0.986	1.826
	(0.004)	(0.004)	(0.005)	(0.289)	(0.627)	(1.196)
CONSTANT	0.011	-0.007	0.011	-0.451*	-0.777	-1.147
	(0.034)	(0.038)	(0.035)	(0.246)	(0.495)	(0.823)
OBSERVATIONS	25,240	18,758	13,697	25,240	18,758	13,697
R-SQUARED	0.004	0.004	0.004	0.000	0.000	0.001

NOTES: This table reports tests of ROE-defined adjusted beta usefulness on an expanded sample, estimating the effect of adjusted accounting beta in 2010 on several performance indicators. Panel A evaluates a probit regression, where the dependent variable is coded 1 if firm had a loss in 2011 and 0 otherwise. In Panels B through D, adjusted accounting beta usefulness is estimated with a regression $y_i = \alpha_0 + \alpha_1 \beta_i + \varepsilon_i$, where in Panel B y_i is Altman Z-score for private firms, in Panel C y_i is ROE in 2011 and in Panel D y_i is (equity-scaled) change in NI from 2010 to 2011.

Adjusted betas are calculated from estimated betas using the following correction: $\beta_{adj} = 0.33\beta_{acc} + 0.67$. Altman Z-score for private firms is calculated as: $Z = 0.717\,WC + 0.847\,RE + 3.107\,EBIT + 0.420\,BV + 0.998\,SALES$, where WC is working capital scaled by total assets, RE is retained earnings scaled by total assets, EBIT is earnings before taxes and interest scaled by total assets, BV is book value of equity scaled by total liabilities and SALES is sales scaled by total assets.

All tests are performed for varying time series lengths, representing the number of years that were available to compute a firm's accounting beta in 2010, but only the results for longest (≥9), medium (≥5) and shortest (≥1, all observations) minimum time series length requirement are reported for brevity. Industry controls and robust standard errors (reported in parentheses) are included in all estimations. Asterisks *, ** and *** denote significance at 10%, 5% and 1% levels respectively.

ŠTUDIJE O KAKOVOSTI IN UPORABNOSTI FINANČNEGA POROČANJA GOSPODARSKIH DRUŽB

APPENDIX 4: DALJŠI POVZETEK

Informacije so ključnega pomena za delovanje organizacij in trgov. Deležniki podjetja so soočeni z negotovostjo glede stanja, v katerem je podjetje, ter z negotovostjo glede posledic svojih odločitev in dejanj, zato poskušajo oblikovati informacijski set, ki bi bil osnova za informirano sprejemanje odločitev. Namen finančnega poročanja podjetja je ekonomskim subjektom dati na voljo informacije, uporabne za njihovo odločanje, in s tem zmanjšati negotovost v procesu odločanja. Izkazi odražajo finančno zgodovino podjetja in omogočajo sklepanje o rezultatih preteklih ter pričakovanjih glede prihodnjih dejanj. S tem lahko spremenijo mnenja ekonomskih subjektov in imajo kot taki zanje ekonomsko vrednost (Christensen & Feltham, 2003). Finančno poročanje je torej posrednik informacij, uporabnih za oblikovanje odločitev o alokaciji virov tako znotraj podjetja kot med podjetjem in njegovim deležniškim okoljem.

Doktorska disertacija v sklopu ocenjevanja informacijske vrednosti finančnih izkazov ocenjuje različne teme, povezane s kakovostjo in/ali uporabnostjo finančnega poročanja gospodarskih družb. Sestavljena je iz treh delov, v katerih so preučevani vidiki vezani tako na investitorje kot na posojilodajalce. Analizirani so politika izplačil delničarjem, medsebojni vpliv revizije finančnih izkazov in stroška dolžniškega financiranja ter ocenjevanje tveganosti podjetja s pomočjo računovodske bete. Opravljena je empirična analiza tako javnih kot zasebnih (nejavnih) podjetij s posebnim poudarkom na kakovosti izbora in pripravi podatkov.

