Are Accruals Mispriced? Evidence from Sweden

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Abstract

We investigate whether Sloan's (1996) accrual-based trading strategy extended with discretionary accrual measures could be applied to the Swedish market in 1998-2010. To increase the strength of our conclusions, we base our study on two alternative measures of discretionary accruals: the widely used Modified Jones (Dechow et al., 1995) and recently introduced Ibrahim (2009) models. Sloan shows that a strategy based on total accruals generates risk-adjusted return of 10.4% when applied to U.S. data between 1962 and 1991. Xie (2001) argues that this return is driven by component of accruals attributable to management discretion. We find that the strategy based on discretionary accruals is successful when applied to the portfolio of Swedish industrial companies: buying income-decreasing and short selling income-increasing companies generated risk-adjusted return of 14.4% before 2005. We find no mispricing when strategy is applied to Swedish market as a whole. However, this finding is contaminated by poor quality of discretionary accrual estimates in this sample. In addition to prior studies, we test how returns to the strategy changed over time and find no evidence of mispricing after IFRS was officially introduced in Sweden in 2005. Overall, our findings suggest that analysis of accruals could have been used to detect mispriced securities of manufacturing companies.

Keywords: Accrual Anomaly, Accruals, Discretionary Accruals, Jones model, Market Efficiency

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Acronyms

B/M	Book-to-Market
CAPM	Capital Asset Pricing Model
DA	Discretionary Accruals
DS	Thomson Reuters Datastream
HML	High-Minus-Low
MSCI	Morgan Stanley Capital International
RI	Total Return Index item in DataStream
SEC	Securities and Exchange Commission
SMB	Small-Minus-Big

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1 Introduction

The efficient market hypothesis (Fama, 1993) assumes that one cannot continuously earn abnormal returns since the market prices of every security already reflect all publicly available information.

Nevertheless, numerous studies provide evidence challenging market efficiency (e.g., Ball and Brown, 1968; Bernard and Thomas, 1989). Post-earnings announcement drift, the observation that stock prices continue to drift in the direction of initial stock price response to earnings announcement, is among the most prominent mispricing phenomena contradicting the theory of market efficiency (Ball and Brown, 1968).

Results of these studies show that investors possessing superior knowledge can earn abnormal returns (e.g., Bernard and Thomas, 1989; Ou and Penman, 1989; Skogsvik, 2008). One way to obtain such knowledge is by means of fundamental analysis, i.e. analysis of published financial statements (Ou and Penman, 1989). Building upon this finding, both researchers and practitioners try to develop successful trading strategies based on financial statement information.

One of such strategies was suggested by Sloan (1996), who discovered a market mispricing phenomenon while doing research into earnings quality.

Sloan (1996) found that earnings backed by cash flows tend to be more stable and predictable, than earnings that result from accrual accounts. Sloan attributed this difference to the greater subjectivity of accruals and their reversal property. He also observed that the stock market was slow to differentiate between cash flow and accrual components (such as changes in reserves for inventory levels) contained in reported earnings. As a result, companies assigning higher values to their accruals – and, thus, reporting higher earnings – attract a lot of investors. But once the overstated values are found to be false and reversed, the stocks plummet. Therefore, by buying stocks of companies with the highest-quality earnings and shorting those most dependent on accruals, investor could achieve risk-adjusted return of 10.4% (Sloan, 1996).

This finding, now commonly referred to as the "accrual anomaly", received ample critique after its publication. Many researchers expressed doubt that such a simple trading strategy can generate abnormal returns and provided different explanations for the observed phenomenon (e.g., Collins and Hribar, 2000; Desai et al., 2004).

However, more recent papers (e.g., Green et al., 2011) show that practitioners do not consider this anomaly illusory. In fact, sophisticated investors are actively seeking to exploit the anomaly, by identifying companies that intentionally over- or understate the value of their accrual accounts and those that do not. Goldman Sachs Asset Management, Barclays Global Investors, and Susquehanna Financial Group, among others, are employing versions of the Sloan (1996) model to guide their investments (BusinessWeek). Ronald Kahn, former Global Head of Equity Research at Barclays Global Investments, says that "Buying companies with high quality earnings and shorting those most dependent on accruals proved a good strategy, until the market figured it out" (FT).

Since sophisticated investors started trading on the anomaly, returns to this trading strategy have continuously gone down (Stark and Soares, 2009). Yet, some traces of the anomaly are still observed in the U.S., possibly due to transaction costs preventing investors from arbitraging the anomaly away (Mashruwala et al., 2006).

In our study we intend to apply the trading strategy described in Sloan (1996) to the Swedish stock market and extend it with discretionary accrual measures.

Our paper makes three contributions to the existing literature.

First, we test whether the accrual anomaly can be observed in Sweden. While there is a large body of evidence that the anomaly exists in the U.S. (e.g., Sloan, 1996; Bradshaw et al. 2001; Xie 2001; Zach 2003), the U.K. (Stark and Soares, 2009), and other countries (Li et al., 2011), only few papers considered the Swedish stock market (LaFond, 2005; Pincus, 2007). However, the results were inconclusive. LaFond (2005) documents positive abnormal return in Sweden, although on 10% significance level, while Pincus (2007) finds no evidence of the accrual anomaly in Sweden.

Second, to our best knowledge no prior studies considered whether the adoption of IFRS in Europe could have an effect on the accrual anomaly. Since IFRS were officially adopted only in 2005, the opportunity to conduct such an analysis was limited due to the low number of observations. Thus, the most cited studies in this area either analyzed the U.S. stock market or looked into the time frame before 2005. We consider the periods both before and after 2005 and compare the returns to the trading strategy based on the accrual anomaly to assess the impact of IFRS.

Third, we compare the performance of the widely used Modified Jones (Dechow et al., 1995) model of discretionary accruals with the recently introduced Ibrahim (2009) model, which supposedly provides better estimates of discretionary accruals due to its ability to differentiate between companies with various business models within one industry.

Therefore, the purpose of our research is threefold: we investigate (1) whether the accrual anomaly can be observed in Sweden; (2) whether the adoption of IFRS had an impact on the accrual anomaly; and (3) whether the trading strategy based on Ibrahim model provides superior abnormal returns to the one based on Modified Jones.

The rest of this paper proceeds as follows. In Chapter 2 we review previous studies on the accrual anomaly and related areas of research. In Chapter 3 we describe the methodology of our research and discuss the sample. In Chapter 4 empirical results are reported, while Chapter 5 provides the discussion based on our analysis. Finally, in Chapter 6 we present our conclusions.

2 Previous Research

In this chapter we review existing publications on the accrual anomaly and related areas. We start by defining accruals and their components. Then, overview of the accrual anomaly and the key drivers behind it is presented. We proceed with a discussion of models used to estimate discretionary accruals and give a detailed description of Modified Jones and Ibrahim models used in the current paper. Finally, we briefly describe the main periods in adoption of IFRS in Sweden.

2.1 Definition of Accruals

IAS 1 requires that an entity prepare its financial statements, except for cash flow information, using the accrual basis of accounting (IAS 1.27). Accrual accounting gives a more accurate picture of a company's current financial condition, since economic events are recognized by matching revenues to expenses (the matching principle) at the time when the transaction occurs rather than when payment is made (or received). Thus, an accrual is any account that separates revenues and expenses from actual cash inflows and outflows.

