

The Impact of Bookrunner Reputation on Earnings Management

A study on Nordic IPOs

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Abstract:

This thesis investigates the relationship between bookrunner reputation and earnings management in Nordic initial public offerings (IPOs). We use two accrual-based models to estimate earnings management across all exchanges in Sweden, Denmark, Norway and Finland between 2011 and 2022. Our results show that earnings management significantly increases in magnitude, specifically in the income-increasing direction, the year following an IPO. Additionally, while we do not find statistically significant evidence linking bookrunner reputation to EM, a negative directional effect indicates that reputable bookrunners may discourage income-increasing EM ahead of IPOs. Our findings are consistent with prior research conducted on U.S. and Western European samples, suggesting comparable patterns across these regions.

Keywords: Earnings Management, IPO, Bookrunner Reputation

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1. Introduction

1.1 Background

The transition of a company from private to public ownership, known as an Initial Public Offering (IPO), carries significant societal implications for the efficient allocation of capital. This transition inherently entails information asymmetry, where issuing firms possess superior knowledge about their financial health, risks, and growth prospects compared to prospective investors (Rock, 1986; Welch 1989). This presence of information asymmetry enables firms to engage in earnings management (EM). EM, or earnings manipulation, refers to the deliberate manipulation of reported earnings by management to achieve specific financial objectives, where the flexibility within accounting standards may be exploited to present a more favourable financial position (Healy and Wahlen, 1999; Dechow and Schrand, 2004). This informational imbalance, rooted in Akerlof's (1970) adverse selection theory, makes it difficult for investors to distinguish high-quality firms from deceptive ones. As a result, high-quality firms often underprice their offerings to compensate uninformed investors for the additional risk that they bear (Beatty and Ritter, 1986; Rock, 1986; Loughran and Ritter, 2002; Ljungqvist, 2007). This means that firms with the greatest potential to contribute to societal and economic growth may forfeit valuable capital, ultimately undermining the efficient allocation of resources in the market.

Research consistently shows that EM peaks during significant corporate events, where incentives for financial misrepresentation are amplified (Teoh, Welch and Wong, 1998; Rangan, 1998). Stora Enso, a Swedish-Finnish provider of renewable products, was in October 2024 exposed for postponing payments to suppliers ahead of their quarterly reports, highlighting the contemporary relevance of EM in relation to major events (Stora Enso, 2024). Among those events, IPOs are particularly susceptible to EM. Some studies argue that firms predominantly engage in EM before an IPO to increase investor demand and inflate initial valuation (DuCharme, Malatesta and Sefcik, 2001). Conversely, other studies suggest that EM is more prevalent after the IPO, as managers often have equity lock-up periods and compensation tied to stock performance, incentivising them to meet earnings expectations after the IPO (Teoh et al., 1998; Roosenboom, Van Der Goot and Mertens, 2003). While these studies establish EM to be more present in relation to IPOs, there are divergent views on when this manipulation primarily occurs.

Bookrunners, also known as lead underwriters, are typically investment banks who play a central role in IPOs by managing share issuance, pricing, and marketing the offering (Hu and Ritter, 2007). They act as an important independent financial intermediary engaging in various practices to reduce information asymmetry between the issuing firm and investors (Carter & Manaster, 1990; Chemmanur and Fulghieri, 1994). One major IPO related concern for bookrunners is poor post-IPO stock performance, a documented and evidenced outcome of EM practices (Teoh et al., 1998; DuCharme et al., 2001). Poor post-IPO stock performance is frequently attributed by investors to the bookrunner's inadequate assessment or disclosure of the issuing firm's financial health, resulting in damage to the bookrunner's "reputational capital" (Beatty and Ritter, 1986; Chemmanur and Fulghieri, 1994). Consequently, reputable bookrunners have strong incentives to deter earnings manipulation, thereby reducing information asymmetry and enhancing financial transparency (Carter, Dark and Singh, 1998). Lee and Masulis (2011) found that U.S. IPOs led by prestigious underwriters engaged in less EM. However, there is limited research examining whether similar dynamics exist in the Nordic markets.

This thesis examines the prevalence and timing of EM in relation to IPOs across all stock exchanges in Sweden, Norway, Denmark, and Finland. We examine the extent and direction of EM and whether bookrunner reputation influences these practices. To estimate EM, we employ two accrual-based models: the Modified Jones Model and the Kothari model. Further reasoning behind the choice of models will be provided in Section 2.3.

Our findings suggest that EM is strategically timed around the IPO process, with no evidence of managers engaging in income-increasing EM prior to the IPO but shifting to significant income-increasing EM the year after. While we do not find statistically significant evidence linking bookrunner reputation to EM, a negative directional effect indicates that reputable bookrunners may discourage income-increasing EM in the year before the IPO. When introducing threshold levels to bookrunner reputation, significance at the 10% level is observed for the Kothari model. Overall, our results align with prior research, highlighting the intensified pressures and incentives for EM after the transition to public ownership and the role of intermediaries in influencing financial reporting behaviour.

1.2 Contribution

Our thesis contributes to the EM literature by providing new insights into the timing and dynamics of EM surrounding IPOs in a Nordic setting. We extend the understanding of how the transition to public ownership intensifies EM and explore the potential deterrent role of bookrunner reputation, suggesting its use as a signalling mechanism for financial prudence. While prior research has largely focused on U.S. markets, limited research has been conducted to examine whether similar dynamics exist in the Nordic region. By focusing on these dynamics, our study offers valuable implications for stakeholders, shareholders, and regulators, highlighting the importance of intermediary reputation and transparent financial reporting in IPO contexts.

1.3 Delimitation

This study focuses on IPOs conducted on the Nordic stock exchanges in Sweden, Denmark, Norway, and Finland, between 2011 and 2022. Due to the inherent varying characteristics of different exchanges, such as regulation and accounting standards, it also introduces some uncertainty. We exclude financial, utilities, and real estate firms through the Global Industry Classification Standard due to their differing accounting standards, impeding comparability between industries. The analysis is limited to accrual-based EM using the Modified Jones Model and the Kothari model, to estimate discretionary accruals used as a proxy for EM. We exclude real EM due to its methodological complexity and limited comparability.

Our study does not explicitly investigate the underlying incentives driving EM around IPOs. Instead, we focus on measuring EM levels and examining the potential mitigating effect of bookrunner reputation. However, established incentives identified in prior literature serve as a critical framework for interpreting our results. This helps contextualising observed EM patterns despite not being directly tested in our study. This approach allows us to link our empirical findings to broader theoretical insights while maintaining a clear focus on EM measurement and its relation to bookrunner reputation.

These delimitations enhance the study's reliability but limit direct comparability with other EM research. The focus on Nordic markets and accrual-based methods reflects a deliberate choice to provide a narrowed analysis of EM within our specific scope.

2. Literature Review

In this section, we explore the theoretical frameworks underpinning our study, focusing on information asymmetry and signalling theory as they are present and relevant in financial markets, particularly during IPOs. We also define EM, examine its incentives and impact around IPOs, and discuss the role of bookrunners in mitigating EM, including our methodology for estimating bookrunner reputation.

2.1 Information Asymmetry

At its core, information asymmetry refers to situations where one party possesses superior or more comprehensive knowledge than another (Akerlof, 1970). This discrepancy is a pervasive issue in financial markets, where managers and insiders of a firm naturally have deeper insights into their company's true financial health, strategic risks, and growth potential (Healy and Palepu, 2001). External investors, by contrast, must rely on publicly disclosed information, which may be limited, outdated, or deliberately skewed to present a more favourable image of the firm.

The existence of information asymmetry challenges the Efficient Market Hypothesis. In theory, efficient markets require that all available information is fully reflected in asset prices (Fama, 1970). However, when critical information is unevenly distributed, mispricing becomes a frequent occurrence (Easley and O'Hara, 2004). Investors, operating in the dark, may either undervalue promising companies or overpay for firms whose financial health has been artificially inflated. This is particularly common in IPOs where issuing firms have limited track records, and disclosures are inherently less comprehensive than those of established public companies (Rock, 1986).

Investors exposed to asymmetric information are more likely to demand higher risk premiums, thereby increasing the cost of capital for firms (Easley and O'Hara, 2004). As Healy and Wahlen (1999) argue, firms engaging in EM, enabled by information asymmetry, ultimately erode trust in financial markets. Once investors begin to suspect that financial statements are manipulated, their confidence diminishes, which can lead to reduced market participation, increased volatility, and higher cost of capital (Easley and O'Hara, 2004).

Another immediate implication of information asymmetry is the potential for adverse selection, where high-quality firms are penalised alongside lower-quality ones. Investors, unable to differentiate between the two types, might discount all IPOs equally. As Akerlof (1970) pointed out in his famous "lemons" model, markets where buyers cannot distinguish good products from bad ones ultimately see the exit of high-quality players, leaving behind a market dominated by low-quality offerings. Further, information asymmetry amplifies the moral hazard problem (Zeckhauser, 1970). Managers, knowing that investors cannot fully monitor their actions, may engage in behaviour that maximises personal benefits at the expense of long-term value. For example, management might manipulate earnings to meet short-term market expectations, to protect their reputation and secure performance-based rewards (Kasznik, 1999). However, these manipulations often come at a cost, as EM leads to long-term stock underperformance (Teoh et al., 1998; Chi and Gupta, 2009).

2.2 Signalling Theory

Signalling theory, introduced by Spence (1973), provides a mechanism for mitigating the challenges posed by information asymmetry. It posits that market participants can convey unobservable qualities through observable actions or characteristics that serve as credible signals. In IPOs, where investors must make decisions with limited information, signalling presents a central function in enabling investors to differentiate firms. Firms with superior quality or performance potential often seek ways to differentiate themselves in markets with asymmetric information (Akerlof, 1970). They do so by sending signals that are costly or difficult for lower-quality firms to imitate. For instance, voluntarily adopting stringent accounting standards or disclosing additional financial data can serve as credible signals of a firm's reliability and transparency (Easley and O'Hara, 2004). These signals help bridge the informational gap, reassuring investors and fostering more accurate pricing of the firm.

