Earnings Management Around IPOs in Hot and Cold Markets

Evidence on Long-Run Performance from Sweden, 1990–2025

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Abstract

The long-run underperformance of IPO firms remains one of the most debated puzzles in financial markets. Prior research links this pattern to both earnings management around the listing and market timing during periods of strong investor sentiment, but these explanations are often studied separately. Building on agency theory, information asymmetry, capital market timing theory, and Lin et al. (2021), this thesis examines Swedish IPOs from 1990 to 2025 to assess whether firms exhibit income-increasing discretionary current accruals, whether this differs between hot and cold markets, and whether it relates to long-run performance. The study estimates discretionary current accruals using a modified Jones-type model and measures three-year buy-and-hold abnormal returns against both the SIX Return Index and matched firms. The findings provide qualified evidence of income-increasing accruals in the IPO fiscal year, but do not show that hot-market IPOs engage in more aggressive earnings management. Instead, long-run underperformance is concentrated among firms going public in hot markets, regardless of earnings-management classification. Overall, earnings management appears relevant but conditional, while market sentiment plays a more central role in explaining long-run IPO performance in Sweden.

Keywords:

Initial public offerings, Earnings management, Long-run performance, Market sentiment

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1. Introduction

The long-run underperformance of firms that complete an initial public offering (IPO) stands as one of the most debated puzzles in financial markets (Lin et al., 2021). Newly listed companies consistently deliver weaker returns than comparable non-issuing firms in the years following their listing, a pattern documented across markets and time (Ritter, 1991; Levis, 1993; Loughran and Ritter, 1995; Roosenboom et al., 2003; Pastor-Llorca and Poveda, 2006; Westerholm, 2006). This pattern is important because IPOs are a central mechanism through which firms gain access to public equity capital and broaden their investor base (Chemmanur and Fulghieri, 1999; Ritter and Welch, 2002). Persistent post-IPO underperformance also raises a broader pricing question. If markets efficiently incorporate available information, newly listed firms should not systematically underperform comparable firms after the offering (Fama, 1970; Ritter, 1991; Loughran and Ritter, 1995).

Two primary explanations have dominated the academic debate on this underperformance. The first points to earnings management, arguing that firms inflate reported performance in order to appear more valuable at the time of going public. Prospective investors must value a firm with limited public information which is mainly due to no prior trading history and no established market price, making information asymmetry particularly severe around IPOs (Rock, 1986; Beatty and Ritter, 1986; Ljungqvist, 2007). Because IPO firms are difficult to value and investors rely heavily on accounting information, managers may have incentives to use accruals to present stronger reported performance before or during the listing process (Teoh et al., 1998a; Chang et al., 2010). Teoh et al. (1998a) show that IPO firms with unusually high accruals in the IPO year experience weaker stock return performance over the following three years. Later studies provide supporting evidence that earnings management can help explain both IPO pricing and subsequent underperformance (DuCharme et al., 2001; Roosenboom et al., 2003; Boulton et al., 2011).

The second explanation instead emphasizes market timing and investor sentiment. IPOs tend to cluster in periods of strong investor demand and heightened optimism, often referred to as “hot markets” (Ibbotson and Jaffe, 1975; Ritter, 1984; Ibbotson et al., 1994). Under hot market conditions, strong investor demand can push IPO valuations above levels that are sustainable in the long-run (Ritter, 1991; Helwege and Liang, 2004). Investors may rely more on optimism than on firm fundamentals when pricing new issues, allowing some firms to go public at temporarily elevated valuations (Wang and Yung, 2018). As more information becomes available after listing, initially optimistic valuations may be corrected towards fundamental value and contribute to weaker long-run performance (Ritter, 1991; Helwege and Liang, 2004; Wang and Yung, 2018).

While both explanations have received substantial empirical support, less is known about how they relate to one another and whether their relevance varies with the market conditions under which firms go public. A firm’s willingness to engage in earnings management may not be driven solely by the IPO event itself. It can also be shaped by the market conditions under which

the firm decides to go public. In hot markets, strong sentiment-driven demand and elevated retail participation reduce investor scrutiny, making accrual-based reporting choices less likely to be detected and priced at issuance (Derrien, 2005; Ljungqvist et al., 2006). If hot markets amplify the incentive to manage earnings or reduce the likelihood that such behaviour is detected, then examining either explanation in isolation risks attributing to one what is partly driven by the other (Lin et al., 2021; Kothari and Warner, 2007). Lin et al. (2021) also provide direct evidence of this interaction in their study of the U.S. IPO market between 1970 and 2008. They find that earnings management is associated with long-run underperformance in hot market conditions, however not in cold markets. Their findings suggest that market conditions shape the relevance of earnings management for post-IPO returns and, while Lin et al. (2021) provide important evidence from the U.S. IPO market, it remains unclear whether the same interaction appears in smaller European markets such as Sweden, where IPO activity is more concentrated and the market environment differs. Prior Swedish and Nordic IPO research has mainly focused on underpricing and long-run stock performance in itself, with Westerholm (2006) providing one of the broader Nordic analyses. Less is known about whether Swedish IPO firms manage earnings before listing, whether such behaviour varies across market conditions, and whether discretionary current accruals help explain long-run aftermarket performance.

We address this gap by connecting reporting behaviour around the IPO with the market conditions under which the firm goes public and the stock performance that follows. We do so in the Swedish IPO market from 1990 to 2025. First, we test whether firms exhibit accrual-based earnings management around the IPO. We then examine whether this reporting behaviour differs across hot and cold issuance markets. Finally, we test whether discretionary current accruals around the IPO are associated with weaker long-run stock performance, and if this relation is stronger in hot markets compared to cold markets.

Swedish equity markets are well suited for a study like ours as they combine active IPO markets with clear variation in issuance conditions over time. Listing activity has historically occurred in waves, allowing IPOs issued in hot and cold markets to be compared within the same national setting (Nasdaq, 2025). Sweden also has a developed equity market with meaningful participation from both institutional and retail investors, making it a relevant setting for examining whether market conditions and investor scrutiny shape accrual-based earnings management before IPOs (OECD, 2026).

Our contribution is threefold. First, we build on the earnings management literature by examining whether discretionary current accruals around IPOs are evident in a Swedish setting. Prior studies document similar patterns in several markets, but Nordic IPO research has mainly focused on underpricing and long-run returns rather than pre-IPO reporting behaviour (Westerholm, 2006). Second, we provide updated evidence on IPO-related earnings management, using an updated sample that extends to 2025. This brings the analysis beyond the periods covered in much of the earlier literature and captures recent issuance cycles, including

the noteworthy IPO activity in 2021, and the subsequent slowdown in the years following (Nasdaq, 2025). Third, we build on Lin et al. (2021) and use a Swedish setting to explore whether firms that engage in earnings management around the IPO event experience weaker long-run stock performance, and whether this relation is stronger among firms that went public during hot issuance markets. We thereby contribute to the debate on IPO underperformance by adding valuable evidence regarding the relative roles of earnings management, market sentiment and the interaction between the two.

Against this background, we define the purpose of our thesis as:

> **Purpose:** Examine earnings management around Swedish IPOs, its variation across hot and cold markets, and its relation to long-run post-IPO performance.

The thesis proceeds as follows. Section 2 clarifies the institutional setting and key concepts, while Section 3 reviews the literature, develops the theoretical framework, and presents the hypotheses. Section 4 describes the data and methodology, followed by the empirical results in Section 5. Section 6 discusses the findings in relation to the hypotheses and prior literature, and Section 7 concludes the thesis by outlining the main contributions, limitations, and suggestions for future research.

2. Institutional Scope and Key Concepts

Before turning to the literature, it is useful to clarify the setting and main concepts used throughout this thesis. We do so to establish a common starting point and to make subsequent sections easier to follow.

Our study focuses on firms that completed an initial public offering on Swedish equity markets between January 1990 and December 2025. The sample includes IPOs on Nasdaq Stockholm, Nasdaq First North, and NGM Equity. Nasdaq Stockholm and NGM Equity are regulated markets, while Nasdaq First North is a multilateral trading facility with lighter admission requirements (Nasdaq, 2026). These differences are relevant, but excluding the growth markets from consideration would result in an incomplete analysis of IPOs in Sweden as many new listings take place outside the main market. For this reason, the thesis includes all three markets. We include only first-time public listings and exclude transfer listings, re-listings, spin-offs, and acquisition-related listings, since these transactions involve different information environments and listing incentives and do not represent pure IPOs (Roosenboom, 2007).

We define some of the main terms used in the thesis as:

Accruals: Accounting adjustments that recognise revenues and expenses when they are earned or incurred rather than when cash is received or paid (Dechow, 1994).

Earnings management: The use of managerial judgement in financial reporting to influence reported earnings (Healy and Wahlen, 1999).

Hot (Cold) market: A period with relatively high (low) IPO activity and strong (weak) investor demand (Ibbotson and Jaffe, 1975).

3. Literature Review and Theoretical Framework

This section establishes the theoretical and empirical foundations on which the study rests. The literature review opens with a discussion of earnings management, its definition, and the measurement models researchers have developed to detect it, before turning to the evidence on earnings management in IPO settings. The review then examines the cyclical nature of IPO markets by considering the emergence, definition, and measurement of hot and cold issuance periods in prior research, as well as how market sentiment may shape both the composition of firms that choose to go public and the reporting incentives those firms face. The review then connects earnings management and market conditions to the long-run underperformance of IPO firms. Building on this evidence, the theoretical framework draws on agency theory, information asymmetry, and capital market timing to develop the hypotheses guiding our empirical analysis.

3.1. Literature review

3.1.1. Earnings Management: Definition and Measurement

Earnings management is commonly understood as the use of managerial judgement in financial reporting to influence reported earnings (Healy and Wahlen, 1999). This concept encompasses accounting choices made within the discretion allowed by reporting standards and therefore does not, by itself, imply fraud. Dechow and Skinner (2000) emphasise that the boundary between legitimate accounting judgement and opportunistic reporting is often difficult to draw. They also distinguish accrual-based earnings management, which affects reported earnings without immediate cash-flow consequences, from real activities manipulation, which alters underlying business decisions. The present study focuses on accrual-based earnings management, consistent with the dominant approach in prior IPO research, while treating real activities manipulation as a related but distinct phenomenon.

A central challenge in empirical earnings management research is that managerial intent cannot be observed directly and must instead be inferred from reported accounting outcomes and the surrounding economic context (Dechow and Skinner, 2000). The dominant empirical approach to detecting earnings management relies on decomposing total accruals into a non-discretionary component, reflecting accruals expected from normal business activity, and a discretionary component, interpreted as a proxy for abnormal reporting choices (Healy, 1985; Kothari et al., 2005). The method is based on the notion that accrual accounting inherently involves estimation and judgement. When a firm recognises revenue before cash is received, records an expense before it is paid, or adjusts the carrying value of an asset, it makes an accounting choice that

affects reported earnings without an immediate cash flow consequence. Because these choices are partially discretionary, they create scope for managers to influence reported results while still applying accepted accounting rules (Healy and Wahlen, 1999; Dechow and Skinner, 2000). Accordingly, earnings management research depends critically on the researcher's ability to distinguish discretionary accruals from accruals generated by normal business activity. Model choice therefore plays an important role in the credibility of the findings (Kothari et al., 2005).

The earliest approaches to estimating discretionary accruals relied on total accruals, or changes in total accruals, as proxies for potential earnings management. Healy (1985) estimated discretionary accruals as the average of past total accruals, while DeAngelo (1986) used changes in total accruals as the proxy in a management buyout context. Jones (1991) criticizes these approaches for assuming that non-discretionary accruals remain stable over time, even though accruals may vary with changes in firms' underlying economic circumstances. To address this limitation, Jones (1991) introduced the first econometric model explicitly designed to separate discretionary from non-discretionary accruals. The Jones model separates accruals into discretionary and non-discretionary components by estimating the normal level of total accruals through a regression on changes in revenues and gross property, plant, and equipment, with the residual component interpreted as discretionary accruals. The underlying assumption highlighted by Jones (1991) is that changes in revenues and capital investment capture the normal level of accruals, so that any remaining unexplained variation reflects the discretionary component. This assumption is contestable when firms differ materially from the peer group used to estimate normal accruals, as heterogeneity in accrual-generating processes may distort discretionary-accrual estimates (Jackson, 2018). This concern is particularly relevant in the IPO setting, where unusually strong growth and IPO-related working-capital adjustments may be classified as discretionary accruals even when they reflect normal economic activity rather than deliberate earnings management (Ball and Shivakumar, 2008).

Dechow et al. (1995) identify an important limitation of the Jones model, namely that revenue changes in the original specification include credit sales, which can themselves be manipulated through early revenue recognition or aggressive receivables management. Their modified Jones model addresses this concern by adjusting revenue changes for changes in receivables, thereby reducing the risk that managed revenues are incorporated into the estimate of non-discretionary accruals. Using simulation-based tests in which predetermined amounts of earnings management are introduced into actual financial statement data, Dechow et al. (1995) show that the modified Jones model provides greater statistical power than the original Jones model in detecting earnings management, particularly when manipulation occurs through credit sales. The modified Jones framework has subsequently become one of the most widely used approaches in accrual-based earnings management research (Kothari et al., 2005; Dechow et al., 2010).

Kothari et al. (2005) further show that discretionary accrual estimates can be sensitive to firm performance. Firms with unusually strong or weak performance may exhibit unusual accruals for

reasons unrelated to opportunistic reporting, which can complicate inference. Their performance-matched approach is designed to reduce this concern by benchmarking discretionary accruals against firms with similar return on assets. However, performance matching does not eliminate the broader limitations of accrual-based models, particularly those arising from model misspecification or from a failure to account for incentives that are specific to the research setting. Its effectiveness also depends on whether the matched control firm provides an appropriate benchmark against which the treated firm's accruals can be evaluated.

Despite these methodological refinements, accrual-based models remain subject to an important limitation. They rely on an accurate specification of the non-discretionary component of accruals, since unexplained residual variation is interpreted as discretionary behaviour. When the model fails to capture relevant economic determinants of accruals, such as changes in business conditions, firm growth, or industry dynamics, the resulting residuals may reflect not only managerial discretion but also measurement error and genuine economic variation (Kothari et al., 2005; Jackson, 2018). Richardson et al. (2005) reinforce this concern by documenting that total accruals contain a significant component attributable to accrual estimation errors that are correlated with firm growth and investment intensity, thereby supporting a cautious interpretation of discretionary accrual estimates. Ball and Shivakumar (2008) make a related critique explicitly in the context of equity issuance, arguing that accrual behaviour around IPOs may partly reflect the economic fundamentals of issuing firms rather than deliberate manipulation. Dechow et al. (2010) provide a comprehensive review of earnings quality research and reach a similar conclusion, noting that distinguishing opportunistic reporting from economically motivated accrual choices remains one of the central unresolved challenges in the literature. Nevertheless, these concerns do not eliminate the empirical relevance of accrual-based approaches. Discretionary accruals remain widely used in earnings management research, and carefully specified models can provide informative evidence about abnormal reporting behaviour, particularly when known sources of bias are explicitly addressed (Kothari et al., 2005).

3.1.2. Earnings Management Around IPOs

The transition from private to public ownership creates a distinctive reporting environment and a set of incentives that have made IPOs an important setting for earnings management research (Teoh et al., 1998a; DuCharme et al., 2001; Ball and Shivakumar, 2008). This section reviews the empirical evidence on accrual-based earnings management around IPOs, evaluates the methodological approaches and assumptions underlying key studies, and identifies the main areas of agreement and disagreement that motivate the present study.