Previous studies discuss two primary methods of measuring total accruals: balance sheet and cash flow statement approaches.

Balance Sheet Approach relies on interdependence of changes in working capital accounts and accrual components of revenues and expenses (Collins and Hribar, 2002):

$$TA_t = \Delta CA_t - \Delta CL_t - \Delta Cash_t + \Delta STD_t - Depr_t \tag{2.1}$$

where

TA_t = total accruals recognized during year t,

ΔCA_t = increase (decrease) in current assets from year t–1 to year t,

ΔCL_t = increase (decrease) in current liabilities from year t–1 to year t,

$\Delta Cash_t$ = increase (decrease) in cash from year t–1 to year t,

ΔSTD_t = increase (decrease) in current portion of debt included in ΔCL from year t–1 to year t,

$Depr_t$ = depreciation and amortization expense in year t.

Cash Flow Approach relies on cash flow statement in measuring accruals. Typically, cash flow statement presents a breakdown of all income-increasing and income-decreasing accruals in the section associated with Cash Flow from Operations. Thus, we can measure total accruals as difference between net income and cash flow from operations:

$$TA_t = Earn_t - CFO_t \tag{2.2}$$

where

TA_t = total accruals recognized during year t,

$Earn_t$ = net income before extraordinary items,

CFO_t = cash flow from operations.

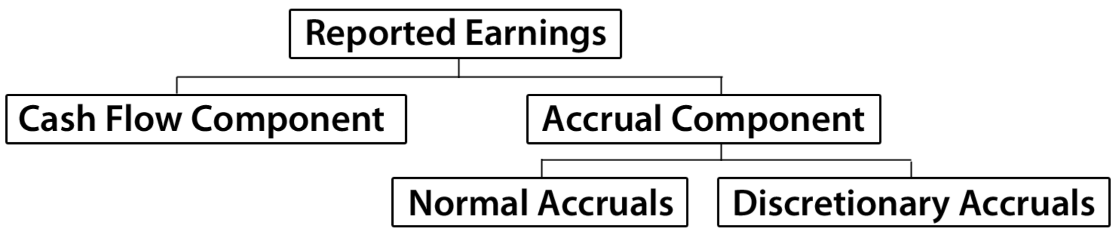
Currently there is no widely-accepted point of view on which approach is preferred.

Collins and Hribar (2002) assess the implications of using balance sheet approach in measuring accruals and argue that it is less reliable than the cash flow approach. When events, such as acquisitions, divestitures and currency translations occur, the relationship between the changes in working capital balance sheet accounts and the accrual components of earnings is destroyed. In such cases, using cash flow approach is more appropriate.

Nevertheless, even more recent studies (e.g., Kothari et al., 2005; LaFond, 2005) rely on the balance sheet approach. LaFond (2005) argues that using balance sheet approach is equally appropriate and shows that results of his analysis are unaffected after elimination of firm-year observations associated with mergers, acquisitions and large divestitures.

Total accruals can be further decomposed into two components: normal accruals, arising in day-to-day business operations, and discretionary accruals, that result from managerial discretion and estimates. Figure 1 depicts this decomposition of earnings.

Figure 1
Decomposition of Earnings



Accruals create the opportunity for earnings management because they require managers to make forecasts, estimates, and judgments. If estimates are found to be erroneous, discretionary component of accruals is likely to be reversed (Sloan, 1996).

2.2 Accrual Anomaly

While investigating whether investors fully understand the role of accrual and cash flow components in prediction of future earnings, Sloan (1996) found that accrual component tends to be more volatile than cash flow component. This observation is related to the reversal property of accruals: over- and under-statements in accruals in a current year are typically reversed in the following year, which is why earnings backed by accruals are not sustainable (Dechow, 1994).

Using the U.S. data from 1962 to 1991 Sloan (1996) tests a hypothetical trading strategy. He ranks sample companies on the basis of total accruals and takes long (short) position in stocks of firms in the lowest (highest) decile of accruals. Sloan (1996) finds a significant negative relation between accruals and future stock returns meaning that the market overreacts to earnings that contain a large (positive or negative) amount of accruals. The finding implies that investors tend to "fixate" on the amount of earnings and fail to fully understand the quality of accrual components – the so-called naïve investor fixation hypothesis (Sloan, 1996). Consequently, analysis of these components can be used to detect mispriced securities. Sloan (1996) was the first to report that differences in returns to high and low accrual firms are not explained by differences in risk as measured by the CAPM, firm size or book-to-market and earnings-to-price ratios. This finding is commonly referred to as the accrual anomaly.

After the publication of this phenomenon numerous studies tried to challenge the finding of Sloan (1996) and suggest alternative explanations for the profitability of accruals-based trading strategy.

Several researchers argue that abnormal return to Sloan's strategy is illusory and results from improper risk-adjustment. Ali et al. (1999) finds that negative association between company accruals and subsequent stock returns is stronger for larger firms followed by financial analysts and institutional investors than for smaller firms, which may be an indication that size effect is related to the anomaly. Zach (2003) argues that to a large extent accruals anomaly is driven by book-to-market effect and effects of mergers and divestitures. After controlling for these two factors, the abnormal return of Sloan's (1996) strategy decreased by almost 50%. Hypothesis of improper risk-adjustment is also tested by Khan (2008). Using a four-factor Intertemporal CAPM model, he tests whether variation in average returns to high- and low-accrual firms can be explained by different risk factors.

However, statistically significant mispricing remains for the three out of seven hedge portfolios he constructed.

Other researchers question the existence of the accrual anomaly as a standalone phenomenon and suggest that the observed effect may be related to one of the already documented mispricing anomalies. Collins and Hribar (2000) examine the relation between post-earnings-announcement drift and the accrual anomaly and find that these are two distinct anomalies, and the level of accruals may mitigate or exacerbate the amount of drift.

In attempt to further expand initial findings of Sloan (1996) and identify the key drivers behind the anomaly researchers tried to look into different types of accruals (e.g., Subramanyam, 1996; Xie, 2001; Dechow and Dichev, 2002; Richardson et al., 2005), while Sloan (1996) based his tests on total accruals only.

Subramanyam (1996) decomposes total accruals into non-discretionary and discretionary components and finds that on average market attaches value to discretionary accrual meaning that the discretionary component communicates information about future firm earnings.

Xie (2001), building on the work by Subramanyam (1996), concludes that the market not only prices, but also overprices discretionary accruals. A trading strategy based on discretionary accruals could yield risk-adjusted return of 11% between 1971 and 1992. A similar strategy based on non-discretionary accruals could yield only 2.3% under the same conditions. Thus, according to Xie (2001), the mispricing of total accruals documented by Sloan (1996) occurs largely due to discretionary accruals.

Therefore, the occurrence of the accrual anomaly is well documented. Moreover, recent studies conducted by LaFond (2005) and Pincus et al. (2007) not only confirm the existence of the anomaly, but also provide evidence of its global “dissemination”. Specifically, LaFond (2005) examines whether the accrual anomaly is present in different countries. He considers 17 countries, including Sweden, and concludes that the accrual anomaly is present in international markets. However, the factors driving it appear to vary across countries since the returns to hedge portfolios are not correlated (LaFond, 2005). Among such factors LaFond names differences in ownership structure, the degree of managerial discretion and analyst following. Pincus et al. (2007), however, finds the accrual anomaly only in four countries: Australia, Canada, the U.K. and the U.S out of 20 countries analyzed. Pincus et al. (2007) explain the existence of the accrual anomaly by earnings management and the absence of close substitutes for mispriced stocks. They also suggest that the anomaly is more likely to occur in countries with a common law legal tradition, more extensive accrual accounting, lower concentration of share ownership and weaker outside shareholder rights.