In the context of IPOs, these signals play an important role due to the presence of high information asymmetry. One powerful signal is the selection of a reputable bookrunner. Firms partnering with more reputable bookrunners provide a signal of quality to potential investors (Carter and Manaster, 1990; Carter et al., 1998). Carter and Manaster (1990) underline that these bookrunners not only bring expertise in pricing and structuring offerings but also conduct rigorous due diligence, which reassures the market about the accuracy of disclosed financial information by putting their own reputation on the line. They further show that firms associated

with reputable bookrunners often achieve better IPO pricing, as their involvement signals lower risk of financial misrepresentation. The interplay between information asymmetry and signalling has deep implications for the functioning of capital markets. It is important to note though, that while signalling can help reduce asymmetry and promote trust, it cannot fully eliminate the fundamental imbalance of information. The effectiveness of any signal depends on its credibility, which in turn relies on its costliness. If signals become too cheap or easy to replicate, their value diminishes (Spence, 1973).

2.3 Earnings Management

2.3.1 Definition of Earnings Management

Earnings management refers to the deliberate manipulation of financial reporting by firms to alter perceptions of their profitability or stability (Healy and Wahlen, 1999). This manipulation can be exercised in both increasing and decreasing directions to enhance profitability or consistency, which according to Jones (1991) is possible due to the judgement and discretion that accounting allows. This widely accepted definition is underlined by most researchers, putting the responsibility of the manipulation on the management of firms (Jones, 1991; Healy and Wahlen, 1999).

The methods of EM can generally be classified into two main categories: accrual-based EM and real EM. While real EM involves altering actual business operations to influence reported earnings, such as Stora Enso in 2024, accrual-based EM adjusts accounting entries without changing underlying business operations (Kothari, Leone and Wasley, 2005). The accrual-based methods of estimating EM mostly aim to identify the difference between normal accruals that arise from business operations, and discretionary accruals, the managerial manipulation of earnings (Jones, 1991) (see Equation 5). It is from managers' strategic use of judgment in accounting policies and estimates to influence financial reports that the discretionary accruals arise (Jones, 1991; Healy and Wahlen, 1999; Payne and Robb, 2000). In our thesis we will focus solely on accrual-based EM.

When analysing EM results, it is important to consider both the signed and absolute values of discretionary accruals. The absolute values capture the overall magnitude of EM, irrespective of its direction, offering a measure of the intensity of accrual-based manipulations. In contrast, the signed values of discretionary accruals indicate the direction of EM. Positive signed values

suggest income-increasing activities, while negative signed values suggest income-decreasing manipulations. Analysing both measures collectively offer a comprehensive understanding of the firm's EM strategies. It is important to note that, due to the short-term nature of accrual-based EM, the signed values are likely to average close to zero across the analysed period (Jones, 1991).

2.3.2 Incentives for Earnings Management

There is a wide consensus that one of the most important aspects in analysing a firm's health is its financials (Jones, 1991). Therefore, managerial compensation is often directly connected to a firm's financial metrics, including earnings and ability to meet analyst expectations (Payne and Robb, 2000; Alvarez & Marsal, 2024). This gives managers clear incentives to manipulate earnings to meet financial goals linked to personal compensation.

Earnings have been shown to be a more important metric compared to cash flows for both outside stakeholders and managerial incentives. Graham, Harvey and Rajgopal (2005) surveyed over 400 executives and financial officers, finding that earnings, rather than cash flows, were the key metric for stakeholders. Similarly, Dechow, Kothari and L. Watts (1998) highlight earnings as a central determinant of IPO share valuation, and that they are frequently tied to executive compensation targets (Payne and Robb, 2000; Alvarez & Marsal, 2024). This emphasis on earnings, rather than cash flows, provides managers with the incentive to engage in EM, leveraging the flexibility and discretion allowed by accounting standards to influence reported earnings without altering underlying cash flows (Jones, 1991).

However, accrual-based EM, while accessible to managers, is predominantly effective only in the short term. As noted by Jones (1991), “since the sum of a firm's income over all years must equal the sum of its cash flows, managers must at some point in time reverse any ‘excessive’ earnings-decreasing (or increasing) accruals made in the past”. This necessity for a reversal implies that the extended use of accrual-based EM is neither feasible nor sustainable.

2.3.3 Earnings Management in Relation to IPOs

Due to the inherent short-term characteristics of accrual-based EM and significant corporate events, increased risks of manipulation during these times have been identified. IPOs as one of the most significant events, have been associated with heightened levels of accrual-based EM

(Roosenboom et al., 2003). The most important reason for the increased levels of EM around IPOs are, according to Payne and Robb (2000), due to managers trying to meet investor expectations. Kasznik (1999) finds further evidence for this, underlining that firms manage their earnings upward in order to align with market expectation. Payne and Robb (2000) find complementary evidence of both income-increasing and income-decreasing EM to meet market expectation. The latter is used by managers to “store up” discretionary accruals, enabling them to set up for a positive reversal and enhanced earnings in the future.

Furthermore, the short-term limitation of accrual-based EM discussed in 2.3.2 is particularly relevant in the context of IPOs, where the short timeframe of the IPO makes accrual-based EM plausible. Roosenboom et al. (2003) underlines the relation between EM and IPOs, where firms are incentivised to present a favourable financial outlook for outside investors. Roosenboom et al. (2003) found that accrual-based EM was greater in the period directly after the IPO. Due to earnings often being perceived as the primary indicator of a firm’s stability and growth prospects (Graham et al., 2005), managers are incentivised to employ short-term EM strategies in the period after the IPO to temporarily boost the firm’s stock performance (Rangan, 1998). This incentive is increased when managerial compensation is tied to performance metrics, such as stock performance after the IPO, creating further motivation for earnings manipulation (Alvarez and Marsal, 2024; Payne and Robb, 2000).

2.3.4 Accrual-Based Earnings Management Models

To quantify accrual-based EM, different models have been developed to examine adjustments to non-cash items made in the reported earnings. In line with previous literature, we will apply the Modified Jones Model and the Kothari model to estimate EM (Lee and Masulis, 2011; Du et al., 2018). The models use total accruals (TA) to differentiate between normal accruals (NA), and discretionary accruals (DA), the proxy used in our thesis for EM. Section 3.2 provides equations for the models. Reasoning behind our choice of models is presented below.

The Jones Model, introduced in 1991, is commonly used in research investigating the extent of accrual-based EM. However, the model has certain limitations. One in particular is its treatment of revenue-related accruals, which may misclassify manipulated revenues as normal, also known as type II errors. To address these limitations, the Modified Jones Model (MJM) was introduced by Dechow, Sloan, and Sweeney (1995), offering a more refined approach. By

excluding credit sales from revenue calculations, some misspecification can be mitigated, resulting in the reduction of false positives, also known as Type I errors (Kothari et al., 2005). Through adjusting for changes in accounts receivables, the MJM is more effective at identifying discretionary accruals in settings where firms use revenue-related tactics to manage earnings, which is prevalent around IPOs (Kothari et al., 2005). The model is widely used in previous research and makes the results more comparable. However, relative to performance-matched models, which compare firms with similar financial performance, the MJM exhibits higher Type I error due to misspecification.

To mitigate the misspecification issues associated with the MJM, our analysis incorporates the performance-matched Kothari model. By including lagged Return on Assets (ROA) as a performance measure, the Kothari model addresses potential performance-related biases in estimating discretionary accruals (Kothari et al., 2005; Lee and Masulis, 2011). While the MJM addresses revenue-related accruals, it does not account for variations driven by profitability. The Kothari model complements this approach by incorporating performance adjustments, offering a more robust framework for detecting EM in data sets with high performance variability (Kothari et al., 2005).

Kothari et al. (2005) concludes that “a performance-matched discretionary accrual measure is useful in mitigating Type I errors in cases where the researchers’ partitioning variable of interest is correlated with performance”. This makes the performance adjustment particularly relevant to our study of IPOs, where profitability varies substantially across our sample. By matching on ROA, the model ensures that discretionary accruals are more accurately estimated by comparing firms with similar profitability levels. Furthermore, the relationship between bookrunner reputation and ROA could influence our results if correlated and not accounted for. The Kothari model’s inclusion mitigates this issue by controlling for ROA, ensuring that discretionary accrual estimates are not confounded by firm performance.

2.4 Bookrunners' Role in Mitigating EM ahead of IPOs

2.4.1 Incentives of Bookrunners

When a company decides to make a public equity offering, it selects one or more investment banks to manage the process, known as underwriters. These underwriters operate at different levels, with the lead underwriter, referred to as the bookrunner, taking on the main role of managing the offering (Hu and Ritter, 2007). A bookrunner is thus the lead underwriter or lead coordinator when one or several investment banks collaboratively issue new equity on behalf of a company. In some cases, multiple bookrunners are appointed, referred to as joint bookrunners, to collaboratively share the main responsibility of the equity process (Hu and Ritter, 2007). Given these distinct responsibilities in the equity offering process, the focus in our thesis, in line with previous research, is exclusively on the bookrunner or joint bookrunners appointed for each offering.

In the context of IPOs, bookrunners are tasked with managing the process, including the coordination of underwriting syndicates, pricing of shares, and allocation of stocks to investors (Beatty and Ritter, 1986). They act as intermediaries, facilitating communication and transactions between the issuing company and potential investors. As intermediaries, bookrunners are expected to reduce information asymmetry through comprehensive due diligence, ensuring that financial information disclosed during the IPO process is accurate and reliable (Carter and Manaster, 1990; Hansen and Torregrosa, 1992; Chemmanur and Fulghieri, 1994).

Reputation is a critical asset for bookrunners in the investment banking industry (Beatty and Ritter, 1986). Carter et al. (1998) argues that underwriters with esteemed reputations are more likely to be involved in high-profile IPOs and can command premium fees for their services. Moreover, it influences their ability to win mandates, attract investors, and negotiate underwriting fees (Megginson and Weiss, 1991). Therefore, maintaining and enhancing reputation is fundamental to bookrunners for their success and longevity in the market.