A foundational contribution to this literature is Teoh et al. (1998a), who examine a sample of US IPOs and find that issuing firms report abnormally high discretionary current accruals in the offering year, estimated using a modified Jones model applied cross-sectionally within industry groups. Their central finding is that firms in the highest quartile of IPO-year discretionary current accruals subsequently experience significantly worse three-year buy-and-hold stock

returns than those in the lowest quartile. Their study established an influential framework in which discretionary current accruals are interpreted as a proxy for reporting choices around the IPO, while subsequent abnormal returns capture the market consequences of those choices. DuCharme et al. (2001) extend this argument by showing that higher pre-IPO abnormal accruals are associated with higher initial firm value and weaker subsequent stock returns. Together, these studies support the view that income-increasing accruals around the offering may contribute to both IPO valuation and later underperformance.

Evidence from other institutional settings broadly points in the same direction. Roosenboom et al. (2003) document earnings management around Dutch IPOs, while Ahmad-Zaluki et al. (2007) report income-increasing discretionary accruals among Malaysian issuers, arguing that weaker legal enforcement and less developed capital markets amplify the scope for opportunistic reporting. Alhadab et al. (2016) further show that accrual-based earnings management differs across UK listing environments, with higher levels among firms listing on the more lightly regulated AIM market than among firms listing on the Main Market. More recently, Premti and Smith (2020), using a large international sample, find significantly positive discretionary accruals both before and after the IPO and show that such behaviour is less pronounced in countries with stronger rule of law. Taken together, these studies show that earnings management around IPOs has been documented across several markets, while also suggesting that its prevalence may vary with the strength of the surrounding institutional environment.

Despite the extensive evidence consistent with opportunistic reporting, the interpretation of discretionary accruals around IPOs remains subject to debate. Ball and Shivakumar (2008) present one of the most influential challenges to the opportunism view, arguing that elevated accruals around IPOs may reflect the economic characteristics of issuing firms rather than deliberate earnings manipulation. In particular, rapid growth, revenue expansion, and increased investment in working capital can generate positive accruals that conventional models may misclassify as discretionary, especially when IPO firms are benchmarked against more mature industry peers. Their critique therefore cautions against interpreting abnormal accruals mechanically as direct evidence of earnings management.

Overall, prior research provides substantial evidence that abnormal accruals are elevated around IPOs and are often associated with valuation and post-issue performance. However, the literature remains divided on whether these accruals primarily reflect opportunistic financial reporting or the underlying economic characteristics of firms entering public markets.

3.1.3. IPO Market Cycles: Hot and Cold Markets

IPO activity is strongly cyclical, with periods of unusually high issuance and elevated initial returns commonly described as hot markets, and periods of lower issuance activity referred to as cold markets (Ibbotson and Jaffe, 1975; Ritter, 1984). Ritter (1991) further shows that firms

going public during high-volume periods experience particularly weak long-run stock performance, linking IPO market conditions to subsequent post-issue performance.

The literature offers several explanations for these cycles. One view, rooted in signaling and information asymmetry, suggests that hot markets arise when adverse selection costs are relatively low and higher-quality firms can access public equity on more favourable terms. A competing view emphasises market timing and investor sentiment. Under this interpretation, firms strategically time offerings to periods of elevated investor demand and high valuations, and long-run underperformance reflects the subsequent correction of sentiment-driven overvaluation embedded in offer prices (Loughran and Ritter, 1995; Baker and Wurgler, 2002). Yung et al. (2008) provide a complementary adverse-selection explanation, arguing that stronger investment opportunities bring more firms to market, including issuers of more uncertain quality, thereby increasing dispersion in firm quality, underpricing, and subsequent delisting risk.

Empirical evidence generally confirms that market conditions matter, while leaving the underlying mechanism contested. Lowry (2003) finds that IPO volume is driven primarily by firms' demand for capital and investor sentiment, with adverse selection playing a more limited quantitative role. Helwege and Liang (2004) similarly conclude that hot and cold IPO markets differ more in the quantity of firms going public than in observable issuer characteristics, which they interpret as more consistent with investor optimism than with systematic shifts in firm quality.

Investor sentiment also provides a direct link between hot markets and pricing outcomes. Ljungqvist et al. (2006) develop a model in which sentiment-driven demand increases underpricing and contributes to hot-market issuance. Consistent with this argument, Derrien (2005) finds that stronger retail demand during the offering period is associated with higher initial returns and weaker subsequent performance. These findings support the view that hot market valuations may partly reflect temporary investor optimism rather than fundamentals alone.

The measurement of market heat is therefore important. Prior studies commonly define hot and cold markets using issuance volume over a specified time window, while some also consider underpricing as a pricing-based indicator of market conditions (Helwege and Liang, 2004; Yung et al., 2008). Yung et al. (2008) classify quarters using a four-quarter moving average of IPO activity relative to its historical benchmark, a methodology that provides the foundation for the market-state classification employed in the present study.

The distinction between hot and cold markets is also relevant because reporting incentives may vary across market conditions. Premti and Madura (2013) argue that some firms may proceed with an IPO under cold market conditions because they face immediate financing needs, anticipate weaker future earnings, or have already engaged in earnings management and may therefore be unable to postpone the offering until market conditions improve. Consistent with

this reasoning, they find that firms listing during cold periods are more likely to exhibit pre-IPO earnings management than firms going public in hot markets. Their findings indicate that incentives to present favourable financial performance may become particularly pronounced when firms seek to attract investors in less favourable issuance conditions.

Finally, Lin et al. (2021) provide the most direct recent evidence linking market conditions and earnings management in explaining IPO long-run performance. They find that hot-market IPOs underperform even when firms do not engage in earnings management, whereas earnings management loses explanatory power among cold-market IPOs. Their results suggest that market conditions and reporting behaviour should be studied jointly rather than as isolated explanations of IPO underperformance. The present study follows this logic by examining whether earnings management around Swedish IPOs varies across market states and whether these dimensions jointly relate to long-run post-IPO performance.

3.2. Theoretical Framework

Two theoretical perspectives are drawn upon. The first combines agency theory and information asymmetry to explain why managers have both the incentive and the opportunity to manage earnings around equity issuance. The second draws on capital market timing to explain why these incentives may vary systematically with market conditions and why both earnings management and market climate may predict long-run post-IPO performance.

3.2.1. Agency Theory and Information Asymmetry

The theoretical foundation for earnings management around IPOs rests on the intersection of two well-established frameworks. Agency theory, developed most formally by Jensen and Meckling (1976), holds that when ownership and control are separated, managers may pursue actions that serve their own interests rather than those of shareholders. In the IPO context, managers and pre-IPO shareholders have strong incentives to maximise the offer price, since a higher price translates directly into greater proceeds from the sale of shares and into the valuation of retained equity stakes. Because reported earnings are a central input in investor valuation models, the flexibility inherent in accrual accounting provides a mechanism through which reported performance can be temporarily elevated within the bounds of accounting standards (Healy and Wahlen, 1999). From this perspective, pre-IPO earnings management is not an aberration but a predictable consequence of the incentive structure surrounding equity issuance.

Information asymmetry amplifies these incentives considerably. Rock (1986) demonstrates that IPO markets are characterised by severe information asymmetry between insiders and outside investors, who must rely primarily on prospectus disclosures to form their valuations. Because firms going public typically lack an extended public reporting history, financial statements carry unusual weight in the pricing process, and investors have limited ability to independently verify the quality of reported earnings. Titman and Trueman (1986) show that accounting information

disclosed at the time of the IPO is particularly influential in determining offer prices, while Beatty and Ritter (1986) demonstrate that ex ante uncertainty about firm value is positively related to underpricing, suggesting that investors compensate for informational disadvantage through pricing rather than through superior evaluation of disclosures. Together, agency theory and information asymmetry create conditions that are particularly conducive to accrual-based earnings management.

3.2.2. Capital Market Timing

While agency theory and information asymmetry explain why earnings management incentives exist around IPOs generally, they do not explain why the magnitude of these incentives might vary across different market environments. Capital market timing theory provides this additional dimension. The core argument, developed by Loughran and Ritter (1995) and formalised by Baker and Wurgler (2002), is that firms strategically time equity issuance to coincide with periods of elevated market valuations and strong investor demand. Hot IPO markets represent precisely such windows of opportunity, and firms going public during these periods face amplified incentives to present strong reported performance, since inflated earnings translate more directly into higher offer prices when market sentiment is already at a high level.

Market conditions also affect the opportunity for earnings management through their influence on investor scrutiny. Derrien (2005) and Ljungqvist et al. (2006) document elevated retail investor participation during hot markets, and retail investors are generally less analytically rigorous than institutional investors in their evaluation of financial disclosures. When the marginal IPO investor is driven by sentiment rather than fundamental analysis, the probability that accrual-based distortions are detected and priced at issuance is reduced. This opportunity channel, operating alongside the incentive channel, is what makes hot markets particularly likely to be associated with elevated earnings management. Cold markets, by contrast, tend to attract more institutional participation and greater analytical scrutiny, constraining opportunistic reporting even where some incentive persists (Premti and Madura, 2013).

Capital market timing theory also provides the link between market conditions and long-run performance. If firms exploit investor overoptimism at issuance, offer prices will systematically exceed fundamental value during hot periods, and long-run returns will reflect the gradual correction of this overvaluation.

Taken together, these two theoretical perspectives generate a coherent set of predictions. Agency theory and information asymmetry predict that managers will engage in income-increasing earnings management around IPOs, and that investors will initially fail to account for accrual-based distortions. Capital market timing theory predicts that these incentives will be stronger in hot markets, where payoffs are larger and scrutiny is weaker, and that both earnings management and market conditions will predict weaker long-run stock performance as the initial mispricing unravels. We build on these in the following section.

3.3. Hypothesis Development

Drawing on the literature review and theoretical framework, we develop a set of testable predictions organised around two stages of empirical investigation. First, whether accrual-based earnings management is present around Swedish IPOs and whether it varies with market conditions. Following that, we assess whether discretionary current accruals around IPO and market conditions are jointly associated with long-run stock performance.

Firms approaching an IPO face a clear set of reporting incentives, as the offering represents a setting in which information asymmetry between firm insiders and prospective investors is particularly severe due to the absence of a public trading history and established disclosure record (Rock, 1986; Ljungqvist, 2007). Investors rely heavily on reported accounting numbers in their valuations, as these are among the few sources of information available before listing. Managers and pre-IPO shareholders may therefore use the discretion available within accrual accounting to present stronger reported performance around the offering (Healy and Wahlen, 1999). Prior research documents abnormally high discretionary current accruals around IPOs across a range of institutional settings (Teoh et al., 1998a; Roosenboom et al., 2003; Premti and Smith, 2020). If Swedish IPO firms face similar incentive structures and operate in a comparable institutional environment, the same pattern should be observable:

> **H1a:** Firms going public in Sweden exhibit income-increasing discretionary current accruals around the IPO.

However, the reporting incentives described above are unlikely to be the same across hot and cold IPO markets. In hot issuance markets, elevated investor sentiment and strong demand for IPOs may both increase the payoff from presenting stronger reported performance and reduce the scrutiny applied to financial disclosures (Derrien, 2005; Ljungqvist et al., 2006). Firms listing during hot periods should therefore exhibit more pronounced discretionary current accruals:

> **H1b:** Income-increasing discretionary current accruals are more pronounced for firms going public during hot issuance markets than for firms going public during cold markets.

Earnings management and market conditions have each been proposed as explanations for long-run IPO underperformance, but how they interact remains relatively unexplored. Lin et al. (2021) provide evidence that the two are linked, showing that earnings management predicts underperformance among hot-market IPOs but not among cold-market IPOs in their US sample. In hot markets, sentiment-driven demand may push valuations above fundamental levels (Baker and Wurgler, 2002) while simultaneously reducing investor attention to accounting quality (Derrien, 2005; Ljungqvist et al., 2006), allowing accrual-based distortions to compound already

elevated prices. As the initial mispricing thereby becomes larger, the subsequent correction is also likely to be more severe. This leads to the final hypothesis:

> **H2:** Higher discretionary current accruals around the IPO is associated with weaker long-run post-IPO stock performance, and this effect is more pronounced for firms that went public during hot issuance markets.

Taken together, these hypotheses allow us to examine whether Swedish IPO firms engage in earnings management, whether such behaviour varies across hot and cold market conditions, and if market conditions shape the extent to which discretionary current accruals around the IPO are associated with long-run post-IPO performance.

4. Data and Methodology

The following section describes our data and methodological approach used to test the hypotheses developed above. It covers the sample construction and data sources, measurement of earnings management, classification of hot and cold, and lastly the measurement of long-run post-IPO performance.

4.1. Research Design

Our study follows a quantitative research design that combines correlational and comparative analysis. Each individual IPO represents a distinct observation. The sample covers firms going public in Sweden between 1990 and 2025, although the earliest observation with sufficient data for estimation falls in 1994.

Hypotheses 1a and 1b test whether discretionary current accruals are associated with the IPO event and whether this association differs across market conditions. Hypothesis 2 adds a comparative dimension by grouping firms according to market conditions and earnings management intensity and examining differences in long-run stock performance across groups. Firms are not randomly assigned to groups but are classified based on their own characteristics and market conditions at the time of listing. The findings will therefore be interpreted as associations rather than causal effects.

4.2. Data

4.2.1. Data Sources

Two primary data sources underpin the empirical analysis. IPO-level data, including listing dates and related event information, are obtained from LSEG Refinitiv Eikon, which provides broad coverage of Swedish IPOs and is also used to construct the IPO volume time series underlying the hot and cold market classification. Firm-level accounting data are sourced from Compustat Global via WRDS, a widely used database in international accounting research that provides standardised financial statement information for listed companies across multiple markets (Teoh

et al., 1998a; Kothari et al., 2005). In the present study, Compustat Global supplies the accounting data for both IPO firms and non-IPO peer firms used in the accrual estimation procedure.

The datasets are merged at the firm level using International Securities Identification Numbers (ISINs) as the common linking identifier, following established practice in international capital markets research (Ince and Porter, 2006). When ISINs are unavailable, Stock Exchange Daily Official List (SEDOL) codes are used as an alternative identifier to capture additional matches across the two datasets. Where identifier-based matching produces ambiguous or missing results, manual verification using firm names and listing dates is performed to limit unnecessary data loss.

For the main earnings-management specification, the accounting variables obtained from Compustat Global include total assets, receivables, inventories, other current assets, accounts payable, taxes payable, other current liabilities, sales, and SIC codes. These variables are used to compute current accruals, construct the modified Jones regressors, and assign firms to industry groups. In addition, the long-run performance analysis relies primarily on stock return data, which we obtain from FinBas, Swedish House of Finance Data Center.

4.2.2. Sample Selection

All firms that completed an initial public offering on Swedish equity markets between January 1990 and December 2025, as identified through LSEG Refinitiv Eikon, form the initial sample population. Accounting data are collected from fiscal year 1989 through fiscal year 2025 and are later mapped to IPO event time window of $t = -1$ to $t = +1$. Firms with incomplete event-time data are retained only in the analyses for which the required observations are available.

Several exclusion criteria are applied to arrive at the final analytical sample. Firms operating in the financial sector are excluded, as the accrual structure of banks, insurance companies, and investment funds differs fundamentally from that of non-financial firms, making standard discretionary accrual models inappropriate for this group (Teoh et al., 1998a; Dechow et al., 1995). Firms for which sufficient accounting data to estimate discretionary current accruals are unavailable in Compustat Global are also excluded. In addition, firm-year observations must be assignable to an industry classification and fiscal-year cell containing a sufficient number of comparable non-IPO firms to estimate normal accruals. A minimum of ten peer firms is required, consistent with established practice in prior research on accrual-based earnings management (Kothari et al., 2005; Ball and Shivakumar, 2008**)**.