2.3 Measuring Discretionary Accruals

An apparent difficulty in implementing a trading strategy based on accruals is measuring the discretionary component. It is impossible to observe it directly in the financial statements or anywhere else, unless the SEC or a similar government body starts an investigation into accounting practices of a particular company. Such cases, however, are hardly suitable for the purpose of implementing a trading strategy.

To resolve this difficulty, researchers in the field of accounting devised numerous quantitative models that aim at measuring the portion of accruals that can be attributed to management discretion or estimates (e.g., Healy, 1985; DeAngelo, 1986; Dechow et al., 1995).

The general idea behind these models is the same. Companies in the same business tend to have similar accrual generation process: their business models, account turnover ratios and depreciation schedules do not differ considerably. These companies typically react to external economic conditions in a similar way. Consequently, the effect that a certain amount of sales has on accrual accounts should be consistent across these companies. And, therefore, it is reasonable to assume that any deviation from what is considered "normal" level of accruals in this industry is due to management discretion.

Therefore, the starting point for measuring discretionary accruals is total accruals. A quantitative model is then used to estimate the expected level of normal accruals, allowing us to decompose total accruals into discretionary and normal components:

$$\mathrm{TA}_{i,t} = \mathrm{NDA}_{i,t} + \mathrm{DA}_{i,t} \tag{2.3}$$

where

TA_i = total accruals for company i during year t,

NDA_i = normal or non-discretionary component of accruals[4],

DA_i = discretionary accruals.

[4] The terms "Normal Accruals" and "Non-Discretionary Accruals" are used synonymously in the literature. Throughout the rest of this paper we are going to use the term normal accruals.

Models require some estimation period when coefficients are estimated based on time series (firm-level) or cross-sectional (industry-level) data. Coefficients are then used to predict normal accruals. Then discretionary accruals can be estimated as the difference between total and normal accruals.

The following sections review the evolution of well-known discretionary accrual models and provide a detailed description of the two models used in the current paper: Modified Jones and Ibrahim models.

2.3.1 Evolution of Discretionary Accrual Models

Over the years researchers introduced different methods of measuring discretionary component of accruals. Each new model attempted to provide a more precise way of estimating normal accruals by responding to limitations found in prior models. This chapter gives an overview of the most prominent models and describes how they evolved over time. Figure 2 depicts overview of several discretionary accrual models.

Figure 2
Overview of Discretionary Accrual Models

Simple models	**Jones-related models**	**Sophisticated models**
▪ Healy (1985) model	▪ Jones (1991) model	▪ Cash flow model (Dechow & Dichev, 2002)
▪ DeAngelo (1986) model	▪ Modified Jones model (Dechow et al., 1995)	▪ McNichols (2002) model
		▪ Kothari et al. (2005) model
		▪ Ibrahim (2009) model

Healy model

The evolution of discretionary accrual models can be traced from Healy (1985) whose model uses mean total accruals in the previous years as a proxy for normal accruals. Healy predicts that systematic earnings management occurs in every period, yet upward and downward manipulations in accruals are assumed to even out over time. A serious shortcoming of this model is that it works only for stable and mature companies. In case of growing companies Healy's model will systematically under-estimate normal accruals and over-estimate discretionary component of accruals.

DeAngelo model

DeAngelo (1986) introduced an expectation model based on the change in total accruals. DeAngelo assumes that this change will be zero under the null hypothesis of no earnings management. Therefore, any change from last year's accruals should be attributed to discretionary component. This model can be considered a special case of Healy model when the estimation period is limited to the previous year. Like that of Healy, DeAngelo's model works only for mature companies with constant level of sales.

Both Healy and DeAngelo models are based on a restrictive assumption that total accruals can be used as a proxy for normal component of accruals. If normal accruals vary from year to year then both models measure discretionary accruals incorrectly. Failure to account for the change in economic circumstances in the model may result in erroneous estimates of normal and, consequently, discretionary accruals.

Jones model

To relax this restrictive assumption of prior models Jones (1991) controls for change in revenue and for gross PPE. Jones introduced a multivariate time-series model to estimate normal accruals for a company. This model uses a two-stage approach to identify discretionary component of total accruals. The first stage requires estimating total accruals. Then total accruals are regressed on the change in revenues and the gross PPE for the time series available before the analysis date.

$$\frac{\mathrm{TA}_{i,t}}{\mathrm{A}_{i,t-1}} = \alpha_0 \cdot \frac{1}{\mathrm{A}_{i,t-1}} + \alpha_1 \cdot \frac{\Delta\mathrm{REV}_{i,t}}{\mathrm{A}_{i,t-1}} + \alpha_2 \cdot \frac{\mathrm{PPE}_{i,t}}{\mathrm{A}_{i,t-1}} + \varepsilon_{i,t} \qquad (2.4)$$

where

$\mathrm{TA}_{i,t}$ = the total accruals in year t for firm i,

$\Delta\mathrm{REV}_{i,t}$ = increase (decrease) in revenue from year $t-1$ to year t,

$\mathrm{PPE}_{i,t}$ = gross PPE in year t for firm i,

$\mathrm{A}_{i,t-1}$ = total assets in year $t-1$ for firm i,

$\varepsilon_{i,t}$ = error term in year t for firm i.

All variables in the proposed model are scaled by the lagged total assets to avoid the problem of heteroscedastisity[5].

[5] The need for scaling arises due to the observed high correlation of the squared residuals obtained from the unscaled regression model with lagged total assets (Jones, 1991).

According to Jones (1991) the expected sign for the PPE estimated coefficient is negative because PPE are related to an income-decreasing accrual (depreciation expense). At the same time, the expected sign for the change in revenues coefficient is not obvious because a given change in revenue may cause income-increasing changes in some working capital accounts (e.g., increases in accounts receivable) and income-decreasing changes in others (e.g., increases in accounts payable) (Jones, 1991).

Using the firm-level data Jones (1991) estimates the parameters from regression (2.4) and applies them to data in subsequent year t when analysis is conducted. All deviations from predicted normal accruals are considered discretionary.

$$\mathrm{DA}_{i,t} = \frac{\mathrm{TA}_{i,t}}{\mathrm{A}_{i,t-1}} - \left(\alpha_0 \cdot \frac{1}{\mathrm{A}_{i,t-1}} + \alpha_1 \cdot \frac{\Delta\mathrm{REV}_{i,t}}{\mathrm{A}_{i,t-1}} + \alpha_2 \cdot \frac{\mathrm{PPE}_{i,t}}{\mathrm{A}_{i,t-1}} \right) \qquad (2.5)$$

These deviations from the model represent management discretion or estimation errors, both of which reduce decision usefulness of earnings. According to Jones (1991), there is one limitation to this model: all revenues are considered to be unaffected by managerial discretion. Therefore, if discretion is exercised over revenues, the model will underestimate or overestimate discretionary accruals.