Failure to address EM during the IPO process can lead to reputational damage for the bookrunners as highlighted by prior research (Beatty and Ritter, 1986). Both Roosenboom et al. (2003) and Teoh et al. (1998) suggest that firms engaging in aggressive EM experience long-term underperformance in the stock market. These outcomes are often a consequence of the reversal of inflated earnings, which results in declining stock prices and investor dissatisfaction

(Rangan, 1998). When post-IPO performance falls below expectations, investors frequently assign blame to the lead bookrunners for failing to detect inconsistencies in valuations, such as irregularities in financial reporting (Beatty and Ritter, 1986). The underwriters involved in such IPOs face reputational damage which hinders their ability to secure future underwriting mandates (Beatty and Ritter, 1986; Hansen and Torregrosa, 1992). Bookrunners are thus believed to have strong incentives to limit any degree of EM ahead of IPOs.

2.4.2 Estimation of Bookrunner Reputation

Several proxies for underwriter reputation have been developed in the IPO literature, aiming to quantify the prestige and quality of investment banks involved in public offerings. Logue (1973) and Beatty and Ritter (1986) were among the first to explore underwriter reputation, paving the way for the more detailed methodology introduced by Carter and Manaster (1990). The Carter-Manaster system, later extended by Carter et al. (1998), uses underwriters' relative placements in IPO tombstone announcements, a formal advertisement listing details of a transaction. This method assigns reputation scores by examining the hierarchical placement of underwriters in these announcements, under the premise that more reputable underwriters are listed at the top.

Meggison and Weiss (1991) introduced an alternative approach that measures underwriter reputation using market share, defined as the percentage of the total dollar value of IPOs brought to market by a given underwriter. They suggested that underwriters with larger market shares have higher reputational capital due to their ability to attract more and larger deals consistently. Furthermore, they argue that market share is a practical and dynamic proxy for reputation, capturing the underwriter's influence and success in the market more accurately than static rankings. They also demonstrate a high correlation between their market share measure and the Carter-Manaster rankings, suggesting that market share effectively reflects underwriter reputation. However, Megginson and Weiss (1991) critique the rankings provided by Carter and Manaster, arguing that relying on static rankings from a single year assumes underwriter reputation remains constant, despite evidence from Beatty and Ritter (1986) that it evolves over time. Furthermore, they argue that using market shares rather than rankings results in cardinal values as opposed to ordinal values, which are more precise in differentiating underwriters.

In this study, we adopt the market share approach in line with the reasoning of Megginson and Weiss (1991) to estimate underwriter reputation. While some prior research uses Loughran and Ritter's (2004) rankings based on the Carter-Manaster approach, the lack of equivalent rankings for Nordic underwriters renders this method impractical for our study. We then make two adjustments to the market share approach provided by Megginson and Weiss (1991). Firstly, while Megginson and Weiss capture underwriter reputation dynamically, their use of cumulative market share for the same years as their sample introduces an ex post bias for earlier IPOs, as it relies on future activity that would not have been observable at the time. To address this, we calculate the market share based on the preceding ten years of each specific IPO. This approach provides a lagged window of time, following the methodology of Hu and Ritter (2007), which reflects underwriter reputation contemporaneously. It further, more accurately, addresses that reputational capital changes over time (Beatty and Ritter, 1986) while still capturing enough years to reduce annual volatility. Secondly, to provide a broader and more comprehensive view of bookrunner reputation, we follow Chemmanur and Fulghieri's (1994) use of market share across all Equity Capital Market (ECM) transactions, reflecting overall activity and credibility in equity markets.

3. Method

In this section, we will first present our four hypotheses, followed by the models used to estimate discretionary accruals, referred to as EM in our thesis. Subsequently, we will introduce our method approach, as well as our main regression model employed to test the hypotheses.

3.1 Hypothesis Development

Earnings management practices are often strategically timed to align with key financial milestones. The year prior to the IPO is characterised by extensive due diligence conducted by bookrunners, which imposes stricter scrutiny on financial reporting and limits the opportunity for EM. This leads us to believe that heightened oversight reduces EM prior to the IPO. However, once the IPO process is complete, firms face less rigorous scrutiny and managers instead face amplified market pressures to meet earnings expectations, driven by the structure of managerial compensation (Payne and Robb, 2000; Graham et al., 2005; Alvarez and Marsal, 2024). This greater managerial flexibility and incentive to engage in absolute and signed EM after the IPO, leads us to propose the following two hypotheses:

H1: Firms engage in higher absolute levels of earnings management in the first year after the IPO compared to the year before

H2: Firms engage in more income-increasing earnings management in the first year after the IPO compared to the year before

As discussed under 2.4, the involvement of bookrunners during the IPO process plays a central role in mitigating information asymmetry, as they act as intermediaries who signal the credibility of the firm's financial reporting transparency to the market. Esteemed bookrunners are incentivised to conduct rigorous due diligence to ensure the accuracy of reported earnings as their reputational capital depends on it (Beatty and Ritter, 1986; Lee and Masulis, 2011). In contrast, bookrunners with less reputational capital may lack the same incentives to conduct as rigorous due diligence, allowing firms greater flexibility to manipulate earnings prior to the IPO. As a result, we believe that there is a negative relationship between bookrunner reputation and absolute EM ahead of IPOs, leading us to propose the following hypothesis:

H3: Issuing firms with more reputable bookrunners engage in less absolute terms of EM compared to those with less reputable bookrunners in the year prior to the IPO

Building on the relationship between bookrunner reputation and EM, our fourth hypothesis focuses on the directional influence of bookrunner reputation on EM prior to the IPO. Sletten et al., (2018) suggests that income-increasing EM is the primary reason for long-term stock underperformance, the fundamental cause of damaged bookrunner reputation (Beatty and Ritter, 1986). This leads us to believe that reputable bookrunners are mainly concerned with mitigating income-increasing EM specifically, and thus we propose the following hypothesis:

H4: Issuing firms with more reputable bookrunners engage in less income-increasing EM compared to those with less reputable bookrunners in the year prior to the IPO

3.2 Accrual-Based Models

3.2.1 Modified Jones Model

For our study on IPOs, we employ the Modified Jones Model (MJM) to estimate discretionary accruals (DA), serving as a proxy for EM. This model is particularly suitable given that

companies undergoing IPOs are more prone to revenue manipulation; a detailed discussion of the rationale behind this choice is provided in Section 2.3.4. The determinant, out of which DA will be estimated, is total accruals (TA). TA is in turn retrieved from the cash flow and income statement in line with Hribar and Collins (2002):

Equation 1

$$TA_{it} = NI_{it} - CFFO_{it}$$

Where TA_{it} is the total accruals in year t for firm i , NI is defined as Net income, and CFFO is defined as Cash flow From Operations. In accordance with Dechow et al. (1995), no intercept is included in the MJM, and the following is regressed on our data to estimate the coefficients:

Equation 2

$$\frac{TA_{it}}{Assets_{i,t-1}} = \beta_1 \frac{1}{Assets_{i,t-1}} + \beta_2 \frac{(\Delta REV_{it} - \Delta REC_{it})}{Assets_{i,t-1}} + \beta_3 \frac{PPE_{it}}{Assets_{i,t-1}} + \epsilon_{it}$$

This equation is applied separately to each industry. The determined coefficients are used in the following equation to calculate the error term, which represents the DA in accordance with Dechow et al. (1995):

Equation 3

$$\underbrace{\frac{TA_{it}}{Assets_{i,t-1}}}_{\text{Total Accruals Ratio}} = \underbrace{\widehat{\beta}_1 \left(\frac{1}{Assets_{i,t-1}} \right) + \widehat{\beta}_2 \left(\frac{\Delta REV_{it} - \Delta REC_{it}}{Assets_{i,t-1}} \right)}_{\text{Normal Accruals Ratio}} + \underbrace{\widehat{\beta}_3 \left(\frac{PPE_{it}}{Assets_{i,t-1}} \right)}_{\text{Discretionary Accruals Ratio}} + \epsilon_{it}$$

The residuals serve as the proxy for firm-specific DA within each sector, calculated as the difference between TA and NA. Consistent with prior research, these residuals are used as a measure of accrual-based EM, scaled by lagged total assets (Jones, 1991; Dechow et al., 1995). This relationship is detailed below:

Equation 4

$$\epsilon_{it} = \frac{DA_{it}}{Assets_{i,t-1}}$$

Equation 5

$$EM_{it} = \frac{DA_{it}}{Assets_{i,t-1}} = \frac{TA_{it}}{Assets_{i,t-1}} - \frac{NA_{it}}{Assets_{i,t-1}}$$

3.2.2 Kothari Model

The Kothari model, introduced by Kothari et al. (2005), enhances the MJM by incorporating ROA as an additional independent variable. This modification accounts for performance-related variations that may impact accruals, allowing for a more precise distinction between NA and DA. The model's approach of controlling for profitability is particularly relevant to this study, as IPO firms often exhibit widely varying levels of profitability. The formula for the Kothari model is presented below:

$$\frac{TA_{it}}{Assets_{it-1}} = \beta_0 + \beta_1 \frac{1}{Assets_{it-1}} + \beta_2 \frac{(\Delta REV_{it} - \Delta REC_{it})}{Assets_{it-1}} + \beta_3 \frac{PPE_{it}}{Assets_{it-1}} + \beta_4 ROA_{it} + \epsilon_{it} \quad \text{Equation 6}$$

This model is especially relevant when assessing EM, as it adjusts for differences in ROA, improving the estimation of DA. This equation is applied separately to each industry. As shown in the equations, the variables in both models are scaled by lagged total assets, following the methodologies Dechow et al. (1995) and Kothari et al. (2005). Individual variable descriptions are provided in Appendix A.