Prvi del raziskovalnega dela se osredotoča na politiko izplačil delničarjem v povezavi s potencialnim upravljanjem dobičkov kot primarnim kazalnikom poslovanja podjetja. Slednje je bilo dokumentirano v mnogih kontekstih, od doseganja pozitivnih poslovnih rezultatov oziroma njihovega vsakoletnega izboljševanja (Burgstahler & Dichev, 1997) do sledenja napovedim in pričakovanjem analitikov (Degeorge et al., 1999) ali pa v povezavi s politiko nagrajevanja vodilnih (Bergstresser & Philippon, 2006). Politika izplačil je prav tako lahko razlog za upravljanje z dobički, saj je pomembna za javno podobo podjetja, izplačane dividende pa so uporabljane v osnovnih modelih vrednotenja podjetij. Kljub temu da sta Miller in Modigliani (1961) v svojem znanem modelu razvila koncept nerelevantnosti dividendne politike za vrednost podjetja, v praksi temu ni tako in tržne reakcije na spremembe dividend so občutne kljub teoretični neosnovanosti. Obstoj pragov, pomembnih za obnašanje podjetij, prva komentira Hayn (1995), ki opozori na prelom v distribuciji dobičkov v okolici ničelne vrednosti, idejo pa nato podrobno analizirata Burgstahler in Dichev (1997), ki relativno manjše število podjetij z majhno izgubo (majhnim padcem dobička) in relativno visoko število podjetij z majhnim dobičkom (majhno rastjo dobička) interpretirata kot posledico prizadevanj podjetij, da bi prešla prelomno točko iz negativnega v pozitivni poslovni izid (iz padca v rast dobička) tudi za ceno upravljanja z dobički. Naša analiza tako

najprej identificira prelomne točke izplačil javnih podjetij ter jih nato poveže z uveljavljeno mero upravljanja z dobički, diskrecijskimi *accruals*, ki menedžerjem do neke mere omogočajo prenašanje prihodkov v času.

Prva študija o upravljanju dobičkov in dividendni politiki je bila opravljena na vzorcu finskih podjetij, ki so se trudila zagotavljati konstantna dividendna izplačila kot posledico pritiska velikih institucionalnih vlagateljev (Kasanen et al., 1996). V zadnjem času so pomembnost izplačilne politike analizirali tako za ZDA (Daniel et al., 2008) in Združeno kraljestvo (Atieh & Hussain, 2012) kot za druge države (npr. Bennet & Bradbury, 2007), povsod pa je glavni fokus predvsem na samih dividendah. Kot v svoji študiji ugotovijo Brav et al. (2005), je menedžerjem raven dividend sicer zelo pomembna, po drugi strani pa zaznajo tudi povečan obseg odkupov lastnih delnic podjetij kot alternativni način izplačil delničarjem. Le-ta ima sicer svoje prednosti in specifike, a ga tudi drugi avtorji navajajo kot vse bolj prevladujočega v izplačilni politiki podjetij (Grullon & Michaely, 2002; Skinner, 2008). Zaradi tega v analizi pragove dividendnih izplačil primerjamo tudi s pragovi izplačil skupnih neto denarnih tokov delničarjem, definirano kot vsoto dividend in odkupov lastnih delnic, zmanjšano za vrednost novoizdanih delnic, saj le-te predstavljajo denarni tok od delničarjev k podjetju in tako zmanjšujejo skupno maso izplačil v določenem obdobju.

Ustrezno normirane izplačilne spremenljivke razdelimo v enako široke razrede, s katerimi nato oblikujemo histograme porazdelitev glede na število obzervacij v posameznem razredu, in že vizualni pregled nam potrdi prisotnost prelomov na predvidenih mestih. Za statistično potrditev uporabimo test prekinjenosti distribucije avtorjev Garrod et al. (2006), po njihovih začetnicah okrajšan kot GRPV-test. Razvit je bil prav za podobne analize in je zaradi odsotnosti implicitne predpostavke o obliki distribucije, ki jo testiramo, primernejši od drugih testov, uporabljenih v literaturi. V drugem delu analize nato s pomočjo modificiranega Jonesovega modela (Dechow et al., 1995) ocenimo diskrecijske *accruals*, katerih povprečne in medianske vrednosti so nato primerjane med posameznimi razredi, z namenom identifikacije značilnih razlik, ki bi nakazovale drugačno obnašanje podjetij v določenem razredu. Za opisano analizo uporabimo podatke javnih podjetij Združenega kraljestva iz sistema *Datastream* v letih med 1990 in 2012. Geografski izbor vzorca narekuje dejstvo, da so javna podjetja v Združenem kraljestvu zgodovinsko gledano izplačevala relativno več dividend ter to počno še danes, kljub omenjenemu po vsem svetu prisotnemu trendu zmanjševanja dividendnih izplačil. Poleg tega je vzorec javnih podjetij Združenega kraljestva dovolj časovno in številčno obsežen ter podatkovno kakovosten za zanesljivo analizo.