Even though originally Jones (1991) model is specified for time-series of observations for a single company, subsequent studies legitimized cross-sectional formulation of the same model (Subramanyam, 1996).

Subramanyam's (1996) evidence suggests that cross-sectional versions of original and Modified Jones models perform no worse than their time-series counterparts. Cross-sectional estimation imposes milder data availability requirements for a firm to be included for analysis than time series estimation. This mitigates potential survivorship bias problems. The precision of the estimates is also likely to be higher in cross-sectional estimation because of larger sample sizes than the number of time series observations for an individual firm. (Kothari, 2001)

2.3.2 Modified Jones Model

Models used in the current literature are usually derived from the original Jones model. These modified versions generally result from researchers responding to limitations of the model (e.g., Dechow et al., 1995; Kothari et al., 2005). As a consequence, the literature currently has a variety of Jones-related discretionary accrual models from which to choose. Application of these models has become the accepted methodology in accounting literature.

The widely used modification of Jones model is attributed to Dechow et al. (1995) – this model is known in the literature as the Modified Jones model. The model is almost identical to the original Jones model, except for the adjustment to change in revenues:

$$\mathrm{DA}_{i,t} = \frac{\mathrm{TA}_{i,t}}{\mathrm{A}_{i,t-1}} - \left(\alpha_{0,i} \cdot \frac{1}{\mathrm{A}_{i,t-1}} + \alpha_{1,i} \cdot \frac{\Delta\mathrm{REV}_{i,t} - \Delta\mathrm{AR}_{i,t}}{\mathrm{A}_{i,t-1}} + \alpha_{2,i} \cdot \frac{\mathrm{PPE}_{i,t}}{\mathrm{A}_{i,t-1}} \right) \tag{2.6}$$

where

α_j = coefficients obtained from the original Jones model,

TA_t = total accruals recognized in year *t,*

DA_t = total discretionary accruals in year *t*,

$\Delta\mathrm{REV}_t$ = increase (decrease) in revenue from year $t-1$ to year *t*,

$\Delta\mathrm{AR}_t$ = increase (decrease) in accounts receivable from year $t-1$ to year *t,*

PPE_t = gross PPE for year *t,*

A_{t-1} = lagged total assets.

Expression in parentheses denotes predicted normal level of accruals for a company. Coefficients α_j are measured according to the original Jones (1991) model (see formula 2.5) using the firm-level time series data (Dechow et al., 1995).

In the original Jones model revenues are considered to be an objective measure of the firms' performance before managers' manipulations. However, if earnings are managed through revenue, the original Jones model may result in a biased estimate of normal accruals. Dechow et al. (1995) suggests modifying the model by subtracting a change in accounts receivable from the change in revenues in the event period, whereas model coefficients are obtained using the original Jones model during the estimation period. Thus, Dechow et al. (1995) account for the possibility of managerial discretion exercised over revenues at least in the event period, while the original Jones model suggests that no discretion is exercised over revenues both in the estimation and event periods.

By subtracting a change in accounts receivable, the modified version implicitly assumes that all changes in credit sales in the event year appear due to earnings management (Dechow et al., 1995). The underlying reasoning is that it is easier for managers to exercise discretion over the recognition of revenue on credit sales rather than cash sales (Dechow et al, 1995).

Even though this is not entirely true in real life, with this modification Dechow et al. reduce the measurement error associated with manipulations in revenue. As a result, the estimate of discretionary accruals is no longer biased toward zero in samples where earnings management has taken place through the management of revenues (Dechow et al., 1995).

2.3.3 Ibrahim Model

An alternative model was proposed by Ibrahim (2009), who extended the Modified Jones model and applied it to different groups of accruals (i.e. accounts receivable, inventories, accounts payable, other working capital, depreciation) instead of total accruals. The idea behind Ibrahim model is that different accrual accounts may follow different generation processes and pooling them together in a measure such as total accruals will reduce the level of precision that a model can achieve.

Building upon a finding of Kothari et al. (2005) that controlling for performance in a discretionary accrual model leads to better results Ibrahim (2009) includes Return on Assets (ROA)[6] in the model. Following Beneish (1997), Ibrahim also includes accruals turnover ratios in each of the models as a proxy to accrual policies applied in the prior year. When combined, ROA and accruals turnover ratios[7] allows differentiating between companies with various business models within the same industry. For example, retailers with low margin but high turnover will have a different accrual generation process than retailers with high margin but low turnover.

Similarly to Jones (1991) and Dechow et al. (1995), Ibrahim model has an estimation period, when model coefficients are estimated, though on the industry-level (cross-sectional) data:

$$\frac{\Delta \mathrm{AR}_{i,t}}{\mathrm{A}_{i,t-1}} = \alpha_{11} + \beta_{11} \cdot \frac{1}{\mathrm{A}_{i,t-1}} + \beta_{21} \cdot \frac{\Delta \mathrm{REV}_{i,t} - \Delta \mathrm{AR}_{i,t}}{\mathrm{A}_{i,t-1}} + \beta_{31} \cdot \frac{\mathrm{AR}_{i,t-1}}{\mathrm{REV}_{i,t-1}} + \beta_{41} \cdot \mathrm{ROA}_{i,t} + \varepsilon_{i,t} \qquad (2.7)$$

[6] In calculation of ROA net income before extraordinary items is used rather than net income plus net-of-tax interest expense (the traditional measure used to calculate ROA) to avoid potential problems related to the estimation of a tax rate. This might create an estimation error in case of substantially varying leverage within an industry. However, there is always a trade-off between this type of error and error arising due to improper estimation of a tax rate (see Kothari et al., 2005).

[7] To be precise, the ratios that Ibrahim refers to as "turnover ratios" are actually *inverse* turnover ratios. Ibrahim does not specify any particular reason for this, however, the paper by Beneish (1997) that she cites uses a similar measure, which is called "days sales in receivables index" (and similar measures for other accrual accounts). To be consistent with Ibrahim (2009), we follow the method precisely and keep Ibrahim's terminology.

$$\frac{\Delta \mathrm{INV}_{i,t}}{\mathrm{A}_{i,t-1}} = \alpha_{12} + \beta_{12} \cdot \frac{1}{\mathrm{A}_{i,t-1}} + \beta_{22} \cdot \frac{\Delta \mathrm{REV}_{i,t} - \Delta \mathrm{AR}_{i,t}}{\mathrm{A}_{i,t-1}} + \beta_{32} \cdot \frac{\mathrm{INV}_{i,t-1}}{\mathrm{COGS}_{i,t-1}} + \beta_{42} \cdot \mathrm{ROA}_{i,t} + \varepsilon_{i,t} \qquad (2.8)$$

$$\frac{\Delta \mathrm{AP}_{i,t}}{\mathrm{A}_{i,t-1}} = \alpha_{13} + \beta_{13} \cdot \frac{1}{\mathrm{A}_{i,t-1}} + \beta_{23} \cdot \frac{\Delta \mathrm{REV}_{i,t} - \Delta \mathrm{AR}_{i,t}}{\mathrm{A}_{i,t-1}} + \beta_{33} \cdot \frac{\mathrm{AP}_{i,t-1}}{\mathrm{PURCH}_{i,t-1}} + \beta_{43} \cdot \mathrm{ROA}_{i,t} + \varepsilon_{i,t} \qquad (2.9)$$