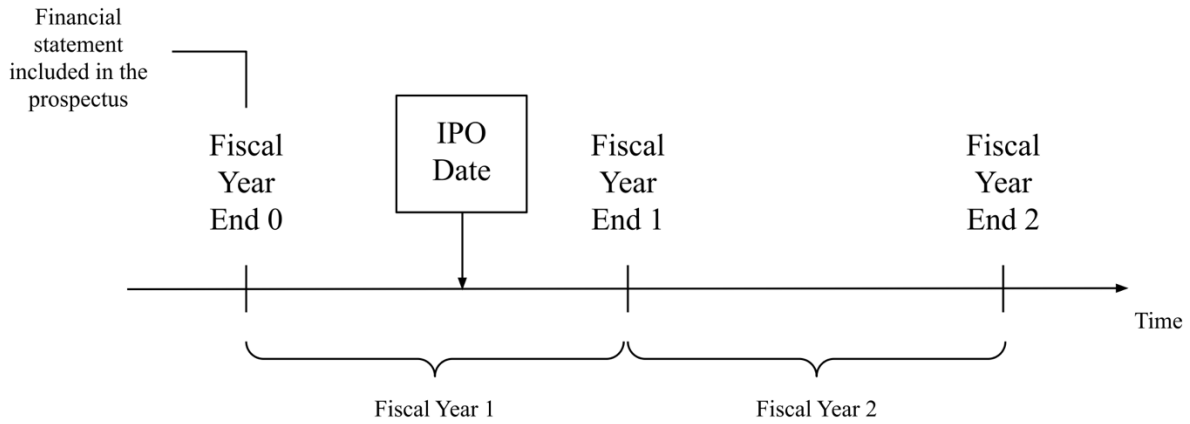
3.3 Cross-Sectional Approach

A key requirement for conducting EM analysis using the MJM and the Kothari model is the ability to track a company's accruals over time. While Jones (1991) initially employed a time-series approach, analysing long historical data at the individual firm level to estimate DA, this method has faced criticism due to the extensive and reliable data it requires for each firm. Consequently, more recent studies have adopted a cross-sectional approach, which examines firms within the same industry annually to estimate the model, as recommended by Kothari et al. (2005) and supported by Roosenboom et al. (2003), as well as Lee and Masulis (2011). Given the limited availability of financial information prior to firms going public, a cross-sectional, industry-specific, approach is considered appropriate for this study. Nonetheless, it is important to acknowledge the limitations of this method, particularly the variations in capital structure among firms within the same industry.

To test H1 and H2, our study adopts an event study methodology. The most recent financial statement prior to the IPO date is designated as $t = 0$, enabling us to compare companies at

similar stages of their IPO. EM at $t = 0$ is then compared to EM at $t+1$ and $t+2$, enabling an analysis of EM across the IPO period.

Figure 1



A potential limitation that could influence the quality of our event study data is the changing macroeconomic conditions over the ten-year period analysed. Shifts in the economic environment may affect IPOs differently, introducing variability into the data. However, this risk is mitigated by the tendency of IPOs to cluster during favourable macroeconomic conditions (Özyeşil and Aktürk, 2024). This clustering effect helps to minimise inconsistencies and promotes greater uniformity in the data.

3.4 Main Regression

3.4.1 Regression Model

To test H3 and H4, the following equation will be used. The objective of the regression is to determine to what extent, and in which direction, our key independent variables influence EM. Individual variable descriptions are provided in Appendix A.

Equation 6

$$EM_{it} = \beta_0 + \beta_1 \text{Bookrunner Reputation}_{it} + \beta_2 \text{Size}_{it} + \beta_3 \text{Growth}_{it} + \beta_4 \text{Leverage}_{it} + \beta_5 \text{ROA}_{it} + \beta_6 \text{Company Age}_{it} + \text{Year FE} + \text{Sector FE} + \epsilon_{it}$$

3.4.2 Dependent Variables & Winsorisation

EM for firm i is captured by the error term derived from the MJM and Kothari model. To enhance the robustness of our analysis and mitigate the impact of extreme outliers, we applied winsorisation to the dependent variable of both models. Although not consistently adopted in previous research, this methodological step decreases the influence of extreme outliers in our

data. Therefore, consistent with Du et al. (2018), winsorisation was conducted at the 1st and 99th percentiles.

In our primary regression model, the DA from the two models serve as the dependent variable, utilised to test our hypotheses. Additionally, we analyse the absolute and signed values of DA, to capture the magnitude and direction of EM, respectively.

3.4.3 Main Independent Variable

Bookrunner Reputation is defined as the natural logarithm of total gross offering amount underwritten by the bookrunner in all ECM transactions during the ten years preceding the IPO. Reasoning behind this definition is further detailed in Section 2.4.2. ECM transactions include activities where equity is raised, such as IPOs, follow-on offerings, and other equity-related instruments. We use the market share approach to estimate *Bookrunner Reputation*, an approach introduced by Megginson and Weiss (1991) and frequently used (Hu and Ritter, 2007). If multiple bookrunners were involved in the IPO the average market share of the joint bookrunners is used, consistent with the methodology of Megginson and Weiss (1991). The gross offering amount is the total transaction value, also known as IPO proceeds, determined by multiplying the number of shares offered by the subscription price. For each transaction in calculating bookrunner reputation, the gross offering amount is fully attributed to all participating underwriters, in line with Chemmanur and Fulghieri (1994), regardless of their specific underwriting role.

3.4.4 Control Variables

In our main regression, control variables are included to account for additional factors that may influence our dependent variable. By controlling for these influences, the regression provides a clearer estimation of the relationship between *Bookrunner Reputation* and EM. This approach minimises the risk of confounding effects or omitted variable bias, improving confidence in our results. Our control variables were selected based on insights from previous literature examining EM in relation to IPOs, which highlights these as the most significant factors influencing EM (Roosenboom et al., 2003; Lee and Masulis, 2011). This targeted selection ensures the model captures the most critical influences, minimising the risk of overfitting or introducing unnecessary variables that could dilute the robustness and interpretability of our

results. A comprehensive description of the control variables included in our main regression are presented below.

Size is measured as the natural logarithm of total assets. Larger firms may possess more complex financial structures, which provide opportunities to exploit accounting discretion. However, their size also attracts greater scrutiny from analysts, auditors, and regulators, potentially discouraging EM practices. This dual effect creates mixed expectations: larger firms might engage in more EM due to their financial complexity but less EM due to heightened external scrutiny. Yangseon Kim (2003) suggests that although larger firms have resources to employ sophisticated accounting techniques, their public profile serves to discourage EM.

Growth is calculated as the annual percentage increase in revenue from year $t-1$ to year t . High-growth firms often face strong incentives to present a favourable financial narrative, particularly during critical periods such as IPOs, driven by the need to meet market expectations and sustain investor confidence. Lee, Li and Yue (2006) suggest that firms experiencing rapid revenue growth are more likely to inflate earnings, leveraging financial reporting to align with optimistic market perceptions. As a result, a positive association is anticipated between *Growth* and EM.

Leverage is defined as the ratio of total debt to total assets. Highly leveraged firms often have stronger incentives to manipulate earnings to meet debt covenants or avoid financial distress. Conversely, close monitoring by creditors can act as a deterrent to EM. Despite this, previous studies have consistently found a positive relationship between leverage and EM, as increased leverage amplifies the incentives for managers to engage in earnings manipulation to meet covenant requirements. Bassiouny (2016) and DeFond and Jiambalvo (1994) provide evidence that firms with high leverage are particularly prone to increased EM.

ROA is calculated as net income divided by total assets. It serves as a measure of firm performance, with lower ROA firms more likely to engage in EM to offset weak financial results. Controlling for *ROA* ensures that the detection of EM is not conflated with performance outliers. Dechow et al. (1995) underscores the importance of controlling for *ROA* to address potential misclassification of discretionary accruals, especially among low-performing firms. *ROA* is expected to exhibit a negative relationship with EM.

Company Age is measured as the natural logarithm of the years between the company's founding and its IPO. Older firms tend to have more established management practices, robust accounting systems, and longer financial histories, reducing their incentives to manipulate earnings. In contrast, younger firms face greater uncertainty, limited resources, and higher risk of failure, which may encourage more aggressive EM to secure favourable IPO valuations. As noted by Lee and Masulis (2011), older firms are less likely to engage in EM during the IPO period due to their operational stability and financial predictability. Thus, *Company Age* is expected to have a negative relationship with EM.

Year Fixed Effects and *Sector Fixed Effects* are applied to control for unobservable heterogeneity across firms in line with previous research (Lee and Masulis, 2011).

4. Empirical Data

In this chapter, we detail the empirical data and methodology employed in our study of how underwriter reputation affects EM in IPOs across the Nordic countries. We outline our scope of work, sample collection process, data sourcing methods, and the industry classifications used to ensure accurate and reliable analysis.

4.1 Scope of Work

This study examines how the reputation of bookrunners affects EM in firms undergoing IPOs in the Nordic countries Sweden, Denmark, Norway and Finland. These countries were chosen due to their similar economic environments and regulatory frameworks, as highlighted by Leuz, Nanda and Wysocki (2003) and Enomoto, Kimura and Yamaguchi (2015). To avoid bias that might arise from focusing solely on major exchanges, we include all stock exchanges within these countries. By broadening the scope to include all exchanges, the analysis isolates the effect of bookrunner reputation on EM across different company sizes and listing venues, in line with Chang, Chung and Lin (2010).

We analyse a ten-year time frame between January 1, 2011, and January 1, 2022, which enables us to collect more observations and increase our sample size compared to previous studies that often focused on limited markets or shorter periods. Given that our study examines companies one year before and two years after their IPO, ending the sample in 2022 ensures that financial

information is available for the two subsequent financial statements. This larger sample allows for a more conclusive analysis of the relationship between underwriter experience and EM. While this broader scope introduces additional complexity due to the extended time frame, including potential influences from IFRS 16 adoption and the COVID-19 pandemic, we address these issues by employing fixed year effects.

The investigation defines three specific periods for analysing EM practices. The year prior to the IPO (year 0) captures the latest annual financial statement ahead of the IPO. The maximum timeframe is thus limited to 12 months prior to the offering. This approach ensures the analysis reflects EM activities leading up to the IPO. The first year after the IPO (year 1) includes the annual report immediately following the IPO, allowing for the assessment of changes in EM practices upon transitioning to public ownership. The second year after the IPO (year 2) covers the second annual report after the IPO, offering insights into whether the observed effects on EM persist over a longer horizon. By incorporating these distinct periods, the study captures a comprehensive picture of EM practices surrounding IPOs, aiming to address when EM primarily occurs. The abovementioned timeline is visualised in Figure 1.

4.2 Sample Collection

The sample is retrieved from Capital IQ with an original sample size of 1 239 companies. Firms undergoing a list change, and those resulting from a spinoff of an existing public firm were excluded in the collected sample. Further, eight observations were manually excluded due to being incorrectly included by Capital IQ. Another 392 IPO firms were excluded due to their first trading date occurring outside of our sample period.