For the analysis of H1, the event window is defined as [–1, 0, +1], where $t = -1$ denotes the fiscal year immediately preceding the IPO fiscal year, $t = 0$ denotes the IPO fiscal year, and $t = +1$ denotes the first fiscal year immediately following the IPO fiscal year. In accrual-based earnings-management studies, normal accruals are typically estimated within industry-year peer

groups, most commonly defined using two-digit SIC classifications, as in Teoh et al. (1998a) and DuCharme et al. (2001). In this study, industry matching is instead based on the Fama-French 17 industry classification, constructed from SIC codes. This choice reflects the fact that the Swedish market is relatively small compared with the US setting examined in Teoh et al. (1998a) and DuCharme et al. (2001), so a broader industry grouping is more suitable for preserving a sufficient number of comparable firms within each industry and fiscal-year group. Normal accruals are therefore estimated separately within each industry-year peer group using non-IPO firms from Compustat Global.

The initial event-time sample, after Compustat matching, consists of 512 IPO firms and 1,452 IPO firm-year observations within the [–1, 0, +1] window. This is before any accrual-based sample restrictions. Because discretionary current accruals are estimated separately by industry-year, not all IPO firm-years remain in the final H1 sample. Observations without the required accounting variables or sufficient peer-group data cannot be assigned estimated discretionary current accruals and are therefore later excluded from the relevant tests.

Two related samples are used in the H1 analysis. The primary sample is the all-available-observations sample, which consists of all IPO firm-year observations for which discretionary current accruals can be estimated at any of the three event times within the [–1, 0, +1] window. Thus, all available IPO firm-year observations are retained separately for $t = -1$, $t = 0$ and $t = +1$, without requiring the same firm to be observed at all three event times. This sample is used for the main tests of whether discretionary current accruals are significantly different from zero in each event period separately, thereby allowing the analysis to evaluate whether income-increasing earnings management is present before, during, and after the IPO. This approach is consistent with prior research, as it maximizes the number of usable observations at each event time and avoids unnecessary sample loss (Teoh et al., 1998a; Ball and Shivakumar, 2008). A second, supplementary sample is the full-window sample, which includes only firms for which discretionary current accruals are available at all three event times within the [–1, 0, +1] window. This sample is used both to examine whether discretionary current accruals differ from zero at each event time for a balanced set of IPO firms and to conduct within-firm comparisons across event periods. However, it is not used as the primary sample for testing H1a, since restricting the analysis to firms observed throughout the full event window would reduce sample size and could introduce survivorship-related distortions.

Table 1. Sample Selection Procedure for IPO Firms

Selection Criteria	# of adjustments	# of firms remaining
Original selection (LSEG)		569
(1) Not matched to Compustat	-57	512
(2) Financial firms (FF17 = 16)	-77	435
(3) Missing accounting data at t = 0	-70	365
(4) Missing prediction regressors	-3	362
(5) Insufficient industry-year peers (<10)	-36	326
H1a earnings management sample	**-243**	**326**
(6) Missing market-state classification	-3	323
H1b Hot versus Cold sample	**-246**	**323**
(7) Missing long-run return price data	-19	304
H2 Long-run performance sample	**-265**	**304**

Notes: This table summarises the sample selection procedure for the IPO firms included in the analyses of H1a, H1b, and H2. The original sample comprises 569 Swedish IPOs identified from LSEG.

4.3. Measurement of Earnings Management

4.3.1. Accrual Measurement

This study uses discretionary current accruals (DCA) as the primary proxy for earnings management. This choice is aligned with Teoh et al. (1998a), who argue that current accruals are particularly relevant in the IPO context because they capture short-term working capital adjustments over which managers typically exercise greater discretion than over long-term accrual components.

Current accruals are defined as changes in operating working capital:

$$CA_{i,t} = \Delta REC_{i,t} + \Delta INVT_{i,t} + \Delta ACO_{i,t} - \Delta AP_{i,t} - \Delta TXP_{i,t} - \Delta LCO_{i,t} \qquad (1)$$

where *i* denotes firm and *t* fiscal year, *REC* denotes receivables, *INVT* inventories, *ACO* other current assets, *AP* accounts payable, *TXP* taxes payable, and *LCO* other current liabilities. This measure captures changes in operating working capital only and therefore excludes depreciation and other long-term accrual components.

The resulting variable, denoted *CA*, represents actual current accruals for firm *i* in year *t*. Because not all current accruals are discretionary, a model is needed to estimate the normal level of accruals implied by the firm's operating activity (Teoh et al., 1998a).

4.3.2. The Modified Jones Model

The normal level of current accruals is estimated based on the modified Jones framework. Consistent with the study's focus on discretionary current accruals, the specification follows Jones (1991) and Dechow et al. (1995) but is adapted to current accruals rather than total accruals. The modified Jones adjustment is appropriate because it removes changes in receivables from sales, thereby reducing the risk that revenue-related earnings management is treated as normal accrual activity. This is especially relevant in the IPO setting, where prior research highlights the possibility of sales manipulation through credit policies (Dechow et al., 1995; Teoh et al., 1998a; DuCharme et al., 2001).

The model is estimated cross-sectionally within each industry-year group using non-IPO peer firms. In the present study, industries are defined using the Fama-French 17 industry classification, and each industry-year cell is required to contain at least ten peer firms. This estimation design is in broad sense consistent with Teoh et al. (1998a), who estimate accrual models by industry and fiscal year, require at least ten observations in each estimation cell, and then use the estimated coefficients to compute expected current accruals for IPO firms.

For each industry-year group, the following cross-sectional regression is estimated:

$$\frac{CA_{j,t}}{AT_{j,t-1}} = \beta_{0,t}\left(\frac{1}{AT_{j,t-1}}\right) + \beta_{1,t}\left(\frac{\Delta SALE_{j,t}}{AT_{j,t-1}}\right) + \varepsilon_{j,t} \qquad (2)$$

where $CA_{j,t}$ is current accruals for peer firm j in fiscal year t, $AT_{j,t-1}$ is lagged total assets, and $\Delta SALE_{j,t}$ is the change in sales. Consistent with Jones (1991), the variables are scaled by lagged total assets to mitigate heteroskedasticity associated with differences in firm size. The term $1/AT_{j,t-1}$ follows the Jones accrual-model specification and functions as a scaled intercept in Jones-type models estimated without a separate constant. This specification is retained in later modified Jones applications, including Dechow et al. (1995) and Teoh et al. (1998a).

The cross-sectional estimation approach serves two purposes. It allows the model to benchmark each IPO firm against firms facing similar industry conditions in the same fiscal year, and it avoids the infeasibility of long time-series estimation for IPO firms, which by definition lack long public accounting histories. Moreover, the cross-sectional design helps control for industry-wide economic conditions that affect accruals in a given year (Teoh et al., 1998a).

To reduce the influence of scaling artefacts caused by very small lagged total assets, observations are set to missing when the absolute value of CA, $\Delta SALE/AT_{t-1}$, $(\Delta SALE - \Delta REC)/AT_{t-1}$, and $1/AT_{t-1}$ exceeds 5. This restriction is applied to both peer firms and IPO firms. Although Kothari et al. (2005) apply a stricter cutoff of 1, such a criterion may remove observations that reflect economically meaningful variation in accruals, including potentially informative earnings management behavior. A cutoff of 5 is adopted as a more conservative line that removes

observations most likely driven by scaling distortions while retaining economically meaningful variation in accruals that may be relevant for identifying earnings management.

Because the dependent variable is current accruals, the model captures short-term working capital accruals rather than accruals related to depreciation. Accordingly, the model excludes PPE and expected current accruals are modeled using changes in sales only. This differs from the traditional Jones model and its modified variant for total accruals, where PPE is included to control for non-discretionary depreciation expense, but it is consistent with IPO studies that focus on discretionary current accruals, like Teoh et al. (1998a). This focus on current accruals also motivates the choice of event window. Since current accruals reflect working capital adjustments, they are most naturally examined over short horizons and are therefore especially relevant in periods close to the IPO. On this basis, the analysis is limited to the three-year event window [–1, 0, +1], capturing the fiscal year prior to the offering, the IPO year, and first full year after listing.

4.3.3. Prediction of Non-Discretionary and Discretionary Current Accruals

Once industry-year coefficients have been estimated from the peer sample, they are applied to IPO firms in the same industry-year to compute non-discretionary current accruals (*NDCA*). In line with the modified Jones, the prediction equation adjusts sales growth for the change in receivables. This adjustment is intended to reduce the risk that aggressive revenue recognition through credit sales is mistakenly treated as part of normal accrual-generating activity (Teoh et al., 1998a).

The expected, or non-discretionary, current accruals are therefore calculated as:

$$NDCA_{i,t} = \hat{\beta}_{0,t}\left(\frac{1}{AT_{i,t-1}}\right) + \hat{\beta}_{1,t}\left(\frac{\Delta SALE_{i,t} - \Delta REC_{i,t}}{AT_{i,t-1}}\right) \quad (3)$$

where $\Delta REC_{i,t}$ is the change in receivables for IPO firm i in fiscal year t. Discretionary current accruals (*DCA*) are then defined as the residual difference between actual and predicted current accruals:

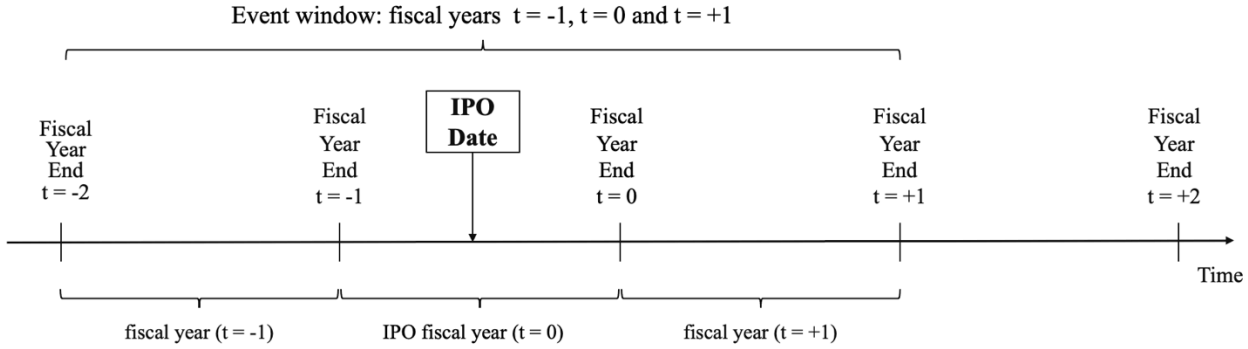
$$DCA_{i,t} = CA_{i,t} - NDCA_{i,t} \quad (4)$$

The variable *DCA* constitutes the main test variable for H1a. Following prior IPO earnings management studies, positive *DCA* indicates that actual current accruals exceed their estimated non-discretionary level and is therefore interpreted as income-increasing reporting. Negative *DCA*, in turn, indicates that actual current accruals fall below their estimated non-discretionary level and is interpreted as income-decreasing, or relatively conservative, reporting (Teoh et al., 1998a; Ball and Shivakumar, 2008). However, this interpretation should be made cautiously because discretionary accruals are model-based estimates and may also reflect normal working capital changes or model error rather than deliberate earnings management (Kothari et al., 2005).

DCA is not winsorized in the main analysis, in order to preserve the original distribution of the estimated earnings management proxy. To assess whether the results are driven by extreme values, a robustness test is conducted using *DCA* winsorized at the 1st and 99th percentiles.

4.3.4. Event Window and Test Procedure for H1a

The event window for H1a is defined as [–1, 0, +1], covering the fiscal year immediately preceding the IPO fiscal year, the IPO fiscal year itself, and the fiscal year immediately following the IPO fiscal year. More specifically, $t = -1$ denotes the pre-IPO fiscal year, $t = 0$ denotes the fiscal year in which the IPO occurs, and $t = +1$ denotes the first post-IPO fiscal year. As illustrated in Figure 1, the IPO date falls within fiscal year $t = 0$. This window is motivated by prior IPO earnings management research documenting elevated discretionary accruals before the IPO, unusually high accruals during the IPO year, and subsequent declines in the post-IPO period (Teoh et al., 1998a; DuCharme et al., 2001; Premti and Smith, 2020). The [–1, 0, +1] window thus aligns the empirical design with the timing of discretionary accrual patterns documented in the IPO earnings management literature.



Notes: This figure illustrates the event-time structure used in the analysis. The event window spans three fiscal years, t=-1, t=0, and t=+1. Fiscal year t=-1 refers to the fiscal year immediately preceding the IPO fiscal year, t=0 denotes the fiscal year in which the IPO occurs, and t=+1 refers to the fiscal year immediately following the IPO fiscal year. The IPO date falls within fiscal year t=0. Source: Authors' own illustration, inspired by Teoh et al. (1998a).

Figure 1. Illustration of the IPO Event Window

The first set of tests constitutes the main empirical test of the first hypothesis and examines whether discretionary current accruals differ from zero at each event time separately. Following prior IPO earnings management research, two complementary statistical tests are employed. Specifically, a one-sample t-test is used to examine whether the mean discretionary current accrual equals zero, while a Wilcoxon signed-rank test is applied to evaluate whether the median differs from zero (Premti and Smith, 2020). These tests are first conducted using the all-available-observations sample for each event year. To assess the robustness of the findings to sample composition, the same tests are also repeated using the full-window sample, which includes only firms observed in all three event periods, $t = -1$, $t = 0$, and $t = +1$.

The second set of tests is supplementary and examines whether discretionary current accruals change across the three event years. These comparisons are conducted using the full-window sample to maintain a consistent set of IPO firms across the event window and to facilitate within-firm comparisons over time. Paired t-tests and Wilcoxon signed-rank tests are used for two pairwise comparisons. The first compares $t = 0$ with $t = -1$ to assess whether discretionary current accruals increase in the IPO fiscal year. The second compares $t = +1$ with $t = 0$ to examine whether discretionary current accruals decline in the fiscal year following the IPO.

Although H1a is directional and predicts positive discretionary current accruals, the reported statistical tests are two-sided. This choice is consistent with reporting practice in prior IPO earnings management studies, where directional interpretations are often based on the sign of estimates while statistical significance is assessed using two-sided tests (Teoh et al., 1998a; DuCharme et al., 2001).

Robustness checks are also conducted using *DCA* winsorized at the 1st and 99th percentiles, the Fama-French 30 industry classification, the original Jones model, and alternative exclusion thresholds of 1 and 10 for the scaled variables used in the accrual estimation procedure.

4.4. Classification of Hot and Cold IPO Markets

4.4.1. Hot and Cold Market

To test H1b, IPO firms are classified as going public in either hot or cold issuance markets. Classification is based on quarterly IPO volume, following the volume-based approach in the IPO cycle literature **(**Yung et al., 2008). The classification is constructed from the full LSEG IPO file of 569 Swedish IPOs, and hence before any sample exclusions.