$$\frac{\Delta \mathrm{OWC}_{t,i}}{\mathrm{A}_{i,t-1}} = \alpha_{14} + \beta_{14} \cdot \frac{1}{\mathrm{A}_{i,t-1}} + \beta_{24} \cdot \frac{\Delta \mathrm{REV}_{i,t} - \Delta \mathrm{AR}_{i,t}}{\mathrm{A}_{i,t-1}} + \beta_{34} \cdot \frac{\mathrm{OWC}_{i,t-1}}{\mathrm{REV}_{i,t-1}} + \beta_{44} \cdot \mathrm{ROA}_{i,t} + \varepsilon_{i,t} \qquad (2.10)$$

$$\frac{\mathrm{DEPR}_{i,t}}{\mathrm{A}_{i,t-1}} = \alpha_{15} + \beta_{15} \cdot \frac{1}{\mathrm{A}_{i,t-1}} + \beta_{25} \cdot \frac{\Delta \mathrm{REV}_{i,t} - \Delta \mathrm{AR}_{i,t}}{\mathrm{A}_{i,t-1}} + \beta_{35} \cdot \mathrm{PPE}_{i,t} + \beta_{45} \cdot \mathrm{ROA}_{i,t} + \varepsilon_{i,t} \qquad (2.11)$$

where

$\Delta \mathrm{AR}_t$ = increase (decrease) in accounts receivable from year $t-1$ to year t,

$\Delta \mathrm{INV}_t$ = increase (decrease) in inventories from year $t-1$ to year t,

$\Delta \mathrm{AP}_t$ = decrease (increase) in accounts payable from year $t-1$ to year t,

$\Delta \mathrm{OWC}_t$ = change in other working capital defined as $(\Delta \mathrm{TAX}_t + \Delta \mathrm{OTH}_t)$,

$\Delta \mathrm{TAX}_t$ = decrease (increase) in taxes payable from year $t-1$ to year t,

$\Delta \mathrm{OTH}_t$ = net change in other current assets and liabilities from year $t-1$ to year t,

DEPR_t = depreciation expense for firm i in year t,

A_{t-1} = lagged total assets in year t,

REV_t = total revenues in year t,

COGS_{t-1} = cost of goods sold in year $t-1$,

PURCH_{t-1} = purchases in year $t-1$,

ROA_t = return on assets in year t which is calculated as net income before extraordinary items in year t divided by total assets at beginning of year t.

All variables in the regressions, other than ROAt, are divided by lagged total assets to control for heteroscedasticity.

Once the coefficients are estimated, one can predict the normal level of each component of accruals in subsequent year using these coefficients and identify discretionary part by subtracting normal part from the actual accrual account.

The sum of the discretionary components estimated using regressions (2.7)-(2.11) represents a measure of aggregate discretionary accruals.

$$\mathrm{DAC}_t = \mathrm{DAR}_t + \mathrm{DINV}_t + \mathrm{DAP}_t + \mathrm{DOWC}_t + \mathrm{DDEP}_t \qquad (2.12)$$

where

DAC_t = total discretionary accruals in year *t*,

DAR_t = discretionary accounts receivable accrual in year *t*,

$DINV_t$ = discretionary inventory accrual in year *t*,

DAP_t = discretionary accounts payable accrual in year *t*,

$DOWC_t$ = discretionary other working capital accrual in year *t*,

$DDEP_t$ = discretionary depreciation accrual in year *t*.

2.3.4 Tests of Models' Reliability

Most discretionary accrual models stem from research into managers' motivation for manipulating earnings (e.g., Jones, 1991; Beneish, 1997; Beneish et al., 2002). Yet it is unclear to what extent these models are able to detect when discretion is exercised over accruals. One of the most common approaches to assess a model's ability to detect discretionary accruals is to test it on a sample of firms that were either subject to SEC's (or similar organization) enforcement actions or were identified as manipulators by the news media (see Dechow et al., 1995; Beneish, 1999; Bartov et al, 2001; Jones et al., 2008).

In order to evaluate the performance of the most popular discretionary accrual models Dechow et al. (1995) uses a sample of firms targeted by the SEC. Under such setting Dechow et al. find that Modified Jones model exhibits the best ability in detecting earnings management compared to original Jones, Healy and DeAngelo models.

Later Bartov et al. (2001) evaluate the ability of cross-sectional version of Jones and Modified Jones model to detect earnings management in comparison to their time series counterparts (Jones, 1991; Dechow et al, 1995). They use a methodology in which they test the ability of both models to distinguish between 173 firms with qualified audit opinions[8] and 173 similar firms with clean reports (Bartov et al. 2001, p. 423). In their tests Bartov et al. (2001) also introduce control variables which may create certain bias in evaluating association between discretionary accruals and audit qualifications: book-to-market ratios, leverage, profitability, firm, size and mergers and acquisitions. The results obtained by Bartov et al. (2001) show that cross-sectional models perform better than their time series counterparts at least among firms with extreme earnings management (i.e. those with qualified audit reports). However, only Modified Jones model is robust to the test with the removal of firms involved in mergers and acquisitions (Bartov et al., p. 447).

[8] Bartov et al. (2001) focus on qualified audit reports issued due to either scope limitation or departure from GAAP that would materially affect the financial statements. Scope limitation occurs when an auditor is unable to obtain necessary information or perform all the necessary audit procedures (Bartov et al., 2001, p.429).

In a more recent study Jones et al. (2008), however, criticize the methodology chosen by Bartov et al. (2001) since qualified audit report does not necessarily imply the presence of earnings management. Having a fraud sample of 118 firms that were charged by the SEC (with having committed fraud by overstating earnings between 1988 and 2001) Jones et al. (2008) find that cross-sectional models based on Dechow and Dichev (2002) framework have higher association with fraud in comparison to Jones-based models. Consistently with the study of Bartov et al. (2001), the results of Jones et al. are robust to the inclusion of various control variables.

Following the methodology of Dechow et al. (1995), Ibrahim (2009) identifies firms from the Accounting and Auditing Enforcement Releases made by SEC during 2000-2004. After dropping observations with insufficient data Ibrahim (2009) compares the predictive ability of her model to an alternative model using a sample of 25 firms. Ibrahim (2009) concludes that her model has higher power in detecting earnings management in this sample. However, the small sample indicates that these results might not be robust (Ibrahim, 2009).

To sum up, previous studies do not reach a single conclusion with regard to the power of discretionary accrual models in detection of earnings management. Obviously, in many studies Modified Jones model performs quite well under different settings, whereas more tests are needed in order to assess power of Ibrahim model. Furthermore, the settings in which different authors run their tests seem to have significant effect on results.

2.3.5 Limitations of Models

While working with discretionary accrual models, one should take into account their inherent limitations.

Firstly, there is no possibility to validate the accuracy of these models' predictions. This issue is referred to as construct validity problem and occurs in a situation when a model is a proxy for the phenomenon that cannot be directly detected (see DeFond, 2010). What makes this limitation especially acute is that all discretionary accrual models are based on the assumption that no systematic earnings management occurred during the estimation period (Dechow et al., 1995, p.197). Although, this assumption is unlikely to hold in reality, there is no other way to construct a proxy for normal accruals.