In line with previous literature, 112 firms in the financial, utilities and real estate sectors have been excluded due to their varying accounting principles differing significantly from the rest of the sample (Roosenboom et al., 2003). Due to incomplete accounting information in Capital IQ, a further 396 observations were removed, concluding at an estimation data sample of 331 firms. We chose the IPO offer date as our primary reference point for data analysis due to its importance in the regulatory environment. This date represents the first official day an IPO stock can be traded publicly. When conducting the main regression, another 62 observations are dropped due to missing information regarding bookrunners in their IPO prospectuses. This results in a main regression data sample of 269 firms for hypotheses 3 and 4.

Table 1: Sample Size

Criteria	<i>Adjustments</i>	Numbers of companies
Initial sample		1,239
Misclassified Spin-offs	-8	1,231
Invalid first trading date	-392	839
Financial, Utilities, and Real-Estate sectors	-112	727
Incomplete financials	-396	331
Final sample for H1 and H2		331
Unavailable bookrunner information	-62	269
Final sample for H3 and H4		269

Table 2: Sector Frequency

Sector	Frequency for H1 & H2	<i>Adjustments</i>	Frequency for H3 & H4
Communication Services	17	-1	16
Consumer Discretionary	48	-3	45
Consumer Staples	20	-3	17
Energy	13	-4	9
Health Care	48	-9	39
Industrials	92	-19	73
Information Technology	75	-22	53
Materials	18	-1	17
Total	331	-62	269

4.3 Data Sourcing

IPO and financial data were sourced from Standard & Poor's Capital IQ to estimate EM. Stock and underwriter details were obtained using S&P's tool for Excel. Sector classifications and gross offering amounts for Bookrunners were also retrieved from Capital IQ with additional data supplemented through FactSet and prospectuses.

4.4 Industry Classifications

We employ a cross-sectional approach, in line with previous research (Roosenboom et al., 2003; Lee 2011), leveraging the accrual patterns of firms operating within the same industry for a given year, as this approach assumes that firms within similar industries share comparable economic conditions and accounting practices. This method highlights the role of accurate industry classification in capturing the unique characteristics of each industry, ensuring the reliability of the estimates. Based on the findings of Hrazdil and Scott (2011), the Global Industry Classification Standard (GICS) provides significantly more accurate estimates of discretionary accruals compared to other widely used classification systems such as Standard Industry Classification (SIC). Consequently, we organise all IPO data from Nordic exchanges into industry sectors using the GICS framework, ensuring a more reliable and precise assessment of EM.

5. Results

In this section, we present the findings from our analysis of EM around IPOs, including descriptive statistics, correlation and multicollinearity assessments, and finally the regressions testing our four hypotheses. Specifically, we examine the changes in absolute and income-increasing EM levels across our specified IPO period and explore the relationship between bookrunner reputation and EM practices in the year prior to the IPO.

5.1 Descriptive Statistics

As seen in Table 3, both the MJM and the Kothari model show small differences in their means and medians with similar variability, suggesting consistent estimation methods. The signed accruals have mean values close to zero for both models, underlining the short-term limitations of accrual-based EM discussed under 2.3.2. The paired t-test in Appendix B reveals that the Kothari model consistently estimates slightly higher absolute and signed DA than the MJM at the 1% significance level. These results indicate that, while the models yield broadly similar outcomes, minor yet significant differences in their detection of EM behaviour exists.

Table 3: Descriptive Results

Variable	Min	Max	Median	Mean	SD
<i>MJM absolute EM</i>	0.00	1.28	0.07	0.13	0.16
<i>Kothari absolute EM</i>	0.00	1.05	0.09	0.14	0.16
<i>MJM signed EM</i>	-0.81	1.28	-0.02	-0.02	0.20
<i>Kothari signed EM</i>	-0.82	1.05	0.03	-0.02	0.21
<i>Bookrunner Reputation</i>	0	14.17	11.61	9.39	4.49
<i>Size</i>	0.23	12.40	5.39	5.51	2.24
<i>Growth</i>	-0.98	34.85	0.19	0.63	2.65
<i>Leverage</i>	0	4.00	0.19	0.22	0.26
<i>ROA</i>	-1.85	0.90	0.02	-0.03	0.22
<i>Company Age</i>	0	5.59	2.83	2.97	0.98

5.2 Correlation and Multicollinearity

The Pearson Correlation Matrix is presented in Appendix C, showing the correlation between our dependent variable, EM, our main independent variable, *Bookrunner Reputation*, and other independent control variables. Lower correlations among our independent variables indicate lower risk for multicollinearity issues, implying more reliable and unbiased estimates in the regression model. We generally anticipate strong correlations between our dependent variables, as both models use similar methods to estimate EM (Kothari et al., 2005). We expect a negative correlation between *Bookrunner Reputation* and EM, in line with our hypothesis of an inverse relationship between the two. Additionally, we anticipate correlations between control variables and EM, highlighting their contribution to the model's explanatory power, and low correlations among control variables, indicating minimal multicollinearity. Among our anticipated low correlations between our control variables, we make one exception for *Size* and *Company Age*, as we believe older companies tend to be larger, naturally leading to higher correlation between these variables.

The Pearson Correlation Matrix results largely confirm our expectations. Our dependent variables show a strong positive significant correlation with each other. *Bookrunner Reputation* is negatively and significantly correlated with absolute EM, while its correlation with signed EM is slightly negative, although insignificant. Among our five control variables, *Firm Size*, *ROA*, and *Company Age* are significantly negatively correlated with absolute EM but exhibit

weaker, insignificant, and positive correlations with signed EM. *Growth* is positively correlated with EM in both models, while *Leverage* shows a slight, insignificant negative correlation.

Correlations between control variables and *Bookrunner Reputation* are significant at the 1% level and mostly fall within the range of -0.17 to 0.25, except for *Firm Size*. Across all independent variables, correlations generally lie between -0.3 and 0.3 and are mostly significant, suggesting a low risk of multicollinearity. However, *Firm Size* exhibits a moderately high and significant correlation with *Bookrunner Reputation* (0.63) and *Company Age* (0.45), raising potential concerns about multicollinearity. These concerns are further evaluated through a Variation Inflation Factor (VIF) test. The result from our VIF test is presented in Appendix D, showing that all variables have VIF values lower than 2.1, indicating that multicollinearity is within acceptable limits as suggested by Hrazdil and Scott (2011). Thus, the overall model remains robust.

5.3 Regression Results

5.3.1 Absolute EM after the IPO

In our first hypothesis, we investigate whether there are increased absolute levels of EM in the year after the IPO, year 1, compared to the year prior to the IPO, year 0. As presented in Table 4, the Kothari model and the MJM both reveal a similar pattern of fluctuations in mean absolute EM over the three-year period. In year 0, mean absolute EM is 0.121 in the Kothari model and 0.133 in the MJM. In year 1, both models indicate a notable increase in EM, with the mean rising to 0.185 in the Kothari model and 0.162 in the MJM. In year 2, the second year after the IPO, mean absolute EM decreases to 0.099 in the MJM and returns to levels comparable to year 0 (0.121) in the Kothari model. These findings highlight heightened EM activity immediately after the IPO, followed by a subsequent decline and stabilisation by the second year after the IPO, reinforcing the consistency of results across both models. These results are illustrated in Figure 2.

The increase in absolute EM from year 0 to year 1, observed in both the MJM and Kothari model, is statistically significant at the 5% and 1% levels respectively, as confirmed by our t-tests. We can thus reject the null hypothesis and establish, in line with H1, that the extent of absolute EM is significantly higher in the year after the IPO than the year before.

5.3.2 Income-Increasing EM after the IPO

In our second hypothesis, we investigate whether there are increased levels of income-increasing EM in year 1 compared to year 0. As presented in Table 4, signed EM from both models reveal important trends in the direction of EM. In year 0, the Kothari model shows a near-zero mean (-0.002), while the MJM indicates a negative mean (-0.040). By year 1, both models demonstrate a shift toward positive EM, with the Kothari model at 0.033 and the MJM at 0.0128 . In year 2, the Kothari model maintains positive EM (0.029), showing a continued trend of income-increasing adjustments, with a significant difference from year 0. In contrast, the MJM reveals a return to slightly negative EM (-0.0240), indicating income-decreasing behaviour in the subsequent year. These findings suggest a general tendency toward income-increasing EM immediately after the IPO, as indicated by both models, followed by a divergence in year 2, where the MJM points to a partial reversal while the Kothari model suggests stability in income-increasing behaviour. These results are illustrated in Figure 2.

The elevation in income-increasing EM from year 0 to year 1, observed in both the MJM and the Kothari model, is statistically significant at the 1% and 5% levels respectively, as confirmed by our t-tests. We can thus reject the null hypothesis and establish, that the extent of income-increasing EM is significantly higher in the year after the IPO than the year before.

For our first and second hypothesis, results reveal a consistent pattern across both models: a significant increase in the absolute magnitude of EM in the immediate year after the IPO, followed by a decline in the second year. This trend aligns with findings from prior research (Roosenboom et al., 2003; Lee 2011). Similarly, signed EM values highlight a strategic use of accrual-based EM around the IPO, with firms emphasising income-increasing adjustments in the first post-IPO year and exhibiting mixed outcomes in the second year.

5.3.3 Bookrunner Reputation and Absolute EM

In our third hypothesis, we investigate whether there is a negative relationship between *Bookrunner Reputation* and absolute EM in year 0. The regression results in Table 5 reveal no statistically significant relationship between the two. However, the coefficients for *Bookrunner Reputation* are consistently positive across both MJM and the Kothari model. While the lack of statistical significance limits definitive conclusions, the consistency in the direction of the coefficients suggests a potential directional relationship, where a more reputable bookrunner is

associated with higher levels of EM. This observation contradicts our third hypothesis, which posited a negative association between bookrunner reputation and the extent of EM in the year prior to the IPO. These results, in combination with the lack of significance, means that we are unable to reject the null hypothesis for H3.