Rezultati GRPV-testa potrdijo iz histogramov razvidna opažanja o obstoju izrazitih prelomnih točk, povezanih z izplačilnimi spremenljivkami, med katerimi so prelomi močnejši pri dividendnih izplačilih kot pri skupnih neto denarnih tokovih delničarjev. Tako sklepamo, da so dividendna izplačila tista, po katerih se podjetja ravnajo pri določanju svoje izplačilne politike. Sredinske vrednosti diskrecijskih *accruals* so značilno različne med razredi prav v okolici prelomov, kar dodatno nakazuje na namensko upravljanje z vrednostmi v povezavi z

izplačilno politiko podjetij. GRPV-test v dodatni analizi uporabimo še za oceno učinkov, ki so jih imeli določeni dogodki v času obsega našega vzorca na izplačilno politiko podjetij, in potrdimo ter razložimo pričakovane rezultate ob nastopu finančne krize, spremembi standardov računovodskega poročanja ter spremembi relevantne zakonodaje, ki je vplivala na davčno obravnavo dividend.

Drugi del disertacije se poglobi v vpliv, ki ga ima revizija finančnih izkazov na strošek dolga. Okvir raziskovanja je postavljen v kontekst zasebnih podjetij, kjer identificiramo zanimivo raziskovalno vprašanje s potencialom večjega doprinosa k znanosti, saj je preučevanje delovanja in obnašanja zasebnih podjetij v literaturi zelo aktualno, a hkrati omejeno z dostopnostjo podatkov. Tu je naša primerjalna prednost v uporabi podatkovne baze finančnih izkazov podjetij, ki jo vodi Agencija Republike Slovenije za javnopravne evidence in storitve (v nadaljevanju AJPES). S pomočjo podrobnih in kakovostnih podatkov nam je tako omogočeno oblikovanje relativno bolj natančne mere povprečnega stroška dolga kot glavnega vhodnega podatka v naši analizi.

Zunanja revizija finančnih izkazov predstavlja neodvisno oceno njihove kakovosti in naj bi kot taka doprinesla k njihovi kredibilnosti (Cassar, 2011). Pozitivno revizorsko mnenje je razumljeno kot jamstvo, da so bili izkazi pripravljeni v skladu s standardi računovodskega poročanja ter da ustrezno odražajo ekonomsko delovanje podjetja. Kot taki bi morali revidirani računovodski izkazi zmanjševati informacijsko asimetrijo med podjetji in investitorji, tako na kapitalskem kot dolžniškem trgu, kar bi posledično pomenilo tudi nižje stroške zadolževanja (Francis et al., 2005; Bharath et al., 2008). A, zaradi zakonsko obvezne revizije izkazov javnih podjetij v praktično vseh gospodarstvih, vpliva le-te ni mogoče ocenjevati neposredno, ampak le posredno preko lastnosti samih revizorjev, ki naj bi odražale tudi kakovost njihovega dela.

Po drugi strani pa revizija ni obvezna za vsa zasebna podjetja in to nam omogoča preučevanje njenega neposrednega vpliva kljub temu, da ima pri zasebnih podjetjih praviloma drugačen pomen. Med maloštevilnimi študijami v tem kontekstu tako Kim et al. (2011) ter Minnis (2011) ugotovijo, da prostovoljna revizija znižuje strošek dolga, če pa jo opravi ena izmed t. i. velikih štirih revizorskih hiš (v nadaljevanju veliki-4), sta kredibilnost in pojmovana kakovost še toliko večji, kar se odrazi tudi na stroških zadolževanja (Pittman & Fortin, 2004; Karjalainen, 2011; Kim et al., 2012). Vseeno pa učinka dodatnega znižanja stroška dolga samo zaradi revizije, bodisi velikih-4 ali preostalih revizorjev, ne potrdijo vse študije (Fortin & Pittman, 2007; Allee & Yohn, 2009).