Secondly, there is always a trade-off between application of time series version of a discretionary accrual model and its cross-sectional version. Whereas the former assumes that the length of firm's operating cycle does not change over the estimation period and the event year, the latter assumes that all firms in the same industry have similar operating cycle (Bartov et al., 2001). Obviously, in reality these assumptions are unlikely to hold for all firms.

Thirdly, the modifications applied to discretionary models usually improve their performance only relatively. For example, the adjustment for growth in credit sales in Modified Jones model reduced the number of cases where accruals were incorrectly classified as normal (Type II errors[9]); however, the model continued suffering from classifying accruals as discretionary when they are not (Type I errors[10]), probably even more than the original Jones model (Dechow et al, 2010). In a similar manner, the inclusion of performance-matching factor (ROA) in Ibrahim model has allowed accounting for individual firm's performance; however, there is a risk that performance matching can extract too much discretion resulting in a lower estimate of abnormal accruals (Dechow et al., 2010).

2.4 IFRS in Sweden

Ability of managers to execise discretion over accruals and manipulate earnings is to a large extent related to currently effective accounting regulations. Generally IFRS are associated with higher accounting quality and capital market-related economic benefits such as increase in stock market value and lower cost of capital (Barth et al. 2008). However, the widespread adoption of IFRS may not necessarily lead to the consistent changes in local accounting practices due to various firm-specific factors, institutional context and differences in enforcement systems (Hellman 2011).

Although the Swedish accounting model became more capital-market oriented over time, the prevailing accounting tradition and legislation were a strong incentive to employ balance sheet conservatism due to creditor protection and tax-accounting link (Hung, 2001; Hellman, 2011). That is why, the introduction of more capital market-related IFRS in Sweden resulted in a lengthy process of a so-called soft adoption. The period of soft adoption started in 1991 and was characterized by the existence of the national IFRS version, rather weak legal enforcement and the opportunity for listed firms to either comply

[9] Type II errors arise when the null hypothesis (of no systematic earnings management in this case) is accepted when the null is false (see Dechow et al., 2005, Dechow et al., 2010).

[10] Type I errors arise when the null hypothesis (of no systematic earnings management in this case) is rejected when the null is true (see Dechow et al., 2005; Dechow et al., 2010).

or explain deviations from the SFASC (Swedish Financial Accounting Standards Council) recommendations (Hellman 2011).

Since almost all prevailing IFRS were adopted into the Swedish GAAP during 1991-2004, no dramatic change was expected in Sweden after a hard adoption of IFRS in 2005. The major revision was related to the growing emphasis of the fair value accounting due to the introduction of three fair value standards (IAS 39, IAS 40, IAS 41) not voluntarily adopted by the SFASC before 2005. Other important changes included the prohibition of goodwill amortization, recognition of contingent liabilities in a business combination and specific accounting for share-based payments (see Appendix 3 for overview of main changes).

The introduction of new IFRS and previously not voluntarily adopted standards resulted in the increase of net profit and balance sheet numbers under the hard adoption regime compared to the soft adoption (Hellman 2011). The increase in book values of both assets and liabilities could be explained by a broader implementation of fair value accounting and corresponding increase in deferred taxes, whereas a new treatment of goodwill was likely to underlie higher net profit numbers.

At the same time, according to Hellman (2011), the soft adoption was likely to have given managers increased room for earnings management that may also explain the difference between net earnings presented under different regimes. For example, the stronger tax alignment is associated with more downwards earnings management, although a greater attention of analysts to the listed firms may mitigate this effect. Following the reasoning of Othman and Zeghal (2006), Hellman (2011) uses the potential to smooth earnings (standard deviation of operating income during 2001-2004 compared to its mean during the same period) as a proxy to distinguish firms that had greater opportunities for earnings management under the soft adoption regime. The presented results show that the difference in net profits under soft and hard regimes is smaller for firms with lower earnings management opportunities. At the same time, there is evidence that smaller firms are more inclined to manage earnings upwards probably because of the lower analyst following. However, no systematic pattern was detected with regard to the effective tax rate, executive ownership (sum of the equity percentage held by top executives), foreign stock exchange listing and Big 4 audit (see Hellman, 2011).

Based on previous, we expect that the accrual anomaly is more likely to be seen in Sweden during the soft adoption period. Both weak legal enforcement and existence of several accounting frameworks (e.g., IFRS, national standards) during that period could be used by managers as an opportunity to choose between standards to their benefit and exercise discretion over accruals. The introduction of new fair value standards associated with greater use of subjective valuation has probably created a new possibility for earnings management in the hard adoption period, though, this effect could be mitigated by the strong legal enforcement. We also suppose that more companies engaged in manipulations with income-decreasing accruals, rather than income-increasing, due to the strong tax-accounting link in Sweden.

3 Research Methodology

3.1 Sample Selection

Thomson Reuters Datastream (DS) is a primary source of data for our research. For the years 1995–2010 we select all companies currently and formerly traded in Sweden from DS database. Thus, the sample includes currently active companies, companies listed during 1995–2010 and companies that ceased to exist during this period.[11] We have decided to extend the sample beyond companies listed on the Stockholm Stock Exchange due to low number of firm-year observations which prevents us from estimating discretionary accrual models in several industries. Hence, our sample includes all companies traded on the Stock Exchange and OTC markets and having published financial statements in at least three consecutive years. We use Retriever database to manually fill in all the omissions in DS data.

We then create sub-samples based on the industry classification in order to proceed with cross-sectional estimation of discretionary accrual models. However, as we discovered, industry information provided by DS tends to be of low quality with numerous mistakes and omissions. We, therefore, manually classify all companies into 10 industry groups according to company descriptions. We intentionally make these groups quite broad to ensure that we have sufficient number of observations in every industry-year pair, while keeping each group as homogeneous as possible.

All financial companies are excluded from the sample due to specific nature of their business. We also exclude transportation industry, due to low number of observations in all years, and holding companies, due to their exposure to multiple industries.

Before estimating the coefficients we remove outliers: 1% of the most extreme values in every variable used in either Modified Jones or Ibrahim model. According to Dechow et al. (1995), the Jones model is not well-specified for cases of extreme financial performance. By excluding extreme observations we ensure that our results are unaffected by such cases.

Table 1 provides overview of our sample by year and industry. The sample is dominated by industrial and technology companies, which may result in biased results. Furthermore, more that 60% of our observations are concentrated in the hard adoption period.

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[11] By including firms that cease to exist after the sample year we avoid survivorship bias.

Table 1
Sample Size by Year and Industry Groups

Industry	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*Total*
Basic Resource	13	12	12	11	6	7	20	17	15	17	21	24	30	*205*
Consumer Goods & Services	13	11	12	10	10	12	18	22	22	24	27	24	24	*229*
Entertainment	8	4	5	5	5	7	12	12	13	18	26	24	28	*167*
Health Care & Chemicals	13	13	14	16	25	26	29	33	34	40	38	43	49	*373*
Industrial Goods	44	44	42	32	39	44	59	60	59	74	66	73	67	*703*
Professional Services	14	14	12	11	17	21	31	31	29	35	33	38	36	*322*
Real Estate & Development	10	10	10	9	11	13	15	17	16	16	17	18	20	*182*
Retail	11	11	8	6	7	7	15	16	16	15	18	20	19	*169*
Technology & Telecommunications	17	18	15	14	41	42	67	64	68	76	73	71	71	*637*
Total	143	137	130	114	161	179	266	272	272	315	319	335	344	*2 987*

Notes:

Numbers reported are firm-year observations in each year and industry group. An observation is defined as a firm having at least three years of financial statements available prior to the year when we construct a hedge portfolio. Thus, financial statements are available from 1995, but the first year when we form portfolios is 1998.