The control variables in our absolute regression explain how various firm-specific factors influence the magnitude of EM in year 0. *Size* has a significant negative relationship with absolute EM in both the MJM and Kothari models, indicating that larger firms are less likely to manipulate earnings. *Growth* and *Leverage* show significant positive relationships, suggesting that high-growth and highly leveraged firms are more prone to EM. *ROA* and *Company Age* are not statistically significant in either model, indicating limited influence on absolute EM in year 0. The absolute EM regression's explanatory power is reflected in adjusted R-squared values of 0.325 (MJM) and 0.303 (Kothari), consistent with prior research (Du et al., 2018). Strong F-statistics (5.29 and 5.01) and the use of *Year* and *Industry Fixed Effects* further support the models' robustness in capturing temporal and sector-specific influences.

5.3.4 Bookrunner Reputation and Income-Increasing EM

In our fourth hypothesis, we investigate whether there is a negative relationship between *Bookrunner Reputation* and income-increasing EM in year 0. The regression results in Table 5 reveal no statistically significant relationship between the two. However, the coefficients remain consistently negative across both models, which could indicate a potential tendency for reputable bookrunners to deter income-increasing EM and instead indicate an income-decreasing manipulation. While this trend is not statistically significant, the uniformity of the negative coefficients aligns with the theoretical expectation of reduced upward adjustments in earnings. This observation aligns with our H4, which posits that issuing firms with more reputable bookrunners engage in less income-increasing EM in the year before the IPO, as evidenced by the consistent negative coefficients in the signed models. However, the lack of significance at the conventional 5% level means that we fail to reject the null hypothesis.

The control variables in our signed regression explain how firm-specific factors influence the direction of EM in year 0. Interestingly, *Size* is insignificant in both models, showing no consistent direction or impact on signed EM. *Growth* has a statistically significant positive relationship with signed EM in MJM, indicating higher growth firms are more likely to engage

in income-increasing adjustments, while this relationship is positive but insignificant in the Kothari model. *Company Age* shows a similar positive but insignificant relationship across both models. *Leverage* and *ROA* exhibit consistent but insignificant coefficients in both models. The signed EM regression's explanatory power is lower for signed values regression, with adjusted R-squared values of 0.050 (MJM) and 0.023 (Kothari). F-statistics are significant at the 5% level for the MJM but not for the Kothari model. *Year* and *Industry Fixed Effects* are included to account for broader contextual influences.

Table 4: Mean Earnings Management over the IPO-period [T-stat]

Earnings Management	Pre-IPO (y0)	Post-IPO (y1)	Difference (y1 – y0)	Post-IPO (y2)
Absolute Kothari Model	.12 [16.00]***	.19 [16.76]***	.06 [5.74]***	.13 [18.03]***
Absolute MJM	.13 [16.88]***	.16 [13.39]***	.03 [2.42]**	.10 [15.78]***
Signed Kothari Model	-.00 [-0.24]	.03 [2.21]**	.036 [2.04]**	.03 [2.86]***
Signed MJM	-.04 [-3.79]***	.01 [0.85]	.05 [2.99]***	-.02 [-2.93]***
Number of observations	331	331	331	331

Figure 2: Mean Earnings Management over the IPO-period

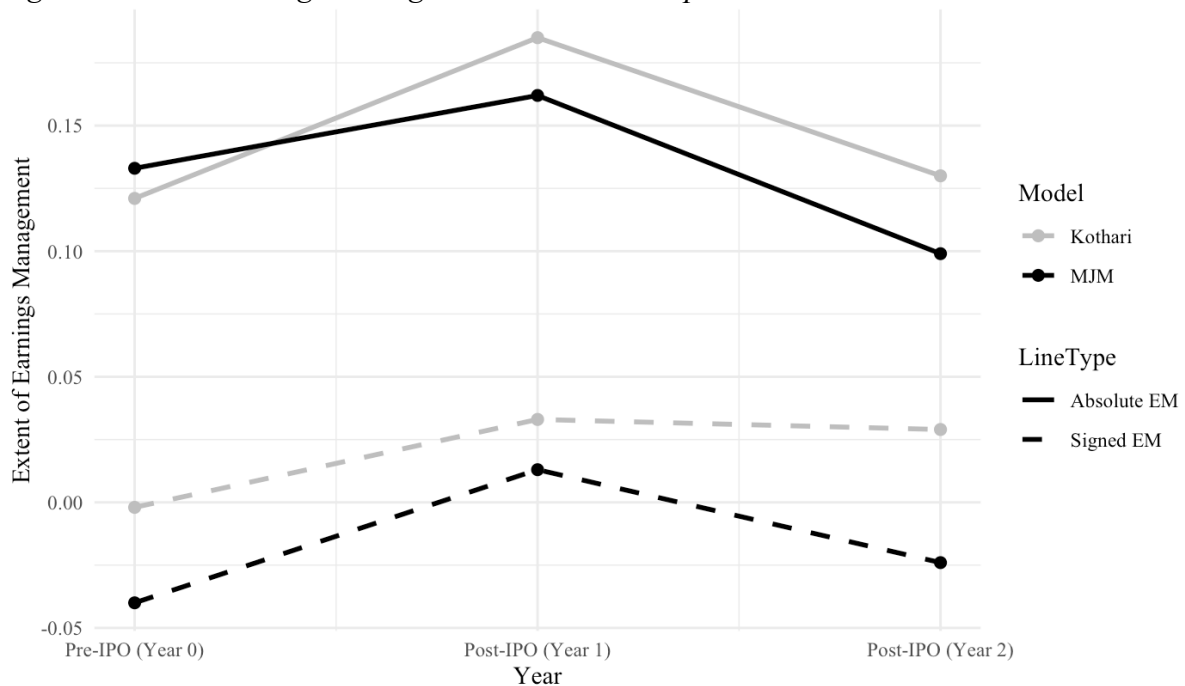


Table 5: Main Regression Results for year 0 (pre-IPO year) [Robust standard errors]

Dependent Variable = Absolute EM

	MJM	Kothari
<i>Bookrunner Reputation</i>	.003 [0.003]	.002 [0.002]
<i>Size</i>	-.032*** [0.006]	-.032*** [0.006]
<i>Growth</i>	.009* [0.005]	.011** [0.027]
<i>Leverage</i>	.066** [0.029]	.066** [0.027]
<i>ROA</i>	-.023 [0.036]	.018 [0.039]
<i>Company Age</i>	.002 [0.006]	.006 [0.006]
<i>Constant</i>	.198*** [0.062]	.182*** [0.063]
<i>Year FE</i>	YES	YES
<i>Industry FE</i>	YES	YES
<i>Adjusted R²</i>	0.325	0.303
<i>F-Statistic</i>	5.35***	5.03***

Significance level:

Dependent Variable = Signed EM

	MJM	Kothari
<i>Bookrunner Reputation</i>	-.001 [0.004]	-.003 [0.004]
<i>Size</i>	-.002 [0.010]	.005 [0.010]
<i>Growth</i>	.019*** [0.007]	.016** [0.007]
<i>Leverage</i>	-.033 [0.053]	-.033 [0.049]
<i>ROA</i>	.019 [0.110]	.036 [0.069]
<i>Company Age</i>	.018* [0.011]	.015 [0.011]
<i>Constant</i>	-.035 [0.071]	-.022 [0.070]
<i>Year FE</i>	YES	YES
<i>Industry FE</i>	YES	YES
<i>Adjusted R²</i>	0.050	0.023
<i>F-Statistic</i>	1.76**	1.23

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6. Analysis

In this section, we analyse the results of our study on EM across the IPO period, testing our four hypotheses regarding changes in EM levels and the influence of bookrunner reputation. We also discuss the implications of our findings, assess the robustness of our regression models, and evaluate the validity, reliability, and comparability of our research.

6.1 Results Analysis

6.1.1 EM Variation over the IPO period

Our first hypothesis examines whether there are increased absolute levels of EM in the year after the IPO compared to the year prior to the IPO. The results from both the MJM and the Kothari model confirm our first hypothesis at the 5% significance level, indicating a higher extent of EM in the year after the IPO compared to the year before on Nordic exchanges.

Our second hypothesis examines whether there are increased levels of income-increasing EM in the year after the IPO compared to the year prior to the IPO. The results from both the MJM and the Kothari model confirm our second hypothesis, indicating more income-increasing EM in the year after the IPO on Nordic exchanges. These results are in line with previous literature (DeFond and Jiambalvo, 1994; Roosenboom et al., 2003).

The findings of heightened EM observed in the year following an IPO on the Nordic exchanges, both in magnitude and direction, can according to existing literature be attributed to two primary reasons: the financial incentives of managers and the reduction in oversight by bookrunners.

Firstly, managers often face significant financial compensation based on earnings in the years after the IPO (Kasznik, 1999; Payne and Robb, 2000). The majority of compensation structures, including bonuses, stock options, and equity grants, are tied to share price performance after the IPO, with lock-up periods often around 6 months (Sletten et al., 2018; Alvarez and Marsal, 2024). DuCharme et al. (2001) finds that income-increasing EM in the year before the IPO is linked to higher initial IPO proceeds, but significantly inferior subsequent stock performance. Thus, managers are incentivised to not engage in income-increasing EM prior to the IPO.

Instead, managers are incentivised to engage in the income-increasing EM in the year after the IPO to increase stock performance and thus meet compensation targets (Sletten et al., 2018).

Secondly, the intense oversight and due diligence typically exerted by bookrunners during the IPO process diminishes significantly once the IPO is completed (Chemmanur and Fulghieri, 1994; Hansen and Torregrosa, 1992). Bookrunners, whose reputations are closely tied to the transparency of the IPO process itself, shift their focus away from the issuer after the offering. This reduction in external monitoring after the IPO creates an environment where managers have greater ability to exert discretion over financial reporting. Together, these factors highlight the dual pressures of managerial self-interest and diminished external accountability that drive EM in the year after the IPO.

The consensus regarding increased EM in the year after the IPO has real-life implications, particularly for investors and financial analysts. The inclination of managers to engage in income-increasing EM during this period poses risks to the reliability of financial information, which is used in investment decision-making (Chi and Gupta, 2009; Healy and Palepu, 2001; Rangan, 1998). This misrepresentation can result in investors overvaluing the company's stock, as shown by Chi and Gupta (2009), leading to long-term stock underperformance when the actual performance surfaces, as shown by Rangan (1998).