The hot and cold market classification is constructed in three steps. First, IPO dates are grouped into calendar quarters and the number of IPOs is counted for each quarter, including quarters with zero listings. Quarterly aggregation is appropriate because it preserves time variation while avoiding monthly groupings with very few observations (Yung et al., 2008). Second, a four-quarter trailing moving average is computed for each quarter using the current and the three immediately preceding quarters. This follows Yung et al. (2008) and is intended to smooth short-term fluctuations, ensuring classification reflects the current issuance environment rather than seasonality. The first three quarters in our sample are left unclassified, as fewer than four quarters have elapsed to compute the trailing average. Third, for each quarter, a historical average is computed using only prior quarters, starting from the first quarter in 1994, which is the first year in the sample with IPO firms for which discretionary current accruals can be estimated. This aligns the market-state classification with the period covered by the accrual-based sample. The historical benchmark updates over time using only IPO activity observed before the quarter being classified. As a result, each quarter is assessed relative to the market conditions that would have been known at that point in time, rather than relative to information from later periods.

Building on this procedure, the study adapts the framework of Yung et al. (2008), who distinguish between hot, normal, and cold IPO periods using a relative threshold approach. In the present study, IPO quarters are instead classified into two market states, hot and cold. The main reason for this is that a three-way classification would reduce the number of observations in each group, limiting statistical power in further subgroup comparisons that are central to H1b and H2. A quarter is classified as hot when its four-quarter trailing moving average of IPO volume exceeds 1.6 times the historical average, while all remaining quarters are classified as cold. Yung et al. (2008) apply a 1.5 benchmark in their main specification and show that their qualitative conclusions remain unchanged under alternative cutoffs, including a 60% threshold. The 1.6 cutoff adopted here therefore remains within the range of thresholds examined in prior research. The threshold is set marginally above Yung et al.'s main specification in order to obtain a more balanced distribution of observations across the hot- and cold-market groups in the present sample.

To assess the sensitivity of the market-state classification to the choice of cutoff, additional robustness tests are conducted using alternative thresholds of 1.5 and 1.7 times the historical average.

4.4.2. Empirical Tests for H1b

H1b examines whether income-increasing discretionary current accruals are more pronounced for firms going public during hot issuance markets than for firms going public during cold markets. The hypothesis is therefore tested by comparing *DCA* between hot-market IPOs and cold-market IPOs separately at each event time [$t = -1, 0, +1$].

At each event time, two complementary between-group tests are used. First, a Welch two-sample t-test assesses whether mean *DCA* differs between hot and cold IPO firms. This test is appropriate because it does not require equal variances and is well suited to comparisons involving unequal group sizes (Delacre et al., 2017). Second, a Wilcoxon rank-sum test is used to examine whether the distribution of *DCA* differs between the groups without relying on normality assumptions (Whitley and Ball, 2002). The use of complementary parametric and rank-based tests is consistent with prior IPO research examining differences in discretionary current accruals and hot versus cold IPO samples (Premti and Smith, 2020; Yung et al., 2008; Premti and Madura, 2013).

4.5. Classification of Conservative and Aggressive Earnings Management

For the later analysis of long-run post-IPO performance, IPO firms are also classified according to the magnitude of discretionary current accruals at $t = 0$. This event time is chosen because the IPO fiscal year is the period in which incentives to inflate reported performance are expected to be the strongest and most likely therefore most directly reflected in discretionary current accruals (Teoh et al., 1998a). Following the logic of Teoh et al. (1998a), firms are grouped on the basis of their discretionary current accruals in the IPO year. However, whereas Teoh et al. (1998a)

classify firms into quartiles, this study divides firms into two groups based on the median value of *DCA,* in line with Sletten et al. (2018). Firms with *DCA* above the sample median are classified as aggressive, while firms with *DCA* at or below the median are classified as conservative. This approach is adopted because the smaller sample size in the present study makes a two-group classification more suitable, as it preserves a sufficient number of observations within each group for meaningful comparison in the later long-run performance analysis.

4.6. Long-Run Post-IPO Performance

It is widely acknowledged in financial literature that no model for measuring long-run performance is perfect, and flaws in these methodologies are well-documented. Because any assessment of abnormal returns requires a benchmark to define "normal" performance, one inevitably faces what is known as the joint-hypothesis problem (Fama, 1970). As noted by Fama (1970) and further discussed by Kothari and Warner (2007), any test of abnormal performance is also implicitly a test of the benchmark used to define expected returns. If the benchmark is misspecified, what appears as abnormal performance may reflect benchmark error rather than genuine mispricing.

This thesis does not aim to evaluate competing expected return models or long-run event study methodologies. Instead, we acknowledge that abnormal return measurement is subject to well documented limitations and focuses on applying methods that are appropriate for the study's comparative research design. The remainder of Section 4.6 therefore explains and justifies how long-run post IPO performance is measured, benchmarked, and interpreted in this study.

4.6.1. Buy-and-Hold Abnormal Returns

Long-run post-IPO stock performance is measured using event-time buy-and-hold abnormal returns, hereafter referred to as BHARs.

While both event-time and calendar-time approaches have known limitations in long-horizon settings (Lyon, Barber, and Tsai, 1999; Kothari and Warner, 2007), the event-time framework is better suited in our research design for two reasons. First, as Loughran and Ritter (2000) argue, when corporate events are strategically timed, as IPOs plausibly are, tests that weight each firm equally have greater power to detect abnormal performance than tests that weight each calendar month equally. Since this study explicitly examines differences between hot and cold market IPOs, preserving the relative weight of high-issuance periods is analytically important. Calendar-time portfolios, by contrast, would compress the hot-market signal by assigning equal weight to months regardless of how many IPOs occurred. Second, the calendar-time approach requires a sufficiently long time series of monthly portfolio returns to produce reliable regression estimates (Kothari and Warner, 2007). In a single-market sample of our size, too few months contain IPOs for such a regression to be meaningful.

The BHAR for firm i over the holding period from event month 1 to T is defined as the geometrically compounded return on the stock following the issuance month minus the geometrically compounded return on its benchmark over the same period:

$$BHAR_{i,1\ to\ T} = \prod_{t=1}^{T}(1 + R_{it}) - \prod_{t=1}^{T}(1 + R_{bt}) \quad (5)$$

where R_{it} denotes the monthly stock return for firm i in event month t, and R_{bt} denotes the corresponding monthly return on the benchmark.

Returns are measured from the end of the listing month, such that the first full calendar month of trading constitutes the initial return observation. Beginning the measurement window after the listing month has passed mitigates the influence of first-day underpricing on the long-run return series (Barber and Lyon, 1997; Lyon et al., 1999; Lin et al., 2021). Monthly returns are computed from end-of-month closing prices sourced from the Swedish House of Finance FINBAS database. Returns include dividend distributions and are adjusted for corporate actions such as stock splits and similar capital events. Thereafter, average abnormal returns are calculated using equal weighting across sample firms, ensuring that each IPO contributes equally to the analysis rather than allowing a small number of large firms to dominate the results, consistent with prior studies (Ritter, 1991; Loughran and Ritter, 1995; Lin et al., 2021).

The measurement horizon in studies of long-run IPO performance typically ranges from one to five years (Certo et al., 2009). Consistent with seminal studies such as Ritter (1991), Teoh et al. (1998a), Vijh (1999), and Levis (1993), a three-year post-IPO horizon is adopted as the primary window for evaluating long-run performance. Abnormal returns are reported at six-month intervals in order to capture how post-IPO performance evolves over time. If either the sample firm or a matched benchmark is delisted before the end of its three-year event window, the BHAR is truncated at the delisting date and both the IPO firm's and the benchmark's compounded returns are terminated at that point (Ritter, 1991; Loughran and Ritter, 1995). This standard treatment retains delisted firms in the sample and thereby mitigates survivorship bias.

We focus solely on BHARs rather than cumulative abnormal returns (CARs) when measuring long-run IPO performance. BHAR directly captures whether investors earn abnormal returns by holding shares over a given horizon, while CAR sum single-period abnormal returns and implicitly assume monthly portfolio rebalancing, causing them to diverge from actual compounded returns as the holding period lengthens (Barber and Lyon, 1997; Lyon et al., 1999). BHAR is adopted as the sole measure of long-run performance due both to its widespread use in prior IPO research (e.g., Ritter, 1991; Levis, 1993; Lin et al., 2021) and its closer alignment with realized investor outcomes. The statistical challenges associated with BHARs and the inference methods used to address them are discussed further in Section 4.6.3.

4.6.2. Benchmark Construction

To assess long-run post-IPO performance in terms of abnormal returns, it is necessary to define a measure of normal long-run performance. Meaningful inference requires comparing IPO returns against benchmarks that capture similar risk characteristics, as emphasised by prior literature (Fama and French, 1993; Brav and Gompers, 1997). However, Barber and Lyon (1997) demonstrate that no single benchmark is free from misspecification, and that inferences drawn from long-run abnormal return studies can be sensitive to the choice of reference portfolio. To reduce the risk that the results are driven by a single benchmarking approach, abnormal returns are therefore estimated relative to two benchmarks: the SIX Return Index, and a matched firm benchmark.

The SIX Return Index (SIXRX) is used as the market benchmark. It is a broad, value-weighted index covering firms listed on Nasdaq Stockholm Main Market, with dividends reinvested. It provides a transparent and widely used reference point for overall Swedish market performance. However, because SIXRX reflects the market as a whole, it does not directly account for firm-level characteristics that may be particularly relevant for IPO firms, such as size, maturity, and valuation profile. In addition, index-based benchmarks are generally affected by rebalancing and new-listing biases (Barber and Lyon, 1997).

For these reasons, a matched firm benchmark is constructed to provide a more firm specific measure of abnormal performance. Following Barber and Lyon (1997), each IPO firm is matched with a non IPO firm using market capitalization as a size measure and book-to-market ratio as a value measure. To ensure that the benchmark firm has an established return history and is no longer within the post-IPO performance window, potential peers are required to have been listed for at least three years prior to the IPO firm's listing month (Barber and Lyon, 1997; Brav and Gompers, 1997). Matching is carried out in two steps. First, all eligible firms with a market capitalisation within +/– 30 percent of the IPO firm are identified. If no eligible firm falls within this range, then we expand it to +/– 50 percent, in line with the suggestion by Barber and Lyon (1997) that wider ranges should be used in markets with a limited pool of potential control firms. Second, among the size-comparable firms, the company whose book-to-market ratio is the closest match is selected as the matched peer. Market capitalization is measured at the end of IPO listing month for both the sample company and the matched firm. The book-to-market ratio is calculated by taking book value of equity from the most recent annual report divided by the market capitalization at the end of the IPO listing month (Fama and French, 1993). With this procedure, no observations are lost due to matching and all IPOs are successfully paired with a control firm.

Industry is not imposed as an additional matching criterion due to the relatively limited pool of eligible control firms in the Swedish market. Instead we prioritise size and book-to-market as they are widely used in long-term event studies to capture expected return variation. Fama and French (1993) document the importance of size and book-to-market in explaining cross sectional

stock returns, while Barber and Lyon (1997) show that control firms matched on these dimensions improve the specification of long-run abnormal return tests. However, it is also worth mentioning that more recent research finds that size and value premia have weakened in several markets since the early 2000s (Fama and French, 2012; Linnainmaa and Roberts, 2018), something that may reduce the degree to which the two benchmarks diverge in practice. Yet the matched firm approach avoids the rebalancing and new-listing biases associated with index-based benchmarks, as both the control firm and the IPO firm are held over the same time window without recomposition (Lyon et al., 1999; Kothari and Warner, 2007).

4.6.3. Statistical Inference

Using BHARs to measure long-run performance introduces some positive skewness in return distributions, as losses are bounded at −100 percent while gains are unbounded. Consequently, extreme positive outcomes increasingly pull the distribution rightward as the holding period lengthens (Mitchell and Stafford, 2000; Kothari and Warner, 2007). Using a three-year maximum holding period, rather than the five-year horizon employed in some studies, helps reduce this issue, as the right skewness of compounded returns tends to increase over longer holding periods (Barber and Lyon, 1997). To further address residual skewness in BHAR inference, the main results report the skewness-adjusted t-statistic from Lyon et al. (1999). This statistic modifies the standard t-statistic by adding two correction terms based on the cross-sectional skewness of abnormal returns.

$$t_{sa} = \sqrt{n}\left(S + \frac{1}{3}\hat{\gamma}S^2 + \frac{1}{6n}\hat{\gamma}\right) \tag{6}$$

where

$$S = \frac{\overline{BHAR}}{\sigma(BHAR)} \; and \; \hat{\gamma} = \frac{\sum_{i=1}^{n}\left(BHAR_i - \overline{BHAR}\right)^3}{n\sigma(BHAR)^3} \tag{7}$$

Here $\overline{BHAR}$ is the cross-sectional sample mean, $\sigma(BHAR)$ is the cross-sectional sample standard deviation, $\hat{\gamma}$ is the cross-sectional coefficient of skewness and n is the number of firms in the sample. Lyon et al., (1999) demonstrate through simulation that this adjustment substantially improves the specification of long-horizon abnormal-return tests relative to the conventional t-statistic.

Beyond skewness, BHAR inference may also be affected by cross-sectional dependence. IPOs tend to occur in waves, especially during hot markets, which means that firms listed around the same time often have overlapping return windows and are exposed to similar market conditions (Loughran et al., 1994; Kothari and Warner, 2007). This can make abnormal returns correlated across firms and may lead to overstated statistical significance (Brav, 2000; Mitchell and Stafford, 2000).

In this study, the issue mainly concerns inference rather than the logic of the comparisons. When aggressive and conservative earnings-management firms are compared within the same market condition, both groups are likely to face similar market-wide shocks. This makes the comparison informative for assessing whether earnings management explains performance beyond the common effect of market sentiment. For the hot-versus-cold comparison, IPO clustering is less a methodological obstacle and more part of the phenomenon being studied. If hot-market IPOs underperform, this may indicate that sentiment and IPO timing matter for long-run performance.

Given the inference challenges in long-run BHAR studies, the results are interpreted based on convergent evidence rather than statistical significance alone. Emphasis is placed on economic magnitude, persistence over time, consistency across benchmarks, and differences between the four subgroups. The matched-firm benchmark is treated as the primary specification, with SIXRX Index used as a complementary market benchmark.

5. Empirical Results

5.1. Description of data

Table 2 reports the Fama-French 17 industry distribution of the 326 IPO firms for which discretionary current accruals are available at event time $t = 0$. The sample is highly concentrated in the residual Other category, which accounts for 201 firms, or 61.7 percent of the sample. Outside this broad residual category, the most represented industries are Machinery and Business Equipment with 47 observations (14.4 percent), Construction and Construction Materials 22 observations (6.7 percent), and Retail Stores 17 observations (5.2 percent). The remaining industries each account for relatively small shares of the sample.

This distribution indicates that the usable IPO sample at $t = 0$ is not evenly spread across industries, but is instead concentrated in a limited number of industry groups. This is relevant for the accrual estimation procedure, since the modified Jones model is estimated within industry-year groups and therefore depends on the availability of comparable peer firms within each industry classification. Financial firms are absent from the sample, which is consistent with the study's exclusion of that sector from the accrual analysis. However, 61.7 percent of the sample falls within the residual Other category, which groups firms from diverse industries under a single classification. Because the modified Jones model assumes a common accrual-generating process within each industry group, this heterogeneity may weaken the precision of non-discretionary current accrual estimates for firms in that category.

Table 2. Fama-French 17 Industry Distribution of IPO Sample

Industry	FF17	Freq.	%
Food	1	5	1.5
Mining and Minerals	2	4	1.2
Oil and Petroleum Products	3	1	0.3
Consumer Durables	5	2	0.6
Chemicals	6	2	0.6
Drugs, Soap, Perfumes, Tobacco	7	14	4.3
Construction and Construction Materials	8	22	6.7
Machinery and Business Equipment	11	47	14.4
Transportation	13	11	3.4
Retail Stores	15	17	5.2
Other	17	201	61.7
Total		**326**	**100.0**

Notes: This table reports the Fama-French 17 industry distribution of IPO firms with discretionary current accruals computed at event time $t = 0$. Industries with zero IPO firms are omitted.