Glavna ugotovitev našega dela je, da ima odločitev majhnega zasebnega podjetja za prostovoljno revizijo zvišujoč (in ne znižujoč, kot bi intuitivno pričakovali) vpliv na ceno zadolževanja. Ob tem predstavimo interpretacijo na podlagi etiketiranja, po kateri podjetja poizkusijo pridobiti etiketo revizije brez resnične zaveze k bolj kakovostnemu finančnemu poročanju ter ob tem upajo, da jih investitorji in posojilodajalci ne bodo spregledali. Če se to

zgodi, je lahko reakcija nasprotna pričakovani in prostovoljna odločitev za revizijo je lahko razumljena kot poskus prikrivanja resničnega stanja ter kot taka »nagrajena« z višjim stroškom dolga. Ker so manjše revizorske hiše v primerjavi z velikimi-4 bolj odvisne od posameznega posla in ker so njihove stranke nasproti njim v primerjalno močnejšem položaju, obstaja pri teh manjših revizorjih večje tveganje za t. i. revizijsko etiketiranje, medtem ko so veliki-4 v skrbi za svoj ugled manj pripravljeni sprejemati potencialne kompromise. Rezultat, da revizija velikih-4 marginalno znižuje ceno dolga, tako potrjuje zgornje sklepanje, da posojilodajalci cenijo, kdo izvede revizijo in ne samo, da je bila revizija narejena.

Glede na to, da je naš rezultat nasproten dosedanjim rezultatom v stroki, smo še toliko bolj pozorni na natančno in izčrpno statistično analizo, ki – z uporabo različnih pristopov za obravnavo potencialne endogenosti v preučevanih razmerjih – v vseh oblikah potrdi osnovno opažanje. V glavni analizi uporabimo Heckmanov dvostopenjski postopek, s katerim želimo izločiti vpliv samoizbire, ko na odločitev podjetja (v tem primeru odločitev za prostovoljno revizijo) vplivajo dejavniki, ki jih kot raziskovalci ne moremo zaznati. Uveljavljenim kontrolnim spremenljivkam dodamo še nekatere nove, za katere smatramo, da bi lahko imele vpliv na odločanje majhnega zasebnega podjetja glede revizije, hkrati pa naj ne bi imele vpliva na višino obrestne mere in na podlagi slednjih ocenimo inverzni Millsov kvocient, ki nato vstopa kot popravni faktor v ocenjevanje na drugi stopnji.

Vzorec majhnih zasebnih podjetij v obdobju 2006-2010 iz AJPES-ove baze identificiramo z uporabo Zakona o gospodarskih družbah, ki določa velikostne razrede, glede na katere so nejavna podjetja zavezana k reviziji in že omenjeni rezultati se izkažejo za robustne v različnih variacijah vzorca in dodanih spremenljivkah ter na koncu tudi ob uporabi alternativnega *propensity score matching* pristopa.[62] S tem delom tako odpiramo drugačen pogled na prostovoljno revidiranje finančnih izkazov in potencialne koristi, ki si jih ekonomski subjekti ob tem obetajo.

Tretji del disertacije se ukvarja z mero sistemskega tveganja, ocenjeno izključno iz poročanih finančnih podatkov, tj. računovodsko beto. Ocena tveganosti podjetja po standardni finančni teoriji vpliva na strošek kapitala, kar se nadalje odraža v vrednotenju in drugih finančnih odločitvah podjetja, kot sestavina diskontnega faktorja pa je prisotna v vsaki kalkulaciji sedanje vrednosti. Kot smo na primer opazili v predhodni analizi, se tveganje ne pojavlja eksplicitno (posredno seveda se) kot dejavnik v analizi stroška dolga zasebnih podjetij, in to zlasti ne zato, ker taka mera ni neposredno na voljo. Za javna podjetja je po drugi strani na voljo mnogo ocen njihove tržne bete, ki predstavlja odzivnost donosov delnice danega podjetja glede na donos povprečne delnice, torej trga kot celote. V okoliščinah, kjer tržni podatki že po definiciji niso na voljo (ocenjevanje tveganosti zasebnih podjetij pa tudi divizij

[62] Ob odsotnosti uveljavljenega slovenskega izraza zaradi jasnosti zopet navajam izvirnega, pri *propensity score matching*-u pa gre za to, da se s posebnim postopkom identificira obzervacije (v našem primeru podjetja), ki so, glede na opazovane karakteristike, najbolj podobne tistim, ki jih preučujemo (torej podjetjem, ki so se prostovoljno odločila za revizijo). S primerjalno analizo obeh skupin nato poskušamo izolirati vpliv, ki nas zanima.

večjih podjetij z razgibano dejavnostjo, pri čemer tržna beta matičnega podjetja ni informativna za posamezne oddelke, vrednotenje ob prvi javni izdaji delnic), jih lahko nadomestijo računovodski podatki in analogno tržni se oceni računovodska beta. Računovodski donosi podjetja se povežejo z računovodskimi donosi trga ali sektorja kot celote in ocenjeni koeficient odzivnosti prvih je računovodska beta.