The increased EM in the year after the IPO also poses intra-firm risks in the form of increased financing problems. Easley and O'Hara (2004) underline the increased financial costs associated with higher levels of information asymmetry, specifically indicated by Dechow, Sloan and Sweeney (1996) as well as Francis et al. (2005) that show a significantly higher cost of equity and debt attributed to increased levels of EM. The increased cost of capital and undermined investor trust consequently threatens long term growth.

6.1.2 Bookrunner Reputation and EM

Our third hypothesis examines whether there is a negative relationship between *Bookrunner Reputation* and absolute EM in the year prior to the IPO. The results indicate a directional effect as both models show a positive coefficient, indicating an increased absolute level of EM associated with a higher bookrunner reputation. However, the results do not confirm our hypothesis, as the significance levels do not reach the conventional 5 % threshold.

Our fourth hypothesis examines whether there is a negative relationship between *Bookrunner Reputation* and income-increasing EM in the year prior to the IPO. The results do not confirm our hypothesis, as there are no significances at the conventional 5 % threshold. However, the results indicate directional characteristics consistent with previous literature; an inverse relation between reputation and income-increasing EM (Chang2010; Lee and Masulis, 2011; Du *et al.*, 2018).

The findings of an income-decreasing EM relationship with *Bookrunner Reputation* in the year before the IPO can according to existing literature be attributed to the due diligence conducted by bookrunners to protect their reputational capital (Beatty and Ritter, 1986; Carter and Manaster, 1990; Hansen and Torregrosa, 1992; Carter et al., 1998). This consensus is in line with our directional results and can thus be seen to strengthen, in line with Lee and Masulis (2011), Du et al. (2018), and Chang (2010), that reputable bookrunners exert greater scrutiny over financial disclosures during the pre-IPO process due to their certification role and incentive to protect their reputation (Beatty and Ritter, 1986; Chemmanur and Fulghieri, 1994).

The results of our study indicate that from an issuing firms' perspective, the use of reputable bookrunners serve as a mechanism to inform investors about their true quality. This suggests that investors are more capable to differentiate high-quality firms from deceiving ones, ultimately contributing to address the problem of adverse selection ahead of IPOs. Consistent with Francis et al. (2005), Dechow et al. (1996), and Easley and O'Hara (2004), IPO firms can signal prudence through their bookrunner, who serves as a certifier. Thus, in accordance with previous literature, we find indication that underwriter reputation serves a signalling effect, certifying financial prudence of issuing firms conducting IPOs on Nordic exchanges (Carter and Manaster, 1990; Hansen and Torregrosa, 1992; Carter et al., 1998). High-quality firms can thus get access to the lower capital costs available due to the reduced information asymmetry.

However, it is important to acknowledge that our results do not attain statistical significance at the 5% level. Furthermore, we cannot establish a causal relationship between bookrunner reputation and firm-specific attributes based on our study's findings. A spiraling effect may occur as smaller, less reputable bookrunners tend to underwrite smaller firms, which in turn list on less regulated exchanges, offering greater flexibility for EM. Conversely, reputable bookrunners may facilitate larger listings on more regulated exchanges, limiting opportunities for EM. As such, while the directional trends observed offer valuable insights in line with

previous literature, they should be interpreted with caution and not considered definitive nor causal. To address limitations and test the validity of our findings, further robustness tests will be conducted in Section 6.2.

6.1.3 Control Variables

Size exhibits a negative coefficient significant on the 1% level in the absolute EM regression. These results are in line with our predictions and the research conducted by Yangseon Kim (2003) regarding larger companies being more closely scrutinised from outside stakeholders and thus engaging in less absolute terms of EM. Notably, this significance is not present in the signed EM regression.

Growth exhibits consistent, positive coefficients across both signed and absolute EM, with significant results in absolute EM and mixed significance in signed EM. The direction and significance align with our prediction based on the research of Lee et al. (2006), that firms with high revenue growth are more incentivised to engage in both absolute and income-increasing EM. High-growth firms are typically valued at higher multiples, amplifying the impact of EM on their overall valuation.

Leverage exhibits a significant increase in absolute EM, although insignificant in the income-decreasing direction. These results are not consistent with Bassiouny (2016) and DeFond and Jambalvo (1994) who suggest that firms facing higher leverage engage in significantly more income-increasing EM to meet debt covenants and attract further financing.

ROA exhibits no significance at the 5% threshold and indicates varying directions of coefficients across the models. These results do not provide us with significant nor directional interpretations, which is not consistent with the prediction made under 3.4.4, that less profitable firms will engage in income-increasing EM.

Company Age exhibits a positive coefficient across all models, indicating a small directional effect and only significant in the signed MJM at the 10% level. This would indicate that older firms engage in more absolute and income-increasing EM in the period leading up to the IPO, which contradicts our prediction in Section 3.4.4. However, due to the small coefficients and insignificant results we render these suggestions inconclusive.

6.2 Robustness of Regressions

6.2.1 Power of the Regressions

The explanatory power of the model remains modest, with an adjusted R-squared range of 0.325 to 0.303 for the absolute EM and 0.050 to 0.023 for the signed EM. Compared to previous research the same trend is seen with higher power in the absolute EM regressions compared to the signed. However, our signed EM regressions show lower power than previous literature and our absolute EM regressions show higher adjusted R-squared values.

The reason for these inconsistencies is unclear. However, our use of winsorisation to control for extreme outliers, which is not applied consistently across previous research could be one potential reason. Furthermore, our data is sampled from all Nordic exchanges without any firm size constraints, increasing variability in the data. In conclusion, we attribute these diverging adjusted R-squared values to differences in data composition, regression model specifications, and the broader context of IPO markets studied. Future research could explore alternative model specifications or extended sample periods to verify these findings.

6.2.2 Heteroskedasticity

To ensure the validity of our regression analysis, we conduct a Breusch-Pagan (BP) test to examine the presence of heteroskedasticity. The BP test results indicate significant heteroskedasticity in our data as seen in Appendix E, necessitating the use of robust regressions. By employing heteroskedasticity-robust standard errors, we mitigate these issues, ensuring that our coefficient estimates and inference remained reliable and consistent with the assumptions of linear regression.

6.2.3 Separation of Small and Big Firms

As a robustness test for our H1 and H2, we separate the sample into large and small firms based on the sample median of asset size. We then re-analysed the mean DA from the MJM for the IPO period within the two size groups. As highlighted by previous literature and supported by our findings, firm size significantly influences EM in both direction and magnitude (Yangseon Kim, 2003). By dividing the sample into large and small firms, we can test whether differences in organisational structure and EM tendencies affect our results for hypothesis 1 and 2. The results are presented in Appendix F and show differences in magnitude between large and small firms. However, these differences are consistent with our main finding, that both absolute and

signed EM are higher in year 1 compared to year 0. This indicates that the observed patterns of EM in our main results are robust across firms of varying sizes.

6.2.4 Threshold Value on Bookrunner Reputation

To ensure the robustness of our regressions for H3 and H4, we conduct an additional test using a dummy variable to categorise high bookrunner reputation, defined as above the 75th percentile of bookrunner market share. This threshold is chosen to capture the top-performing bookrunners who are most likely to exert a meaningful influence on EM practices, while maintaining sufficient statistical power by retaining a substantial portion of the sample. The 75th percentile provides a logical balance, as the distribution of bookrunner experience reveals a highly right-skewed distribution, with most observations concentrated at lower values and a smaller subset of bookrunners dominating the market with significantly larger deal volumes. By focusing on the upper quartile, this approach isolates the elite bookrunners who represent the high-reputation group, while accounting for the extreme variation inherent in the dataset.

This approach enables us to evaluate whether the relationship between bookrunner reputation and EM remains consistent when treated as a binary classification rather than a continuous variable. This method aligns with previous literature, which applies a threshold to bookrunner reputation (Lee and Masulis, 2011). The results from this test are highly consistent with our main regression, indicating significance at the 10% level for the signed Kothari EM. This underlines that the directional relationship between bookrunner reputation and EM is robust although insignificant. The results from these regressions are shown in Appendix G.

6.3 Validity, Reliability, and Comparability

To ensure the validity of our study, we made purposeful decisions in our sample selection, modelling, and testing procedures. By focusing on IPO firms from multiple Nordic countries, we minimise the impact of market-specific conditions, while ensuring that the firms operate under similar regulatory and economic frameworks (Leuz et al., 2003; Enomoto et al., 2015). Furthermore, we have conducted tests for multicollinearity and used robust standard errors to control for possible heteroskedasticity problems.

The use of the MJM and the Kothari model, both well-established in the EM literature, further reinforces validity. While we acknowledge potential limitations, such as Type I errors in the accrual-based models, these methods are widely recognised as robust proxies for EM (Kothari et al., 2005). Moreover, we applied fixed effects for years and sectors to account for macroeconomic shocks and industry-specific variations, thereby addressing potential sources of bias and enhancing internal validity. However, a general problem with conducting research on EM is the systematic inclusion of noise in the models' classifications of EM.

We have taken extensive measures to ensure the reliability of our findings. All data were cross verified, including comparisons between Capital IQ entries and company prospectuses, while missing or inconsistent entries were excluded from the dataset. Winsorisation at the 1st and 99th percentiles further reduced the influence of extreme outliers, ensuring the consistency of our analysis. The use of multiple EM estimation models, both the MJM and Kothari model, which both produced similar trends, further reinforces the reliability of our results. Additionally, our methodology is fully replicable for future research, ensuring transparency and repeatability.

The comparability of our study is strengthened by our application of established accrual-based EM models, allowing meaningful comparisons with prior studies, such as those by Lee and Masulis (2011) or Roosenboom et al. (2003). By focusing our scope to the Nordic region, we can moderately contribute to the research environment that is focused on Western Europe and the U.S. Furthermore, our study's ten-year timeframe captures a range of macroeconomic conditions, including the COVID-19 pandemic and the implementation of IFRS 16. However, we recognise that this timeframe might limit comparability with studies conducted during different economic cycles. Nonetheless, our findings contribute with insights into EM in an understudied region and establish areas for future comparative research.

7. Suggestions for Future Research

Our findings indicate a significant increase in EM during the year after the IPO. Such EM has been established by prior research to decrease long-term stock returns and from a shareholder's perspective, such EM should thus be minimised. Since managerial incentives have been established as a key driver of EM, future research should focus on exploring corporate governance structures and managerial incentives to deter EM by managers after the IPO. Such studies would provide actionable insights into reducing EM and improving post-IPO firm performance.