The distribution of the 326 IPO firms with discretionary current accruals available at $t = 0$ by IPO year is reported in Appendix Table A1. The observations are unevenly distributed across the sample period, with relatively few IPOs in the earlier years and a pronounced concentration in later years. Most notably, 2021 accounts for 79 IPOs, corresponding to 24.2 percent of the sample, making it by far the most represented year. This clustering is consistent with the cyclical nature of IPO activity and is relevant for the subsequent analysis of hot and cold market conditions.

Descriptive statistics for current accruals across the event-window are reported in Tables 3 and 4, both all-observations sample and balanced full-window subsample respectively. In both tables, median current accruals remain close to zero at all periods, while mean values are somewhat more negative, particularly at $t = -1$. The wide ranges and dispersion in the distribution suggest that current accruals remain sensitive to extreme observations even after the outlier restriction is applied. At the same time, the balanced full-window subsample in Table 4 appears somewhat less dispersed than the all-observations sample in Table 3, especially in the IPO year, suggesting that some of the more extreme accrual observations are concentrated among firms not observed at all three event times. These descriptive patterns provide useful context for the subsequent hypothesis tests and support the use of both mean- and median-based inference.

Table 3. Descriptive Statistics of Current Accruals – All Observations

Event Time	N	Mean	Std. Dev.	Min	P5	P25	Median	P75	P95	Max
t = -1	270	-0.051	0.454	-4.757	-0.573	-0.081	-0.009	0.054	0.404	1.662
t = 0	326	0.015	0.317	-1.271	-0.290	-0.071	0.009	0.093	0.381	3.713
t = +1	360	-0.002	0.227	-3.335	-0.188	-0.039	0.006	0.067	0.228	0.628

Notes: This table reports descriptive statistics for current accruals (CA) by event time. Event time *t* = -1 is the last fiscal year before the IPO, t = 0 is the IPO fiscal year, and t = +1 is the first post-IPO fiscal year.

Table 4. Descriptive Statistics of Current Accruals – Full Event Window Firms

Event Time	N	Mean	Std. Dev.	Min	P5	P25	Median	P75	P95	Max
t = -1	246	-0.040	0.459	-4.757	-0.392	-0.068	-0.009	0.054	0.434	1.662
t = 0	246	0.004	0.227	-1.175	-0.273	-0.069	0.009	0.078	0.367	0.863
t = +1	246	-0.008	0.249	-3.335	-0.172	-0.037	0.004	0.043	0.183	0.628

Notes: This table reports descriptive statistics for current accruals (CA) by event time for IPO firms with available discretionary current accruals at all three event times.

5.2. Discretionary Current Accruals Around the IPO

5.2.1. Income-Increasing Discretionary Current Accruals Around the IPO

Tables 5 and 6 report the main tests of H1a by examining whether discretionary current accruals differ from zero at each event time. Table 5 presents the results for the all-observations sample of IPO firms with available *DCA* at each event time, while Table 6 reports the corresponding statistics for the balanced full-event-window subsample. In Table 5, the evidence is strongest in the IPO year, where both the mean and median *DCA* are positive and more than half of the firms exhibit positive discretionary current accruals. The Wilcoxon signed-rank test indicates that median *DCA* at $t = 0$ is significantly greater than zero at the 5 percent level, while the one-sample t-test provides evidence of a positive mean at the 10 percent level. In light of the skewness and the presence of observations in the tails of the distribution in the earlier descriptive statistics for current accruals, the median and the Wilcoxon signed-rank test are especially informative for interpreting the *DCA* results. At $t = -1$ and $t = +1$, median *DCA* remains positive, and the proportion of firms with positive *DCA* exceeds 50 percent throughout the event window. Although *DCA* at $t = -1$ is not statistically different from zero, the $t = +1$ median is marginally significant at the 10 percent level under the Wilcoxon test. In both cases the signs remain in the predicted direction.

Table 5. Summary Statistics of Discretionary Current Accruals Results by Event Time – All Observations

	N	Mean	Median	Std. dev.	t-stat	p-value (t-test)	p-value (Wilcoxon)	% with DCA>0
t = -1	270	-0.017	0.002	0.462	-0.59	0.554	0.590	51.9
t = 0	326	0.034	0.013	0.346	1.79	0.075	0.038	56.1
t = +1	360	-0.001	0.005	0.235	-0.09	0.925	0.076	54.4

Notes: This table reports summary statistics and tests of discretionary current accruals (DCA) by event time for IPO firms with available DCA at each event time. The t-test and Wilcoxon signed-rank test assess whether mean and median DCA differ from zero, respectively. The rightmost column reports the percentage of firms with positive DCA. All tests are two-tailed.

Table 6 shows a similar pattern for the balanced subsample of firms observed at all three event times. Mean and median DCA are again positive in the IPO year, and the proportion of firms with positive DCA is highest at $t = 0$. Statistical support is weaker than in the all-observations sample, as only the Wilcoxon signed-rank test for the IPO-year median reaches significance, at the 10 percent level. Nevertheless, the results remain directionally consistent with the evidence from the all-observations sample, with the strongest indication of positive discretionary current accruals again appearing in the IPO year. At $t = –1$ and $t = +1$, the estimated DCA values remain statistically insignificant.

Table 6. Summary Statistics of Discretionary Current Accruals Results by Event Time - Full Event Window Firms

	N	Mean	Median	Std. dev.	t-stat	p-value (t-test)	p-value (Wilcoxon)	% with DCA>0
t = -1	246	-0.013	0.001	0.472	-0.41	0.679	0.620	50.8
t = 0	246	0.015	0.014	0.256	0.89	0.374	0.059	56.9
t = +1	246	-0.008	0.006	0.258	-0.49	0.621	0.194	55.7

Notes: This table reports summary statistics and tests of discretionary current accruals (DCA) by event time for IPO firms with available DCA at all three event times. The t-test and Wilcoxon signed-rank test assess whether mean and median DCA differ from zero, respectively. The rightmost column reports the percentage of firms with positive DCA. All tests are two-tailed.

Overall, the results provide supportive evidence for H1a. Most importantly, the IPO year consistently stands out as the period in which discretionary current accruals are most positive, both in the all-observations sample and in the balanced subsample. At the same time, the relatively large standard deviations, particularly at $t = –1$, indicate substantial cross-sectional variation in *DCA*, which supports the use of both parametric and non-parametric tests in the analysis.

Table 7 presents supplementary paired tests of within-firm changes in discretionary current accruals across the event window for the balanced subsample of 246 IPO firms. The estimated

changes follow the expected pattern around the IPO, but none of the differences reaches statistical significance. Specifically, for the comparison between $t = 0$ and $t = –1$, the mean and median changes are positive, consistent with an increase in discretionary current accruals in the IPO year. For the comparison between $t = +1$ and $t = 0$, both the mean and median changes are negative, consistent with a decline in *DCA* after the IPO. The final column further supports this interpretation, as the proportion of firms with positive changes in *DCA* is above 50 percent for the increase from $t = –1$ to $t = 0$ while falling below 50 percent for the change from $t = 0$ to $t = +1$, in line with the expected directional pattern.

Table 7. Paired Tests: Change in Discretionary Current Accruals Across Event Times - Full Event Window Firms

	N	Mean	Median	Std. dev.	t-stat	p-value (t-test)	p-value (Wilcoxon)	% Diff>0
$DCA_0 - DCA_{-1}$	246	0.027	0.008	0.573	0.74	0.460	0.446	53.3
$DCA_{+1} - DCA_0$	246	-0.023	-0.011	0.381	-0.93	0.352	0.238	46.3

Notes: This table reports paired tests of within-firm changes in discretionary current accruals (DCA) across event times for IPO firms with available DCA at all three event times. The t-test and Wilcoxon signed-rank test assess whether the mean and median change in DCA differ from zero, respectively. The rightmost column reports the percentage of firms with a positive DCA change. All tests are two-tailed.

Overall, the paired results are directionally aligned with the expected event-time pattern, although they do not provide statistical evidence of changes in DCA within firms across event times. Thus, while the main event-time tests identify the IPO year as the period in which DCA is most positive, the supplementary paired tests point in the same general direction without yielding statistically significant differences.

This finding is robust to winsorizing DCA at the 1st and 99th percentiles and to replacing the Fama-French 17 industry classification with Fama-French 30. Under both specifications, $t = 0$ remains the event year with the strongest evidence of positive discretionary current accruals and is statistically significant at the 5 percent level. The remaining event periods are statistically insignificant, except for the $t = +1$ median, which is weakly significant at the 10 percent level under the Wilcoxon test in the winsorized specification. Estimating DCA using the Jones model, as well as applying the alternative scaling thresholds of 1 and 10, yields a similar directional pattern. However, in these specifications, the IPO-year results are statistically significant only at the 10 percent level, while the remaining event periods remain statistically insignificant. Overall, the robustness tests largely support the main finding that discretionary current accruals are most elevated in the IPO year.

5.2.2. Discretionary Current Accruals Across Hot and Cold IPO Markets

Table 8 reports the main test of H1b by comparing discretionary current accruals between hot-market and cold-market IPOs using a Welch two-sample t-test and a Wilcoxon rank-sum test

at each event time. Under H1b, hot-market IPOs are expected to exhibit higher DCA than cold-market IPOs.

At $t = -1$, the estimated difference is statistically significant, but the sign is opposite to the predicted direction, as hot-market IPOs exhibit lower DCA than cold-market IPOs. Specifically, the mean DCA is –4.5 percent of lagged total assets for hot-market IPOs and 4.9 percent for cold-market IPOs, and both the Welch t-test and the Wilcoxon rank-sum test reject the null hypothesis of equal DCA across groups. The proportion of firms with positive DCA is also lower among hot-market IPOs than among cold-market IPOs, which reinforces this pattern.

In the IPO year ($t = 0$), the mean DCA is marginally higher for hot-market IPOs at 4.0 percent than for cold-market IPOs at 2.0 percent, but the difference is statistically insignificant under both tests. The median DCA is slightly lower for hot-market IPOs than for cold-market IPOs, and the proportion of firms with positive DCA is also lower in the hot-market group. Similarly, at $t = +1$, hot-market IPOs again exhibit lower mean DCA than cold-market IPOs, although the difference is not statistically significant.

Table 8. Two-Sample Comparison of Discretionary Current Accruals: Hot vs Cold Market IPOs

		N	Mean	Median	Std. dev.	t-stat	p-value (t-test)	p-value (Wilcoxon)	% with DCA>0
t = -1	Hot	190	-0.045	-0.010	0.532				46.3
	Cold	77	0.049	0.030	0.210				63.6
	Diff		-0.094	-0.040		*-2.08*	*0.039*	*0.011*	
t = 0	Hot	219	0.040	0.009	0.374				54.3
	Cold	104	0.020	0.017	0.284				60.6
	Diff		0.020	-0.008		*0.53*	*0.600*	*0.574*	
t = +1	Hot	229	-0.015	0.002	0.279				52.8
	Cold	124	0.019	0.009	0.123				55.6
	Diff		-0.034	-0.007		*-1.57*	*0.118*	*0.397*	

Notes: This table reports two-sample comparisons of discretionary current accruals (DCA) between hot-market and cold-market IPOs at each event time. Hot and cold markets are classified using the baseline threshold of 1.6 times the expanding historical average IPO volume. The t-test is Welch's unequal-variances test, reported for the difference hot minus cold, and the Wilcoxon rank-sum test provides a non-parametric alternative. All p-values are two-sided.

Overall, the results in Table 8 do not provide support for H1b. The evidence suggests that discretionary current accruals are not higher among hot-market IPOs and are instead significantly higher among cold-market IPOs in the pre-IPO year. This finding indicates that, within the present sample, hot issuance conditions are not associated with more pronounced income-increasing accruals around the IPO.

To assess the sensitivity of the results to the choice of market-classification threshold, alternative thresholds of 1.5 and 1.7 are applied. The corresponding results remain consistent with the main analysis and do not alter the conclusions regarding H1b.

5.3. Long-Run IPO Performance: Market Conditions and Earnings Management

Table 9 reports how the 304 IPO firms included in the long-run performance analysis are distributed across market conditions and earnings-management groups. IPOs are classified as issued during either hot or cold market periods according to the methodology described in Section 4.4.1., and further classified as either conservative or aggressive based on the methodology in Section 4.5.

Table 9. Number of IPO Firms by Market Condition and Earnings-Management Group

Earnings Management	**Market Conditions**		
	All	**Cold**	**Hot**
Conservative	148	43	105
Aggressive	156	52	104
All	304	95	209

Notes: Number of IPO firms by market condition and earnings-management group. Hot and cold market classifications are based on the methodology described in Section 4.4.1. Earnings-management groups, conservative and aggressive, are formed using the discretionary current accrual measure and the methodology is described in Section 4.5.

5.3.1. Full Sample Long-Run Performance

We present the full-sample results in Table 10, where IPO returns are reported both on an unadjusted basis (Raw BHR) and after adjustment for market return (SIXRX BHAR) and firm characteristics (Matched-firm BHAR).

Table 10. Full-Sample Long-Run Returns and Buy-and-Hold Abnormal Returns

	Raw BHR	**SIXRX BHAR**	**Matched-firm BHAR**
6-month	-0.025	-0.032	0.012
	(-0.89)	(-1.21)	(0.42)
1-year	-0.034	-0.048	0.009
	(-0.71)	(-1.08)	(0.18)
1.5-year	-0.047	-0.080	-0.031
	(-0.88)	(-1.64)	(-0.60)
2-year	-0.042	-0.139***	-0.091*
	(-0.79)	(-2.79)	(-1.66)
2.5-year	-0.023	-0.186***	-0.138**
	(-0.39)	(-3.39)	(-2.40)
3-year	0.017	-0.258***	-0.234***
	(0.28)	(-4.63)	(-3.76)

Notes: Buy-and-hold returns (BHRs) and buy-and-hold abnormal returns (BHARs) are reported for the full sample over horizons from 6 months to 3 years. Raw BHRs measure the unadjusted long-run returns of the sample firms. SIXRX BHARs are calculated using the SIX Return Index as the market benchmark, while matched-firm BHARs are calculated relative to size- and value-matched benchmark firms. N=304. Values in parentheses are skewness-adjusted t-statistics. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

In unadjusted terms, raw BHRs are negative across all horizons except for the last observation, ranging from -2.5% at 6 months to 1.7% at 3 years. Even though none of the raw returns are statistically significant, the pattern is economically notable. Over a three-year period, the average IPO firm in our sample generated almost no positive cumulative return, despite the broader Swedish equity market delivering clear positive returns on average. Because raw returns are already flat to negative before any benchmark adjustment, the BHAR results that follow should be read with this in mind.

After adjusting for the SIX Return Index, abnormal returns become more clearly negative. SIXRX-adjusted BHARs decline over time and become statistically significant from the 2-year horizon onward, reaching -25.8% after 3 years. A similar pattern is observed for the matched-firm benchmark, although the magnitude of underperformance is slightly lower. Matched-firm BHARs are positive but insignificant during the first year. After that they turn negative from 1.5 years onward, reaching -23.4% after 3 years. Although both benchmarks point in the same direction, the lower magnitude of the matched-firm BHARs relative to the SIXRX-adjusted BHARs suggests that the estimated degree of underperformance is sensitive to the choice of benchmark. As discussed in Section 4.6.3, the matched-firm benchmark is treated as the primary specification because it controls more directly for size and value characteristics.