Table 1 shows that we have less than 20 observations in many industry-year sub-samples, especially in the soft adoption period. This may become an issue when we estimate discretionary accrual models for individual industries. According to Ibrahim, 20 observations is the lowest number of observations required to estimate the model, which is why she drops all industry-year combinations with less than 20 observations (Ibrahim, 2009, p. 1097). However, even having this many observations does not ensure that the coefficients we obtain from the models are significant and reliable.

To overcome this issue we structure our analysis in the following way:

1. We disregard industry classification and estimate all models for the sample as a whole and then consider all companies when doing the hedge-portfolio test (hereafter referred to as *Total sample analysis*). Even though not entirely consistent with original methodologies (Jones, 1991; Ibrahim, 2009), this method allows us to overcome the problem of low number of observations. However, at a price of reduced precision of discretionary accruals measures, because the coefficients we use are averages for heterogeneous sample including companies from different industries.

2. We estimate all the models and coefficients for each industry separately and then pool all companies together when doing the hedge portfolio test (hereafter referred to as *Industry-divided sample analysis*). This method follows the original methodologies precisely.

3. We estimate the models and run all the tests for one individual industry – Industrial Goods, which has enough observations in all years of research time period (hereafter referred to as *Industrial Goods analysis*). This analysis is similar to the previous one, however the conclusions that we reach can be considered the most reliable.

3.2 Research Design

We use two alternative models to estimate discretionary accruals for the trading strategy – Modified Jones model (Dechow et al., 1995) and Ibrahim (2009) model. The former is selected to achieve greater comparability with the previous studies, while the latter model is expected to provide higher precision in estimating discretionary accruals. We also extend our analysis with a trading strategy based on total accruals to see if discretionary accruals measured by either of the models provide superior information content over total accruals.

Application of each of these discretionary accrual models requires financial statement data for 3 years before the portfolio formation date. Portfolios are formed on April 1, year *t*, when all companies have published the financial statements for the previous year *t–1*.

All the following steps are performed on April 1, year *t,* or the next workday:

Step 1. We start by estimating coefficients of the two models based on the data obtained from the financial statements of years *t–2* and *t–3*. Using two years is necessary because we need not only the change in balance sheet items during the year *t–2,* but also increase or decrease in revenue compared to year *t–3,* which cannot be obtained directly from DS. Cross-sectional version of each model is used to overcome lack of time-series data for most companies included in the sample. When performing total sample analysis, we have a single set of coefficients for all companies regardless of the industry, while for industry analysis there is a different set of coefficients for each industry.

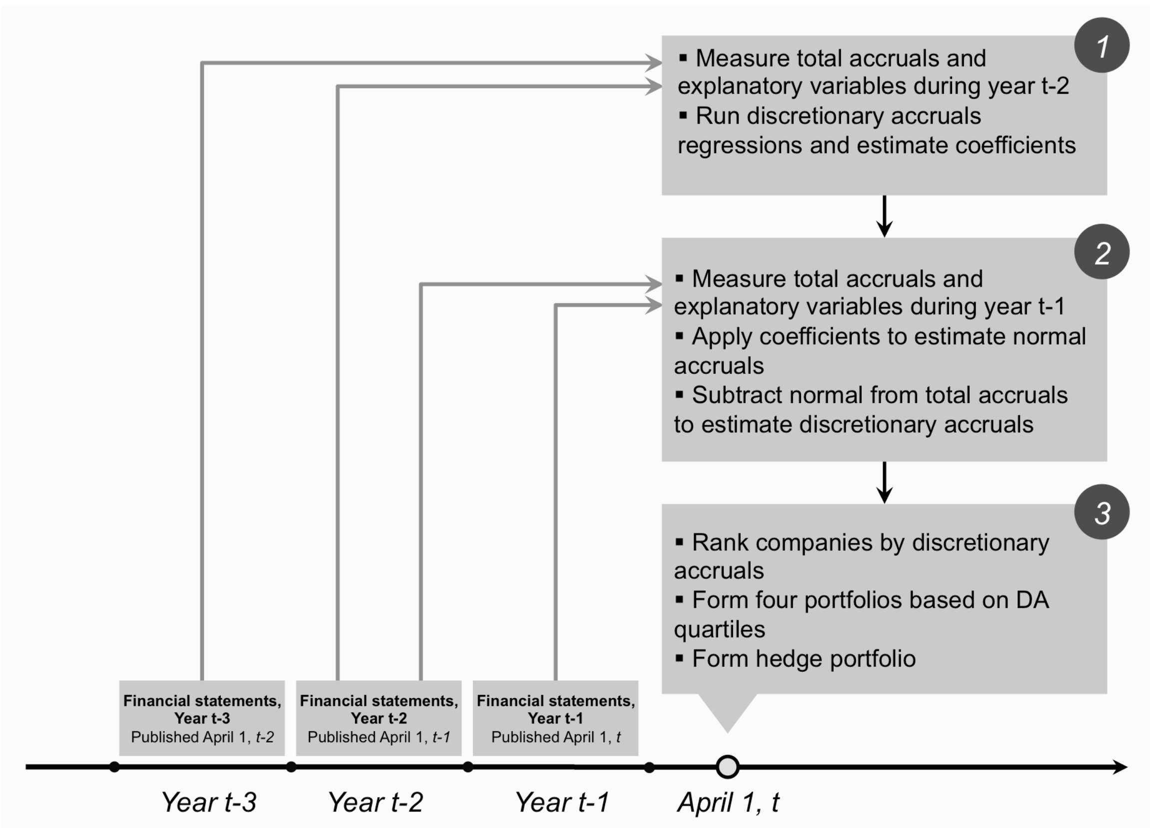
Step 2. We then apply coefficients obtained in Step 1 to predict normal level of accruals for each company in the sample. Using change in balance sheet and income statement items obtained from financial statements of years *t–2* and *t–1*, we measure actual accruals recognized during the year *t–1* and compare them with the normal accruals. The difference between the two is discretionary accruals.

Step 3. We rank all companies in sample according to the level of discretionary accruals measured in Step 2, identify top and bottom quartiles[12], and construct hedge portfolios for each of the models. To account for possibility that income-shifting accruals are reversed after 12 months we track the return of every hedge portfolio for months 1–12 and 13–24 separately. On April 1, year *t+1*, we repeat the process with the new available financial statements.

Figure 3 provides an illustration of the method outlined above.

In order to reach conclusions regarding the effect of IFRS adoption on this trading strategy, we estimate abnormal returns during the periods of soft and hard adoption separately. Since the method requires 3 years of financial statements prior to portfolio formation, our analysis of hard adoption period is limited to three years (2008–2010). Financial statements from 2005–2007 are used in estimating the model coefficients and discretionary accruals (Steps 1 and 2), but no portfolios are formed in those years to avoid mixing financial statement items measured under different accounting regimes.

Figure 3
Overview of Trading Strategy



[12] We deviate from the original methodology of investing in top and bottom deciles (Sloan, 1996) due to low number of observations in most years.