Additionally, future research should focus on developing a more comprehensive bookrunner reputation proxy that goes beyond traditional metrics such as market share or deal volume. While these measures are commonly used in the literature, they capture only a limited aspect of an underwriter's overall reputation. A multi-dimensional reputation index could incorporate qualitative factors such as underpricing consistency, post-IPO stock stability, and client retention rates. Such a holistic scale could offer deeper insights into how bookrunner reputation mitigates EM, better aligning empirical models with real-world perceptions of underwriter credibility and trustworthiness in financial markets. This approach could enhance the analytical depth of future research by extending the examination of bookrunner reputation beyond the context of EM literature.

A further avenue for future research could explore the potential causal relationship between bookrunner reputation and firm-specific characteristics, such as firm size, exchange size, and voluntary financial disclosures, some commonly used as control variables in IPO studies. While prior research, including our study, assumes that reputable bookrunners influence EM through monitoring and certification roles, it remains unclear whether such bookrunners actively select firms based on these characteristics. Future studies could examine whether bookrunners prefer firms with specific profiles, such as larger, more established companies or those operating in less volatile industries, when managing IPOs.

8. Conclusion

In this study, we investigate the dynamics of EM around IPOs in the Nordic exchanges and the effect that bookrunner reputation may have in mitigating such behaviours. Using two established accrual-based models, the MJM and the Kothari model, we examined IPOs across Sweden, Denmark, Norway and Finland over a ten-year period. This study addresses a regional gap in the literature and provides an understanding to the dynamics behind when EM occurs and the mitigating effect of bookrunner reputation.

We find that EM levels, both in magnitude and direction, escalate after the IPO. Managers appear to present deflated earnings prior to the IPO, followed by significantly higher levels of income-increasing EM the year after. These findings align with prior research, showing that the transition to public ownership intensifies pressures and managerial incentives, driving more aggressive EM.

When exploring the relationship between bookrunner reputation and EM, our findings are suggestive but inconclusive. Although our results fail to reach conventional levels of statistical significance, we find a negative directional effect, suggesting that more reputable bookrunners deter income-increasing EM to a greater extent than less reputable ones. One implication of such a relationship is that issuing firms using bookrunners with higher reputation can signal financial prudence to the market, although we acknowledge the lack of robust statistical support.

We believe that our study provides valuable insights into the timing of EM in Nordic IPOs and the potential signalling mechanism of bookrunner reputation to enhance financial reporting transparency. However, given the limited significance of the latter, future research should consider developing a more comprehensive proxy for bookrunner reputation to better reflect real-world dynamics and facilitate findings not only within EM literature. From a shareholder's perspective, future research should explore optimal corporate governance structures and managerial incentives to deter the long-term value destructive practice of EM after the IPO.

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Appendix

Appendix A.

Variable Definitions

Variable Name	Definition	Data Source
<i>NI</i>	Net Income	Capital IQ
<i>CFFO</i>	Cash flow from operations	Capital IQ
<i>ΔRev</i>	Revenue in year t minus revenue in year t-1	Capital IQ
<i>ΔRec</i>	Account receivables in year t minus account receivables in year t-1	Capital IQ
<i>PPE</i>	Property, plant, and equipment	Capital IQ
<i>TA</i>	Total accruals	
<i>DA</i>	Discretionary accruals, referred to as earnings management in our thesis	
<i>NA</i>	Normal accruals, arising from business operations	
<i>EM</i>	Earnings management, captured by the models as discretionary accruals, interchangeably used with earnings manipulation	

Appendix B.

T-test for mean differences between the MJM and the Kothari model classification of EM

Earnings Management	Mean Difference [T-stat] (MJM – Kothari)
Absolute Values	-.014 [-5.04]***
Signed Values	-.037 [-12.09]***

Appendix C.

Pearson Correlations Matrix — (Upper row is absolute values and lower in red is signed)

	<i>MJM</i>	<i>Kothari</i>	<i>Bookrunner Reputation</i>	<i>Size</i>	<i>Growth</i>	<i>Leverage</i>	<i>ROA</i>	<i>Issuer Age</i>
<i>MJM</i>	1							
<i>Kothari</i>	0.91*** 0.95***	1						
<i>Bookrunner Reputation</i>	-0.25*** -0.06	-0.27*** -0.06	1					
<i>Size</i>	-0.48*** 0.01	-0.47*** 0.03	0.63***	1				
<i>Growth</i>	0.23*** 0.19***	0.26*** 0.16***	-0.17***	-0.17***	1			
<i>Leverage</i>	-0.01 -0.08	-0.03 -0.07	0.21***	0.25***	-0.06	1		
<i>ROA</i>	-0.24*** 0.06	-0.14** 0.07	0.25***	0.28***	-0.08	-0.1*	1	
<i>Issuer Age</i>	-0.28*** 0.07	-0.25*** 0.08	0.21***	0.45***	-0.18***	0.02	0.24***	1

*Significance level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$*

Appendix D.

VIF Test for Multicollinearity

	Tolerance	VIF
<i>Bookrunner Reputation</i>	0.61	1.63
<i>Size</i>	0.48	2.10
<i>Growth</i>	0.88	1.14
<i>Leverage</i>	0.83	1.20
<i>ROA</i>	0.82	1.23
<i>Company Age</i>	0.72	1.40

Appendix E.

Breusch–Pagan Test for Heteroskedasticity

Dependent Variable	Model	BP-Statistic	Degrees of Freedom	p-value
Absolute EM	MJM	60.22	6	0.0000
Absolute EM	Kot	72.57	6	0.0000
Signed EM	MJM	108.17	6	0.0000
Signed EM	Kot	94.00	6	0.0000

Appendix F.

Large Firm Threshold — Robustness Test for Hypothesis 1 and 2 [T-stat]

Earnings Management	Pre-IPO (y0)	Post-IPO (y1)	Difference (y1 – y0)	Post-IPO (y2)
Absolute Kothari Model	.070 [9.83]***	.115 [15.43]***	.045 [4.83]***	.100 [14.76]***
Absolute MJM	.079 [10.27]***	.084 [12.14]***	.005 [0.59]	.074 [11.99]***
Signed Kothari Model	-.000 [-0.00]	.052 [4.74]***	.052 [4.02]***	.076 [9.04]***
Signed MJM	-.036 [-3.87]***	-.011 [-1.13]*	.026 [2.00]**	-.015 [-1.84]*
Number of observations	165	165	165	165

Small Firm Threshold — Robustness Test for Hypothesis 1 and 2 [T-stat]

Earnings Management	Pre-IPO (y0)	Post-IPO (y1)	Difference (y1 – y0)	Post-IPO (y2)
Absolute Kothari Model	.172 [14.19]***	.255 [13.20]***	.083 [4.11]***	.160 [12.99]***
Absolute MJM	.187 [15.05]***	.240 [11.12]***	.053 [2.38]**	.124 [11.71]***
Signed Kothari Model	-.005 [-0.27]	.014 [0.52]	.019 [0.59]	-.019 [-1.08]
Signed MJM	-.043 [-2.30]**	.036 [1.28]*	.080 [2.43]**	-.033 [-2.31]**
Number of observations	166	166	166	166

Appendix G.

Bookrunner Reputation with Threshold — Robustness Test for Hypothesis 3 and 4

Pre-IPO year [Robust standard error]

Dependent Variable = Absolute EM

	MJM	Kothari
<i>HIGH Reputation</i>	.014 [0.019]	.009 [0.019]
<i>Size</i>	-.030*** [0.005]	-.030*** [0.005]
<i>Growth</i>	.009 [0.005]	.011** [0.005]
<i>Leverage</i>	.066** [0.031]	.066** [0.029]
<i>ROA</i>	-.019 [0.037]	.022 [0.038]
<i>Company Age</i>	.001 [0.006]	.006 [0.006]
<i>Constant</i>	.211*** [0.063]	.191*** [0.064]
<i>Year FE</i>	YES	YES
<i>Industry FE</i>	YES	YES
<i>Adjusted R²</i>	0.324	0.302
<i>F-Statistic</i>	5.40***	5.05***

Dependent Variable = Signed EM

	MJM	Kothari
<i>HIGH Reputation</i>	-.039 [0.027]	-.047* [0.027]
<i>Size</i>	.001 [0.07]	.005 [0.007]
<i>Growth</i>	.019*** [0.007]	.016** [0.006]
<i>Leverage</i>	-.027 [0.054]	-.026 [0.051]
<i>ROA</i>	.021 [0.108]	.035 [0.068]
<i>Company Age</i>	.017 [0.010]	.014 [0.011]
<i>Constant</i>	-.049 [0.070]	-.045 [0.068]
<i>Year FE</i>	YES	YES
<i>Industry FE</i>	YES	YES
<i>Adjusted R²</i>	0.055	0.032
<i>F-Statistic</i>	2.02***	1.38

Significance level:

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

AI Appendix

During the preparation of this thesis, two AI-based large language models were utilised: ChatGPT 4o and ChatGPT o1-preview. These tools were employed strictly for enhancing spelling and grammar. Drafts of the thesis were inputted into these AI platforms to receive suggestions on grammatical corrections, punctuation, and spelling inconsistencies. It is important to note that these tools were not used for sourcing information, generating content, or formulating arguments. All references and sources cited within the thesis were identified and verified independently through manual research.

The use of ChatGPT 4o and o1-preview contributed to improving the clarity and readability of the thesis. By providing immediate feedback on linguistic errors and stylistic issues, these tools enabled the refinement of the text to a higher standard of academic writing. This allowed for a more precise and effective communication of research findings and arguments. Furthermore, the AI model was used to assist with coding in Stata, specifically for generating code, solving errors, and ensuring the accuracy of our statistical analyses. However, there are several potential risks associated with the use of AI.

There was a risk of becoming overly dependent on AI suggestions, which might overlook context-specific nuances or introduce errors. To mitigate this, all AI-generated suggestions were critically reviewed to ensure they aligned with the intended meaning.

Furthermore, AI tools like ChatGPT tend to "hallucinate", generating plausible but incorrect or nonsensical information. This limitation necessitated vigilant review of all AI-generated suggestions to ensure that no inaccurate content was introduced into the thesis.