Overall, full sample results indicate substantial long-run underperformance among IPO firms, with the pattern becoming especially clear after benchmark adjustment. The 3-year matched-firm BHAR of -23.4% is considerably larger than the market- and size-adjusted 3-year abnormal return of -7.8% reported by Lin et al. (2021), however the comparison should be interpreted with caution given differences in setting and benchmark construction. Next, we present subgroup results which will be used to assess the relative roles of market conditions and earnings management in explaining long-run IPO underperformance, in line with *Hypothesis 2: Higher discretionary current accruals around the IPO is associated with weaker long-run post-IPO stock performance, and this effect is more pronounced for firms that went public during hot issuance markets.*

5.3.2. Subgroup Long-Run IPO Performance by Market Condition and Earnings Management

In this section, we present the IPOs' long-run return performance separately by market condition in Table 11 and by degree of earnings management in Table 12.

Table 11 shows a clear difference between IPOs issued in cold and hot market conditions. For cold-market IPOs, abnormal returns are not statistically significant at any horizon under either the SIXRX or matched-firm benchmark. The estimates turn negative over longer horizons, but they do not provide clear evidence of long-run underperformance.

Hot-market IPOs show a different pattern. Abnormal returns are consistently negative, and the SIXRX-adjusted BHARs are significant at all horizons. At the 3-year horizon, the SIXRX-adjusted BHAR is -33.8%. The matched-firm results point in the same direction, with significant underperformance at the 2-, 2.5- and 3-year horizons. Overall, the results suggest that the full-sample underperformance is largely concentrated among IPOs issued during hot market conditions.

Table 11. Abnormal Returns of the IPOs: Cold versus Hot Markets

	Cold Market		**Hot Market**	
	SIXRX BHAR	**Matched-firm BHAR**	**SIXRX BHAR**	**Matched-firm BHAR**
6-month	0.019	0.043	-0.054*	0.000
	(0.40)	(0.79)	(-1.67)	(0.01)
1-year	0.085	0.100	-0.103***	-0.027
	(0.75)	(0.83)	(-2.66)	(-0.65)
1.5-year	0.066	0.035	-0.136**	-0.050
	(0.65)	(0.31)	(-2.52)	(-0.88)
2-year	0.021	-0.025	-0.197***	-0.107*
	(0.22)	(-0.21)	(-3.44)	(-1.78)
2.5-year	-0.030	-0.014	-0.238***	-0.176**
	(-0.35)	(-0.13)	(-3.48)	(-2.53)
3-year	-0.036	-0.04	-0.338***	-0.305***
	(-0.34)	(-0.33)	(-5.13)	(-4.15)

Notes: Buy-and-hold abnormal returns (BHARs) are reported for IPOs issued in cold and hot market conditions over horizons from 6 months to 3 years. SIXRX BHARs are calculated using the SIX Return Index as the market benchmark, while matched-firm BHARs are calculated relative to size- and value-matched benchmark firms. Cold and hot market conditions are defined based on IPO volume, as described in Section 4.4.1. N=95 (Cold), 209 (Hot). Values in parentheses are skewness-adjusted t-statistics. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Turning to earnings management, Table 12 reports long-run abnormal returns for IPOs classified as conservative and aggressive based on discretionary current accruals. The results show negative abnormal returns for both groups over longer horizons, although the pattern is more pronounced among aggressive earnings-management firms.

For conservative firms, abnormal returns turn negative over longer horizons and become statistically significant mainly between the 2- and 3-year horizons. At 3-years, the matched-firm BHAR is −16.5%, significant at the 10% level. Aggressive firms show weaker long-run performance, particularly under the matched-firm benchmark, where the three-year BHAR reaches −28.4% and is significant at the 1% level.

Table 12. Abnormal Returns of the IPOs: Conservative versus Aggressive Earnings Management

	Conservative		Aggressive	
	SIXRX BHAR	**Matched-firm BHAR**	**SIXRX BHAR**	**Matched-firm BHAR**
6-month	-0.014	0.040	-0.047	-0.011
	(-0.40)	(0.94)	(-1.18)	(-0.27)
1-year	-0.054	0.006	-0.036	0.019
	(-0.86)	(0.08)	(-0.56)	(0.30)
1.5-year	-0.105*	-0.074	-0.046	0.024
	(-1.89)	(-1.22)	(-0.56)	(0.29)
2-year	-0.149**	-0.126*	-0.115	-0.042
	(-2.30)	(-1.69)	(-1.50)	(-0.51)
2.5-year	-0.154*	-0.102	-0.199***	-0.153**
	(-1.86)	(-1.14)	(-2.7)	(-2.04)
3-year	-0.235***	-0.165*	-0.264***	-0.284***
	(-2.68)	(-1.69)	(-3.66)	(-3.51)

Notes: Buy-and-hold abnormal returns (BHARs) are reported for IPOs classified as aggressive and conservative earnings management firms over horizons from 6 months to 3 years. SIXRX BHARs are calculated using the SIX Return Index as the market benchmark, while matched-firm BHARs are calculated relative to size- and value-matched benchmark firms. The aggressive and conservative earnings management groups are defined using a median split based on the earnings management method described in Section 4.5. N=148 (Conservative), 156 (Aggressive). Values in parentheses are skewness-adjusted t-statistics. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

The earnings-management split gives a less uniform picture compared to market conditions. Aggressive firms show weaker 3-year performance than conservative firms, especially under the matched-firm benchmark, with BHARs of -28.4% and -16.5%, respectively. Since conservative firms also underperform over longer horizons, the results suggest that high discretionary current accruals contribute to weaker post-IPO performance but do not seem to fully account for the overall underperformance pattern.

5.3.3. Earnings Management Results within Hot and Cold Markets

Having examined market conditions and earnings-management groups separately, we next combine the two dimensions. Table 13 reports results for IPOs issued in cold markets, divided into conservative and aggressive earnings-management groups, while Table 14 presents the corresponding results for IPOs issued in hot markets.

Among the four subgroups, conservative firms issued in cold markets stand out as the only group that does not exhibit long-run underperformance. Instead, these firms generate positive abnormal returns at all horizons except from 1.5- and 2-year matched-sample BHAR.

BHAR of matched firms is 15.0% at 6-months timepoint, and significantly different from zero at the 10% level. While estimates become insignificant over longer time periods, they stay positive after 3-years based on both SIXRX BHAR and matched-firm BHAR.

Aggressive firms in cold markets display a weaker return profile. Abnormal returns are mostly close to zero or positive during the first two years but become clearly negative toward the end of the holding period. At the 3-year horizon, both benchmarks indicate underperformance. The SIXRX-adjusted BHAR is −18.0% and the matched-firm BHAR is −17.7%. Both estimates are statistically significant at the 10% level.

It seems like the cold-market results indicate that IPOs issued in cold markets do not underperform as a group. Conservative firms show no clear sign of long-run underperformance, while weaker returns are mainly found among aggressive firms. This suggests that earnings-management matters within cold markets. However, the subgroup results should still be read carefully, especially for the cold-market groups as they are small and average BHARs can easily be affected by individual observations.

Table 13. Abnormal Returns of the IPOs: Cold Market Condition versus Earnings Management

	Cold Market			
	Conservative		**Aggressive**	
	SIXRX BHAR	**Matched-firm BHAR**	**SIXRX BHAR**	**Matched-firm BHAR**
6-month	0.108	0.150*	-0.055	-0.045
	(1.47)	(1.75)	(-0.90)	(-0.66)
1-year	0.117	0.116	0.058	0.087
	(0.67)	(0.60)	(0.39)	(0.54)
1.5-year	0.087	-0.019	0.047	0.082
	(0.74)	(-0.13)	(0.30)	(0.49)
2-year	0.083	-0.074	-0.029	0.017
	(0.55)	(-0.36)	(-0.21)	(0.12)
2.5-year	0.106	0.075	-0.147	-0.093
	(0.82)	(0.43)	(-1.24)	(-0.74)
3-year	0.130	0.113	-0.180*	-0.177*
	(0.67)	(0.49)	(-1.93)	(-1.80)

Notes: Buy-and-hold abnormal returns (BHARs) are presented for IPOs issued in cold market conditions. The IPOs are divided into conservative and aggressive earnings management groups, with returns reported over horizons from 6 months to 3 years. SIXRX BHARs are calculated using the SIX Return Index as the market benchmark, while matched-firm BHARs are calculated relative to size- and value-matched benchmark firms. Cold market conditions are defined based on IPO volume, as described in Section 4.4.1. Conservative and aggressive earnings management groups are determined using a median split on the earnings management measure described in Section 4.5. N=43 (Cold-Conservative), 52 (Cold-Aggressive). Values in parentheses are skewness-adjusted t-statistics. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Hot-market IPOs display a much stronger underperformance pattern, seen in Table 14. Negative BHARs appear in both earnings-management groups and become larger over longer horizons. Among conservative firms, the 3-year BHAR is −37.3% relative to SIXRX and −27.7% relative to matched firms, both significant at the 1% level. Aggressive firms show a similar pattern, with a three-year SIXRX-adjusted BHAR of −30.1% and a matched-firm BHAR of −33.2%, also

significant at the 1% level. Significance appears earlier under the SIXRX benchmark than under the matched-firm benchmark. Under SIXRX, several estimates are significant from the 6-month or 1-year horizon, while matched-firm BHARs become significant mainly from the 2-year horizon onward.

Table 14. Abnormal Returns of the IPOs: Hot Market Condition versus Earnings Management

	Hot Market			
	Conservative		**Aggressive**	
	SIXRX BHAR	**Matched-firm BHAR**	**SIXRX BHAR**	**Matched-firm BHAR**
6-month	-0.065*	-0.006	-0.042	-0.006
	(-1.65)	(-0.11)	(-0.83)	(-0.12)
1-year	-0.122**	-0.040	-0.083	-0.013
	(-2.39)	(-0.71)	(-1.43)	(-0.22)
1.5-year	-0.182***	-0.097	-0.089	-0.003
	(-3.08)	(-1.64)	(-0.97)	(-0.03)
2-year	-0.238***	-0.146**	-0.156*	-0.069
	(-3.56)	(-2.19)	(-1.66)	(-0.68)
2.5-year	-0.253**	-0.172*	-0.223**	-0.180*
	(-2.51)	(-1.66)	(-2.34)	(-1.94)
3-year	-0.373***	-0.277***	-0.301***	-0.332***
	(-4.05)	(-2.80)	(-3.14)	(-3.08)

Notes: Buy-and-hold abnormal returns (BHARs) are presented for IPOs issued in hot market conditions. The IPOs are divided into conservative and aggressive earnings management groups, with returns reported over horizons from 6 months to 3 years. SIXRX BHARs are calculated using the SIX Return Index as the market benchmark, while matched-firm BHARs are calculated relative to size- and value-matched benchmark firms. Hot market conditions are defined based on IPO volume, as described in Section 4.4.1. Conservative and aggressive earnings management groups are determined using a median split based on the earnings management measure described in Section 4.5. N=105 (Hot-Conservative), 104 (Hot-Aggressive). Values in parentheses are skewness-adjusted t-statistics. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Overall, the subgroup results indicate that long-run underperformance is most clearly linked to going public during a hot-market. Table 11 shows that hot-market IPOs clearly underperform, while cold-market IPOs do not have a statistically significant negative BHAR pattern. The results in Tables 13 and 14 support these findings. Both conservative and aggressive IPOs issued in hot markets have large negative 3-year BHARs, whereas the cold-market results are weaker and more mixed. However, it still seems like earnings management matters, as aggressive firms record lower 3-year matched-firm BHARs than conservative firms within both cold and hot markets. Yet the substantial underperformance of conservative hot-market firms suggests that earnings management does not explain the full return pattern on its own. Overall, the results partially support Hypothesis 2, as higher discretionary current accruals are associated with weaker long-run returns. However, contrary to the predicted interaction, the effect of earnings management on post-IPO performance appears more apparent among cold market issuers than hot market issuers, where underperformance occurs regardless of reporting behaviour.

6. Discussion

Our empirical results provide nuanced but informative evidence on earnings management around Swedish IPOs, its variation across hot and cold markets, and its relation to long-run post-IPO performance. Discretionary current accruals appear higher in the IPO fiscal year, which aligns with prior earnings management literature and the idea that managers have stronger incentives and opportunities to manage earnings around a listing event. However, we find no support for the hypothesis that discretionary current accruals are higher among hot markets IPOs than among cold market IPOs. This may possibly be because weaker investor demand creates stronger pressure to present favourable financials, a reasoning consistent with Premti and Madura (2013). Turning to long-run performance, we observe indications of firms classified in the aggressive bucket underperforming relative to conservative firms, with this distinction most apparent for cold markets. In hot markets, both groups underperform substantially with limited differentiation. Market conditions thus appear to be the primary driver of long-run underperformance for IPO firms, suggesting that earnings management matters less when sentiment driven overvaluation is already present, a finding broadly consistent with Lin et al. (2021).

6.1. Earnings Management Around Swedish IPOs (H1a)

Hypothesis 1a predicts that firms going public in Sweden exhibit income-increasing discretionary current accruals around the IPO. The empirical analysis tests this prediction by examining whether discretionary current accruals differ from zero in the fiscal year preceding the IPO, the IPO fiscal year, and the first full fiscal year after listing. Overall, the results provide supportive, although not conclusive, evidence for H1a. The clearest indication of income-increasing discretionary current accruals appears in the IPO year itself, whereas the pre-IPO year provides no statistically significant evidence and the post-IPO year shows only marginal significance at the 10 percent level for the median.

Using all available observations at each event time, discretionary current accruals are positive in the IPO year, with a mean of 3.4 percent and a median of 1.3 percent of lagged total assets. The Wilcoxon signed-rank test indicates that median DCA in the IPO year is significantly greater than zero at the 5 percent level, while the one-sample t-test provides evidence of a positive mean only at the 10 percent level. Given the skewness and dispersion in the current accruals distribution, the non-parametric result is particularly informative. The balanced subsample of firms observed across the full event window displays a similar directional pattern, with the IPO year again showing the highest mean and median for discretionary current accruals. However, statistical support is limited to the median, which is significant at the 10 percent level. Taken together, these findings suggest that income-increasing discretionary current accruals are most evident in the offering year, rather than being uniformly elevated throughout the broader event window.

This pattern is broadly consistent with the theoretical reasoning underlying H1a. The IPO represents a period of heightened information asymmetry, as prospective investors have limited public information about the firm and must rely heavily on reported accounting numbers when assessing firm value. Managers and pre-IPO owners may therefore have incentives to present stronger financial performance around the time when the firm is being priced by the market. The finding that positive discretionary current accruals are most evident in the IPO fiscal year therefore aligns with the expectation that income-increasing reporting incentives are strongest around the offering itself.

More directly, the concentration of positive discretionary current accruals in the IPO fiscal year aligns with Teoh et al. (1998a), who document abnormally high discretionary current accruals in the offering year among U.S. issuers. The findings are also consistent, more generally, with Roosenboom et al. (2003) and Ahmad-Zaluki et al. (2007), who report evidence of accrual-based earnings management around IPOs in the Netherlands and Malaysia, respectively. At the same time, the Swedish evidence is more temporally concentrated than what is reported by Premti and Smith (2020), who find significantly positive discretionary accruals both before and after the offering in a large international sample. In the present study, statistical support is concentrated in the IPO fiscal year, while the pre- and post-IPO years do not provide comparable evidence. Taken together, the findings are broadly consistent with prior IPO earnings management research, while indicating that the Swedish evidence is concentrated more specifically in the IPO fiscal year.