V analizi ponovno uporabimo AJPES-ovo bazo zasebnih podjetij (tokrat v obdobju 2002-2010), za katera lahko izračunamo donos na lastniški kapital (ROE) kot relevantno računovodsko mero donosa tako za podjetje kot za posamezne panoge v vsakem letu. Ocenjene računovodske bete nato še popravimo zaradi uveljavljene tendence, da se bete v času približujejo svoji povprečni vrednosti (1), in za obe verziji izvedemo pregled njune uporabnosti za napovedovanje kazalnikov poslovanja, med katerimi so prihodnja izguba, Altmanova mera finančnega zdravja podjetja (oziroma mera nevarnosti za bankrot podjetja) ter prihodnji ROE, sprememba dobička, obseg prodaje in operativna dobičkonosnost.

Medtem ko se ocene bete občutno izboljšajo z dolžino časovne vrste, ki je na voljo za njihovo oceno, pa njihov vpliv na kazalnike poslovanja ni konsistenten. Z izjemo verjetnosti prihodnje izgube, ki jo višja trenutna računovodska beta sugerira v vseh ocenjevalnih izvedbah, so pri ostalih kazalnikih rezultati le občasno v skladu s pričakovanji. Med nepričakovane ugotovitve tako sodijo hkratni negativni učinek računovodske bete na prihodnji ROE in pozitivni učinek na spremembo dobička v prihodnjem obdobju, ki jih ne uspemo v polnosti razložiti niti z dodatnimi testi. Rezultati za popravljene bete potrdijo že navedene rezultate z nekoliko višjimi vrednostmi koeficientov, medtem ko so presenetljivi tudi prepričljivejši in bolj smiselni rezultati za računovodsko beto, ocenjeno na vzorcu z vključenimi najmanjšimi zasebnimi podjetji, za katera smo predhodno pričakovali, da bodo prej popačila ocene kot nasprotno. Analiza v tem zadnjem delu doktorske disertacije tako ni enoznačna in omogoča le omejeno uporabnost računovodske bete, kar pa pojasnjuje njeno neuporabo kot zanesljive mere tveganja zasebnih podjetij.

Kljub skrbnemu pristopu z namenom ublažitve znanih pomanjkljivosti uporabljenih raziskovalnih postopkov, le-teh ni mogoče v polnosti odpraviti in to priznavamo kot omejevalne dejavnike v zaključkih vsakega dela. V literaturi na primer obstaja veliko različnih modelov diskrecijskih *accruals* in posledica nekaterih izmed njih bi lahko bile znatno drugačne ocene le-teh, ki morda ne bi tako dobro sovpadale s prelomnimi točkami. Prav tako je analiza prelomov, kljub njeni razširjeni uporabi, v delu literature še vedno pojmovana kot nezadosten raziskovani instrument. Nadalje, prednosti natančne podatkovne baze za določeno državo so po drugi strani tudi omejitev pri možnosti sklepanja ali preproste posplošitve rezultatov izven preučevanega vzorca. In nazadnje, ker so za ocenjevanje računovodske bete na voljo le letni podatki, je zaradi relativno kratkih časovnih vrst težko pridobiti njene zanesljive ocene, prav tako pa je znana tudi splošna kritika bete kot zgodovinske mere tveganja, ki ob uporabi za mero tveganja v prihodnosti zahteva določene predpostavke.

Če sklenemo, v disertaciji predstavljene nove ugotovitve odgovarjajo na identificirana raziskovalna vprašanja ter predstavljajo doprinos k razumevanju sfere tako javnih kot zasebnih podjetij. Uporabnost finančnih izkazov za posredovanje informacij je analizirana v treh različnih kontekstih s splošnim zaključkom, da so izkazi uporabni za širok spekter namenov pod pogojem, da so zanesljivi in zadovoljive kakovosti. Kljub temu da smatramo svoje ugotovitve za prepričljive, pa jih hkrati ne jemljemo kot dokončne in neizpodbitne ter z zanimanjem pričakujemo nadaljnja dognanja o teh vprašanjih.