Nevertheless, this interpretation requires caution, as discretionary current accruals are an imperfect proxy for earnings management. Positive discretionary current accruals around IPOs may partly reflect normal economic developments associated with firms entering public markets, such as rapid growth, revenue expansion, and changes in working capital requirements, rather than deliberate attempts to inflate earnings. Ball and Shivakumar (2008) argue that conventional accrual models may misclassify such IPO-related economic effects as discretionary reporting choices. This concern is relevant when interpreting the present findings. The results should therefore be interpreted as evidence consistent with income-increasing reporting behaviour among Swedish IPO firms, rather than as definitive proof of opportunistic earnings manipulation.

Taken together, H1a receives qualified support. The evidence points most clearly to positive discretionary current accruals in the IPO fiscal year, consistent with the view that heightened information asymmetry and valuation-related incentives may shape financial reporting around the offering. Although the pre- and post-IPO years do not provide comparable statistical support, the concentration of significant results in the IPO year suggests that income-increasing reporting behaviour is most pronounced during the period most closely associated with the public offering.

6.2. The Role of Market Conditions (H1b)

Hypothesis 1b predicts that income-increasing discretionary current accruals are more pronounced among firms going public during hot issuance markets than among firms listing during cold markets. The empirical analysis assesses this prediction by comparing discretionary current accruals between hot- and cold-market IPOs at each event time. Overall, the results do not support H1b. The only statistically significant difference appears in the pre-IPO year, but the sign is opposite to the predicted direction, as hot-market IPOs exhibit lower discretionary current accruals than cold-market IPOs. In the IPO fiscal year and the post-IPO year, the differences between hot- and cold-market IPOs are not statistically significant.

This finding contrasts with the theoretical expectation that hot markets should strengthen income-increasing reporting incentives. H1b is motivated by the idea that elevated investor sentiment and reduced scrutiny during hot issuance periods may increase both the benefits and the opportunity to present more favourable reported performance. However, the results suggest that hot market conditions are not associated with more pronounced discretionary current accruals in the Swedish IPO setting. Instead, the pre-IPO result is more consistent with the possibility that firms listing during colder markets face stronger incentives to enhance reported performance under less favourable issuance conditions. This interpretation is consistent with Premti and Madura (2013), who find that IPO firms entering the market during cold periods are more likely to have engaged in earnings management prior to the offering.

Overall, H1b is not supported. The evidence indicates that hot issuance markets are not associated with more pronounced income-increasing discretionary current accruals, and the only significant difference observed points instead to higher pre-IPO discretionary current accruals among cold-market issuers.

6.3. Long-Run Performance (H2)

In hypothesis 2, we set out to explore the relative roles of earnings management and market conditions in explaining long-run IPO underperformance, and whether these two dimensions interact as predicted in section 3.3. Building on Lin et al. (2021), we argued that hot market conditions would not only inflate valuations through sentiment driven demand, but also reduce investor attention to accounting quality, allowing a high degree of earnings management to compound already elevated prices and produce a more severe subsequent correction. Our results indicate that while both dimensions are associated with weaker post-IPO returns, market conditions play a more dominant role than earnings management in explaining why Swedish IPOs underperform in the long-run. Our hypothesis 2 is thereby partly supported, though the predicted interaction between market conditions and earnings management did not materialise as expected.

In specific, our full sample results confirmed the long-run underperformance puzzle documented in prior IPO literature (Ritter, 1991; Teoh et al., 1998a; Loughran and Ritter, 1995), with

Swedish IPO firms exhibiting clear abnormal underperformance over the 3-year post-listing horizon. When firms are separated solely by degree of earnings management, aggressive issuers exhibit weaker long-run returns than conservative issuers, which aligns with the predictions of Teoh et al. (1998a). However, when market conditions are also taken into account, the role of earnings management becomes conditional on the issuance environment and we obtain a more nuanced result. In cold markets, conservative issuers avoid underperformance entirely while aggressive issuers do not, suggesting that investors in these periods are sufficiently attentive to detect and price accrual based distortions over time, consistent with the higher scrutiny argument advanced by Ljungqvist et al. (2006). Viewed through a market sentiment lens instead, the distinction between hot and cold market IPOs is unambiguous regardless of earnings management classification, consistent with the argument that sentiment driven overvaluation is a first order determinant of long-run IPO outcomes (Baker and Wurgler, 2002; Loughran and Ritter, 1995; Lin et al., 2021).

Our findings suggest that the reason why prior literature finds earnings management to be an important factor in explaining long-run IPO underperformance (Teoh et al., 1998a; DuCharme et al., 2001; Roosenboom et al., 2003) is mainly because they fail to take market conditions fully into account. It also appears that earnings management matters more for long-run returns in cold markets compared to hot markets, where we find that underperformance occurs regardless of reporting behaviour. Hence, prospective investors and market participants should be particularly mindful of the broader market environment in which a firm goes public to better understand the drivers of long-run post-IPO performance.

Moreover, our findings point towards information asymmetry being a more compelling explanation for long-run IPO underperformance than earnings management alone. Hot markets, characterised by elevated issuance volume and strong investor demand, attract a broader pool of issuers including firms of lower quality that benefit from reduced investor scrutiny (Yung et al., 2008; Derrien, 2005). Under such conditions, information asymmetry between insiders and outside investors is amplified, not only regarding reported financials but also regarding fundamental firm quality (Rock, 1986; Ljungqvist, 2007). Earnings management is one channel through which this information gap can be exploited, but lower quality firms may equally obtain elevated valuations simply because sentiment reduces the overall due diligence applied to firms at the point of issuance. That hot market underperformance persists in our sample regardless of the degree of earnings management supports this interpretation and suggests that broader information asymmetry about firm quality, rather than accrual based distortions specifically, could be a better explanation for the long-run IPO underperformance.

In any case, the evidence presented here highlights the importance of considering both market conditions and earnings management together when studying long-run IPO underperformance, as focusing on either dimension alone risks an incomplete understanding of the underlying drivers.

7. Conclusions

7.1. Contribution of thesis

By examining the interaction between earnings management and market sentiment, this thesis contributes to the IPO literature in a Swedish setting. Prior studies have documented accrual-based earnings management around IPOs and long-run IPO underperformance, but these explanations have often been studied separately (Teoh et al., 1998a; Ritter, 1991; Loughran and Ritter, 1995). Linking discretionary current accruals, hot and cold issuance markets, and subsequent stock returns makes it possible to assess whether reporting behaviour around the IPO becomes more relevant when investor sentiment is high. This is particularly relevant in Sweden, where IPO research has mainly focused on underpricing and aftermarket performance, while less is known about earnings management around the listing (Westerholm, 2006).

A central contribution lies in evaluating earnings management in relation to the market environment in which firms go public. The results provide some evidence of income-increasing accruals in the IPO fiscal year, but do not show that hot markets are associated with more aggressive earnings management. At the same time, earnings management appears to matter differently across market states, as aggressive firms in cold markets experience particularly weak long-run returns. This is in line with Lin et al. (2021), who argue that the effect of earnings management on post-IPO performance depends on the issuance environment.

These findings are mainly relevant for investors and future research. For investors, the results suggest that accounting quality around IPOs should be assessed together with the broader issuance environment, since strong IPO activity may reflect investor optimism rather than firm quality. From a research perspective, the thesis shows the value of studying earnings management and market timing jointly, especially in smaller markets where IPO waves are pronounced and prior evidence remains limited.

7.2. Limitations

This thesis is subject to several limitations relevant for interpreting the empirical findings. First, the research design identifies associations rather than causal effects. Firms are not randomly assigned to hot or cold markets, nor to aggressive or conservative earnings-management groups. The results therefore show how discretionary current accruals, market conditions, and long-run returns are related, but they cannot establish that earnings management or market sentiment directly causes subsequent underperformance. This is particularly important because unobserved firm characteristics, such as risk, ownership structure, listing motives, or firm quality, may influence both the decision to go public and subsequent stock performance. Although the matched benchmark tries to control for some of these characteristics, it is far from fully eliminating the possibility that unobserved firm-level factors affect the results.

A second limitation concerns the measurement of earnings management. The thesis relies on discretionary current accruals estimated through a modified Jones-type model, which is consistent with prior IPO earnings-management research. However, such models remain imperfect proxies for managerial discretion. For IPO firms, abnormal accruals may reflect opportunistic reporting, but they may also capture genuine working-capital needs, rapid growth, or model misspecification (Kothari et al., 2005; Ball and Shivakumar, 2008). In addition, the thesis focuses only on accrual-based earnings management. It does not examine real earnings management, such as changes in investment, production, or operating decisions, even though these may also be relevant around IPOs.

Moreover, the decision to solely focus on Sweden also involves a trade-off. Focusing on one country strengthens the hot and cold market classification, since IPO sentiment can differ across markets at the same point in time. A broader Nordic sample, for example, could therefore have blurred the distinction between hot and cold periods. At the same time, this choice reduces sample size and requires the inclusion of several Swedish exchanges with different listing requirements. While this better reflects the full Swedish IPO market, it also introduces variation across listing environments that may affect both reporting incentives and long-run performance. However, our limited sample size is a clear concern and especially in the subgroup analyses where the number of observations falls below 50 in some cold-market samples. Results should consequently be interpreted with considerable caution, as small samples reduce statistical power and make estimates more sensitive to individual observations.

Finally, our thesis solely adopts an event-time approach using BHAR. Calendar-time tests could have provided an additional robustness check, however mainly due to the limited number of Swedish IPO observations in many periods, and the scope of our thesis, it was not pursued.

7.3. Suggestions for future research

Future research could extend this thesis in several directions. Following Lin et al. (2021), future studies could examine whether the interaction between earnings management and market conditions differs across institutional settings by comparing Sweden with other European markets or with emerging markets. This would help clarify whether the Swedish results reflect a broader pattern or are shaped by country-specific market characteristics.

We further encourage replication of this study using alternative methodological choices. Future studies could apply other accrual models, alternative definitions of hot and cold markets, or different measures of long-run performance to assess whether the findings are robust to research design. Such studies could also incorporate more direct measures of investor sentiment, including IPO oversubscription, first-day returns, media attention, retail participation, or valuation multiples at issuance. This would make it possible to distinguish more clearly between accounting-based explanations and broader market-timing explanations for long-run underperformance.

References

Ahmad-Zaluki, N. A., Campbell, K., & Goodacre, A. (2007). Earnings management in Malaysian IPOs: The East Asian crisis, ownership control, and post-IPO performance. *The International Journal of Accounting, 42*(2), 111–137. https://doi.org/10.1016/j.intacc.2007.04.001

Alhadab, M., Clacher, I., & Keasey, K. (2016). A comparative analysis of real and accrual earnings management around initial public offerings under different regulatory environments. *Journal of Business Finance & Accounting, 43*(7–8), 849–871. https://doi.org/10.1111/jbfa.12201

Baker, M., & Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance, 57*(1), 1–32. https://doi.org/10.1111/1540-6261.00414

Ball, R., & Shivakumar, L. (2008). Earnings quality at initial public offerings. *Journal of Accounting and Economics, 45*(2–3), 324–349. https://doi.org/10.1016/j.jacceco.2007.12.001

Barber, B. M., & Lyon, J. D. (1997). Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics, 43*(3), 341–372. https://doi.org/10.1016/S0304-405X(96)00890-2

Beatty, R. P., & Ritter, J. R. (1986). Investment banking, reputation, and the underpricing of initial public offerings. *Journal of Financial Economics, 15*(1–2), 213–232. https://doi.org/10.1016/0304-405X(86)90055-3

Boulton, T. J., Smart, S. B., & Zutter, C. J. (2011). Earnings quality and international IPO underpricing. *The Accounting Review, 86*(2), 483–505. https://doi.org/10.2308/accr.00000018

Brav, A. (2000). Inference in long-horizon event studies: A Bayesian approach with application to initial public offerings. *The Journal of Finance, 55*(5), 1979–2016. https://doi.org/10.1111/0022-1082.00279

Brav, A., & Gompers, P. A. (1997). Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and nonventure capital-backed companies. *The Journal of Finance, 52*(5), 1791–1821. https://doi.org/10.1111/j.1540-6261.1997.tb02742.x

Certo, S. T., Holcomb, T. R., & Holmes, R. M., Jr. (2009). IPO research in management and entrepreneurship: Moving the agenda forward. *Journal of Management, 35*(6), 1340–1378. https://doi.org/10.1177/0149206309347375

Chang, S.-C., Chung, T.-Y., & Lin, W.-C. (2010). Underwriter reputation, earnings management and the long-run performance of initial public offerings. *Accounting & Finance, 50*(1), 53–78. https://doi.org/10.1111/j.1467-629X.2009.00329.x

Chemmanur, T. J., & Fulghieri, P. (1999). A theory of the going-public decision. *The Review of Financial Studies, 12*(2), 249–279. https://doi.org/10.1093/rfs/12.2.249

DeAngelo, L. E. (1986). Accounting numbers as market valuation substitutes: A study of management buyouts of public stockholders. *The Accounting Review, 61*(3), 400–420.

Dechow, P. M. (1994). Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics, 18*(1), 3–42. https://doi.org/10.1016/0165-4101(94)90016-7

Dechow, P. M., Ge, W., & Schrand, C. M. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics, 50*(2–3), 344–401. https://doi.org/10.1016/j.jacceco.2010.09.001

Dechow, P. M., & Skinner, D. J. (2000). Earnings management: Reconciling the views of accounting academics, practitioners, and regulators. *Accounting Horizons, 14*(2), 235–250. https://doi.org/10.2308/acch.2000.14.2.235

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *The Accounting Review, 70*(2), 193–225.

Delacre, M., Lakens, D., & Leys, C. (2017). Why psychologists should by default use Welch's *t*-test instead of Student's *t*-test. *International Review of Social Psychology, 30*(1), 92–101. https://doi.org/10.5334/irsp.82

Derrien, F. (2005). IPO pricing in "hot" market conditions: Who leaves money on the table? *The Journal of Finance, 60*(1), 487–521. https://doi.org/10.1111/j.1540-6261.2005.00736.x

DuCharme, L. L., Malatesta, P. H., & Sefcik, S. E. (2001). Earnings management: IPO valuation and subsequent performance. *Journal of Accounting, Auditing & Finance, 16*(4), 369–396. https://doi.org/10.1177/0148558X0101600409

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance, 25*(2), 383–417. https://doi.org/10.2307/2325486

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33*(1), 3–56. https://doi.org/10.1016/0304-405X(93)90023-5

Fama, E. F., & French, K. R. (2012). Size, value, and momentum in international stock returns. *Journal of Financial Economics, 105*(3), 457–472. https://doi.org/10.1016/j.jfineco.2012.05.011

Healy, P. M. (1985). The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics, 7*(1–3), 85–107. https://doi.org/10.1016/0165-4101(85)90029-1

Healy, P. M., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons, 13*(4), 365–383. https://doi.org/10.2308/acch.1999.13.4.365

Helwege, J., & Liang, N. (2004). Initial public offerings in hot and cold markets. *Journal of Financial and Quantitative Analysis, 39*(3), 541–569. https://doi.org/10.1017/S0022109000004026

Ibbotson, R. G., & Jaffe, J. F. (1975). "Hot issue" markets. *The Journal of Finance, 30*(4), 1027–1042. https://doi.org/10.1111/j.1540-6261.1975.tb01019.x

Ibbotson, R. G., Sindelar, J. L., & Ritter, J. R. (1994). The market's problems with the pricing of initial public offerings. *Journal of Applied Corporate Finance, 7*(1), 66–74. https://doi.org/10.1111/j.1745-6622.1994.tb00395.x

Ince, O. S., & Porter, R. B. (2006). Individual equity return data from Thomson Datastream: Handle with care! *Journal of Financial Research, 29*(4), 463–479. https://doi.org/10.1111/j.1475-6803.2006.00189.x

Jackson, A. B. (2018). Discretionary accruals: Earnings management … or not? *Abacus, 54*(2), 136–153. https://doi.org/10.1111/abac.12117

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research, 29*(2), 193–228. https://doi.org/10.2307/2491047

Kothari, S. P., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics, 39*(1), 163–197. https://doi.org/10.1016/j.jacceco.2004.11.002

Kothari, S. P., & Warner, J. B. (2007). Econometrics of event studies. In B. E. Eckbo (Ed.), *Handbook of corporate finance: Empirical corporate finance* (Vol. 1, pp. 3–36). Elsevier. https://doi.org/10.1016/B978-0-444-53265-7.50015-9

Levis, M. (1993). The long-run performance of initial public offerings: The UK experience 1980–1988. *Financial Management, 22*(1), 28–41. https://doi.org/10.2307/3665963

Lin, T.-Y., Yu, J., & Lin, C.-Y. (2021). IPO's long-run performance: Hot market versus earnings management. *Journal of Risk and Financial Management, 14*(3), 132. https://doi.org/10.3390/jrfm14030132

Linnainmaa, J. T., & Roberts, M. R. (2018). The history of the cross-section of stock returns. *The Review of Financial Studies, 31*(7), 2606–2649. https://doi.org/10.1093/rfs/hhy030

Ljungqvist, A. (2007). IPO underpricing. In B. E. Eckbo (Ed.), *Handbook of corporate finance: Empirical corporate finance* (Vol. 1, pp. 375–422). Elsevier. https://doi.org/10.1016/B978-0-444-53265-7.50021-4

Ljungqvist, A., Nanda, V., & Singh, R. (2006). Hot markets, investor sentiment, and IPO pricing. *The Journal of Business, 79*(4), 1667–1702. https://doi.org/10.1086/503644

Loughran, T., Ritter, J. R., & Rydqvist, K. (1994). Initial public offerings: International insights. *Pacific-Basin Finance Journal, 2*(2–3), 165–199. https://doi.org/10.1016/0927-538X(94)90016-7

Loughran, T., & Ritter, J. R. (1995). The new issues puzzle. *The Journal of Finance, 50*(1), 23–51. https://doi.org/10.1111/j.1540-6261.1995.tb05166.x

Loughran, T., & Ritter, J. R. (2000). Uniformly least powerful tests of market efficiency. *Journal of Financial Economics, 55*(3), 361–389. https://doi.org/10.1016/S0304-405X(99)00054-9

Lowry, M. (2003). Why does IPO volume fluctuate so much? *Journal of Financial Economics, 67*(1), 3–40. https://doi.org/10.1016/S0304-405X(02)00230-1

Lyon, J. D., Barber, B. M., & Tsai, C.-L. (1999). Improved methods for tests of long-run abnormal stock returns. *The Journal of Finance, 54*(1), 165–201. https://doi.org/10.1111/0022-1082.00101

Mitchell, M. L., & Stafford, E. (2000). Managerial decisions and long-term stock price performance. *The Journal of Business, 73*(3), 287–329. https://doi.org/10.1086/209645

Nasdaq. (2026). *Rules & regulations: First North MTF rules*. Retrieved from https://www.nasdaq.com/market-regulation/nordic/first-north-mtf-rules

Nasdaq. (2025). *European surveillance annual report 2024*. Nasdaq. https://www.nasdaq.com/docs/2025/04/23/European-Surveillance-Annual-Report-2024.pdf

OECD. (2026). *The Swedish equity market: Assessment and policy recommendations 2026*. OECD Publishing. https://doi.org/10.1787/0db1ebf9-en

Pastor-Llorca, M. J., & Poveda, F. (2006). Earnings management and the long-run performance of Spanish initial public offerings. *Revista de Contabilidad y Tributación. CEF, 284*, 157–192. https://doi.org/10.51302/rcyt.2006.8233

Premti, A., & Madura, J. (2013). Earnings management during the pre-IPO process: Biases and predictors. *Research in International Business and Finance, 28*, 48–64. https://doi.org/10.1016/j.ribaf.2012.09.002

Premti, A., & Smith, G. (2020). Earnings management in IPOs: Evidence from an international sample. *Research in International Business and Finance, 54*, 101256. https://doi.org/10.1016/j.ribaf.2020.101256

Richardson, S. A., Sloan, R. G., Soliman, M. T., & Tuna, İ. (2005). Accrual reliability, earnings persistence and stock prices. *Journal of Accounting and Economics, 39*(3), 437–485. https://doi.org/10.1016/j.jacceco.2005.04.005

Ritter, J. R. (1984). The "hot issue" market of 1980. *The Journal of Business, 57*(2), 215–240. https://doi.org/10.1086/296260

Ritter, J. R. (1991). The long-run performance of initial public offerings. *The Journal of Finance, 46*(1), 3–27. https://doi.org/10.1111/j.1540-6261.1991.tb03743.x

Ritter, J. R., & Welch, I. (2002). A review of IPO activity, pricing, and allocations. *The Journal of Finance, 57*(4), 1795–1828. https://doi.org/10.1111/1540-6261.00478

Rock, K. (1986). Why new issues are underpriced. *Journal of Financial Economics, 15*(1–2), 187–212. https://doi.org/10.1016/0304-405X(86)90054-1

Roosenboom, P. (2007). How do underwriters value initial public offerings? An empirical analysis of the French IPO market. *Contemporary Accounting Research, 24*(4), 1217–1243. https://doi.org/10.1506/car.24.4.7

Roosenboom, P., van der Goot, T., & Mertens, G. (2003). Earnings management and initial public offerings: Evidence from the Netherlands. *The International Journal of Accounting, 38*(3), 243–266. https://doi.org/10.1016/S0020-7063(03)00048-7

Sletten, E., Ertimur, Y., Sunder, J., & Weber, J. (2018). When and why do IPO firms manage earnings? *Review of Accounting Studies, 23*, 872–906. https://doi.org/10.1007/s11142-018-9445-3

Teoh, S. H., Welch, I., & Wong, T. J. (1998a). Earnings management and the long-run market performance of initial public offerings. *The Journal of Finance, 53*(6), 1935–1974. https://doi.org/10.1111/0022-1082.00079

Titman, S., & Trueman, B. (1986). Information quality and the valuation of new issues. *Journal of Accounting and Economics, 8*(2), 159–172. https://doi.org/10.1016/0165-4101(86)90016-9

Vijh, A. M. (1999). Long-term returns from equity carveouts. *Journal of Financial Economics, 51*(2), 273–308. https://doi.org/10.1016/S0304-405X(98)00065-8

Wang, W., & Yung, C. (2018). IPO information aggregation and underwriter quality. *Review of Finance, 22*(2), 611–646. https://doi.org/10.1093/rof/rfx006

Westerholm, P. J. (2006). Industry clustering in Nordic initial public offering markets. *International Review of Finance, 6*(1–2), 25–41. https://doi.org/10.1111/j.1468-2443.2007.00058.x

Whitley, E., & Ball, J. (2002). Statistics review 6: Nonparametric methods. *Critical Care, 6*, 509–513. https://doi.org/10.1186/cc1820

Yung, C., Çolak, G., & Wang, W. (2008). Cycles in the IPO market. *Journal of Financial Economics, 89*(1), 192–208. https://doi.org/10.1016/j.jfineco.2007.06.007

Appendix

Appendix A: Sample Distribution by IPO Year

Table A1: IPO Sample Distribution by Listing Year

IPO Year	Freq.	%	Cum. Freq.	Cum. %
1994	3	0.9	3	0.9
1996	1	0.3	4	1.2
1997	3	0.9	7	2.1
1998	7	2.1	14	4.3
1999	8	2.5	22	6.7
2000	12	3.7	34	10.4
2001	5	1.5	39	12.0
2002	4	1.2	43	13.2
2004	2	0.6	45	13.8
2005	2	0.6	47	14.4
2006	3	0.9	50	15.3
2007	9	2.8	59	18.1
2008	2	0.6	61	18.7
2010	10	3.1	71	21.8
2011	8	2.5	79	24.2
2014	10	3.1	89	27.3
2015	21	6.4	110	33.7
2016	25	7.7	135	41.4
2017	43	13.2	178	54.6
2018	17	5.2	195	59.8
2019	5	1.5	200	61.3
2020	14	4.3	214	65.6
2021	79	24.2	293	89.9
2022	22	6.7	315	96.6
2023	3	0.9	318	97.5
2024	6	1.8	324	99.4
2025	2	0.6	326	100.0
Total	**326**	**100.0**		

Notes: This table reports the listing-year distribution of IPO firms with available discretionary current accruals (DCA) at event time $t = 0$. Years with no IPO observations are omitted.

Appendix B: Robustness Tests H1a

Robustness: Summary Statistics of Discretionary Current Accruals Results by Event Time (Winsorized)

	N	Mean	Median	Std. dev.	t-stat	p-value (t-test)	p-value (Wilcoxon)	% with DCA>0
t = -1	270	−0.008	0.002	0.365	−0.36	0.719	0.590	51.9
t = 0	326	0.025	0.013	0.262	1.70	0.090	0.039	56.1
t = +1	360	0.008	0.005	0.139	1.10	0.274	0.076	54.4

Notes: This table replicates Table 5 with DCA winsorized at the 1st and 99th percentiles within each event time. All other specifications are identical. All tests are two-tailed.

Robustness: Summary Statistics of Discretionary Current Accruals Results by Event Time (FF30)

	N	Mean	Median	Std. dev.	T-stat	p-value (t-test)	p-value (Wilcoxon)	% with DCA>0
t = −1	253	−0.005	−0.009	0.622	−0.13	0.898	0.745	46.2
t = 0	302	0.036	0.016	0.365	1.73	0.084	0.007	57.3
t = +1	328	−0.010	−0.001	0.240	−0.75	0.452	0.775	49.4

Notes: This table replicates Table 5 using Fama-French 30 industry classification instead of FF17. All other specifications are identical. The sample is smaller (302 vs 326 at t = 0) because finer industry groups result in more industry-year cells falling below the minimum threshold of 10 peer firms. All tests are two-tailed. DCA values are not winsorized.

Robustness: Summary Statistics of Discretionary Current Accruals Results by Event Time (Scaling Threshold = 10)

	N	Mean	Median	Std. dev.	T-stat	p-value (t-test)	p-value (Wilcoxon)	% with DCA>0
t = −1	271	−0.014	0.008	0.462	−0.51	0.608	0.277	54.2
t = 0	329	0.013	0.012	0.436	0.55	0.585	0.088	55.0
t = +1	362	0.001	0.004	0.237	0.06	0.954	0.117	53.6

Notes: This table replicates Table 5 with the exclusion threshold for the scaled variables set to 10 instead of 5. All other specifications are identical.

Robustness: Summary Statistics of Discretionary Current Accruals Results by Event Time (Scaling Threshold = 1)

	N	Mean	Median	Std. dev.	T-stat	p-value (t-test)	p-value (Wilcoxon)	% with DCA>0
$t = -1$	230	−0.020	−0.009	0.212	−1.46	0.145	0.118	44.3
$t = 0$	291	0.023	0.006	0.205	1.90	0.058	0.135	52.9
$t = +1$	345	0.001	0.001	0.120	0.06	0.953	0.760	50.1

Notes: This table replicates Table 5 with the exclusion threshold for the scaled variables set to 1 instead of 5. All other specifications are identical.

Robustness: Summary Statistics of Discretionary Current Accruals Results by Event Time (Jones Model)

	N	Mean	Median	Std. dev.	t-stat	p-value (t-test)	p-value (Wilcoxon)	% with DCA>0
$t = -1$	270	–0.018	0.004	0.462	–0.64	0.520	0.551	52.2
$t = 0$	326	0.031	0.007	0.340	1.64	0.102	0.095	54.6
$t = +1$	360	–0.003	0.004	0.235	–0.27	0.790	0.121	54.7

Notes: This table replicates Table 5 with the Jones model. All other specifications are identical.

Appendix C: Robustness Tests H1b

Robustness: Two-Sample Comparison of Discretionary Current Accruals: Hot vs Cold Market IPOs (Threshold = 1.5)

		N	Mean	Median	Std. dev.	t-stat	p-value (t-test)	p-value (Wilcoxon)	% with DCA>0
t = -1	Hot	202	-0.038	-0.007	0.514				47.5
	Cold	65	0.045	0.024	0.217				63.1
	Diff					*-1.83*	*0.068*	*0.040*	
t = 0	Hot	240	0.039	0.009	0.371				54.2
	Cold	83	0.018	0.018	0.273				62.7
	Diff					*0.56*	*0.576*	*0.564*	
t = +1	Hot	250	-0.009	0.003	0.259				54.0
	Cold	103	0.014	0.005	0.133				53.4
	Diff					*-1.08*	*0.280*	*0.899*	

Notes: This table replicates Table 8 with hot and cold markets classified using a threshold of 1.5 times the historical average. All other specifications are identical.

Robustness: Two-Sample Comparison of Discretionary Current Accruals: Hot vs Cold Market IPOs (Threshold = 1.7)

		N	Mean	Median	Std. dev.	t-stat	p-value (t-test)	p-value (Wilcoxon)	% with DCA>0
t = -1	Hot	185	-0.046	-0.010	0.539				46.5
	Cold	82	0.045	0.027	0.210				62.2
	Diff					*-1.98*	*0.049*	*0.015*	
t = 0	Hot	211	0.043	0.009	0.379				54.5
	Cold	112	0.016	0.017	0.282				59.8
	Diff					*0.73*	*0.468*	*0.682*	
t = +1	Hot	223	-0.015	0.002	0.287				52.9
	Cold	130	0.018	0.008	0.121				55.4
	Diff					*-1.51*	*0.132*	*0.471*	

Notes: This table replicates Table 8 with hot and cold markets classified using a threshold of 1.7 times the historical average. All other specifications are identical.

Appendix D: Disclosure of Generative AI Tool Usage

Two generative AI tools were used during the development of this thesis, ChatGPT and Claude. These tools supported different stages of the work, primarily by improving efficiency in statistical coding, literature navigation, and writing refinement.

While AI can be of great value as a support and efficiency tool, it is also important to acknowledge the risks associated with its use, including inaccurate outputs, unsupported claims and overreliance on generated text. To reduce these risks, we consistently sought to triangulate AI-generated outputs against our own data, relevant academic sources, and discussions with our supervisor.

We used Claude Code primarily to support statistical programming in STATA. More specifically, it was used to generate and troubleshoot code based on the statistical models, datasets, and specifications we provided. This included coding related to discretionary current accruals, hot and cold market classification, subgroup formation, and long-run return calculations. The tool made the empirical workflow more efficient, but the underlying data, model logic, and output were reviewed by us throughout the process. This helped ensure that we understood the drivers of the results rather than relying mechanically on generated code, while also being more efficient.

ChatGPT was used for language-related support, such as grammar checks, sentence restructuring, and suggestions for clearer academic phrasing. These outputs were treated as suggestions rather than final text, and the final wording and interpretation remained our responsibility. Its value in this regard was that it provided an additional layer of feedback similar to an iterative editorial tool.

The main insight gained from using AI tools is that they can improve efficiency and structure in the thesis process, but only when used critically and combined with independent verification, subject knowledge and active judgment based on knowledge.