3.3 Hedge Portfolio Test

We construct hedge portfolios by taking a long position in the lowest DA quartile (firms that supposedly engaged in income-decreasing manipulations) and a short position in the highest DA quartile (firms that supposedly engaged in income-increasing manipulations).

Return of hedge portfolio is calculated as a sum of what we gain from the long position and what we lose on the short position:

$$R_{Ht} = R_{Lt} - R_{St}, \tag{3.1}$$

where

R_{Ht} = the return of hedge portfolio during month t,

R_{Lt} = the return of long position during month t,

R_{St} = the return of short position during month t.

Return of every portfolio is measured as equally-weighted return of securities that constitute this portfolio:

$$R_{Lt} = \frac{1}{N_{Lt}} \sum_{i=1}^{N_{Lt}} R_{it}, \tag{3.2}$$

$$R_{St} = \frac{1}{N_{St}} \sum_{i=1}^{N_{St}} R_{it}, \tag{3.3}$$

where

R_{it} = the return of individual stock during month t,

N_{Lt} = number of securities in portfolio Long during month t,

N_{St} = number of securities in portfolio Short during month t.

If a stock is delisted during particular year, we assume the liquidation proceeds are reinvested in the market index until a portfolio is liquidated. Portfolios are not rebalanced during the year.

3.4 Variable Measurement

3.4.1 Accruals

In this study we use the balance sheet method of measuring accruals, even though cash flow statement method is considered more reliable. The main reasons for this decision are:

- this method was used in original Jones (1991) and Dechow et at. (1995) publications;
- it is more comparable with the Ibrahim model because this model uses the same method to decompose discretionary accruals into their components.

However, we have to to introduce some changes into the original models. We have to drop the OWC regression (2.10) from the Ibrahim model, since there is no information in DS on income tax payable, other current assets and other current liabilities for many Swedish companies. Hence, we assume that DOWC is 0 in all years. We do not expect this to have any substantial effect on the validity of our results. Even Ibrahim admits that OWC component is not always available in the financial statements and she sets DOWC to 0, when it is missing (Ibrahim, 2009, p. 1094).

3.4.2 Returns

We use DS 'Total Return Index' item (RI) to measure monthly buy-and-hold returns of individual securities. RI is similar to a stock price but with one difference: RI is set to 100 when company is listed. All subsequent price changes are reflected in RI to keep return measured with RI and with closing stock price the same (e.g., if on the first day of trading a stock price increases by 10%, then its Return Index would increase from 100 to 110). RI also accounts for dividends and stock splits, and therefore presents a more convenient way to estimate buy-and-hold returns of individual securities than closing price:

$$R_{i,t} = \frac{\mathrm{RI}_{i,t}}{\mathrm{RI}_{i,t-1}} - 1 \tag{3.4}$$

where

$R_{i,t}$ = return of stock i during month t,

$\mathrm{RI}_{i,t}$ = Return Index at the end of month t,

$\mathrm{RI}_{i,t-1}$ = Return Index at the beginning of month t.

One problem associated with this measure is that DS provides data with only two decimal points for RI values. Consequently, companies with RI less than 0.1 may have abnormally high monthly returns even when the actual change in price was quite small. For example, a change from 0.01 to 0.02 would show monthly return of 100% even though the actual change could have been from 0.0149 to 0.0151. To make sure that these extreme return observations do not affect our results we substituted all monthly returns that exceed 20% and caused by company with RI less than 0.1 with corresponding monthly return of market index. We expect the effect of this change to even out when stocks are combined in portfolios. 32 monthly return observations were affected.

3.4.3 Currency Translation

Some of the financial statements in our sample were originally published in currencies other than Swedish Krona (SEK) – 227 firm-year observations from 27 companies. In order to have consistent sample, we manually convert each of these statements into SEK using closing rate for all balance sheet and income statement items. The exchange rates are obtained from DS.

3.5 Risk-adjustment

Evaluating raw buy-and-hold returns of individual portfolios would not provide reasonable assessment of the trading strategy considered in this study, because higher return may be associated with greater risk of a portfolio. Risk-adjustment is conducted to differentiate between expected (i.e., justified by the risk and other characteristics of companies included in the portfolio) and unexpected, or abnormal, return. Abnormal return is return associated with management skill – ability to find mispriced securities and allocate them to the right portfolios.

Abnormal return is typically measured as the difference between raw return and expected return:

$$R_i^{Abnormal} = R_i - \mathrm{E}(R_i), \tag{3.5}$$

where expected return is estimated with a model such as Capital Asset Pricing Model (CAPM) introduced by Sharpe (1964) and Lintner (1965) or an alternative three-factor model by Fama and French (1993). All models require the estimation of beta coefficients which measure the sensitivity of portfolio to different factors. Beta values are measured during an estimation period – several months prior to the year when we calculate abnormal returns. An important assumption behind this method is that risk of each portfolio must remain the same in the estimation period and in the event year when we measure abnormal returns.

However, Sloan (1996) argues that this method of risk adjustment is not appropriate for discretionary accruals based strategies since firms are placed into portfolios based on economic characteristics that are unstable. A firm considered income-decreasing in one year may engage in income-increasing activity in the following year. Hence, the beta value in these two years should be different. And it is unlikely that one firm remains in the same discretionary accruals based portfolio for more than 2 consecutive years.

An alternative method of risk-adjustment was introduced by Ibbotson (1975): abnormal returns and beta values are measured simultaneously based on the actual observations of portfolio returns, as opposed to estimating historical betas for each portfolio. According to Greig (1992), this method avoids the problem of time variation in beta for stocks in the hedge portfolio. The method assumes that portfolio risk is stable within one year; however, it does allow for variation in relative portfolio risk in different years of the evaluation period, which makes it the most appropriate in case of discretionary accruals based trading strategy (Sloan, 1996, p. 295).

Following a procedure described in Sloan (1996, p. 295), in each sample year *t* we calculate monthly returns during months 1–12 and 13–24 starting from the date portfolio is formed. These time series observations for each portfolio are then pooled together across the period of analysis. The last month when returns are measured is October 2011.

Return observations are measured separately for quartile portfolios and hedge portfolio based on discretionary accruals measured with Modified Jones model, Ibrahim models and portfolios based on total accruals. Thus, there are 15 sets of time series measured over whole period, and then soft and hard adoption periods separately; measured during first and then second year; measured for each of the three samples (total sample, industry-divided sample, industrial goods sample) considered in this study. Hence, abnormal returns are estimated for 270 (15x3x2x3) different time series.

3.5.1 CAPM Model

We estimate abnormal returns with CAPM model following a procedure described in Greig (1992). We regress monthly portfolio returns (or returns in excess of risk-free rate for individual portfolios) against the market risk premium:

$$R_{Ht} = \alpha_H + \beta_H \cdot (R_{Mt} - R_{ft}) + \varepsilon_{Ht}, \tag{3.6}$$

$$(R_{Pt} - R_{ft}) = \alpha_P + \beta_P \cdot (R_{Mt} - R_{ft}) + \varepsilon_{Pt}, \tag{3.7}$$

where

R_{Ht} = the return of hedge portfolio in month *t,*

R_{Pt} = the return of individual DA-quartile portfolio (1 to 4) in month *t*,

R_{ft} = the 1 month risk-free rate at the beginning of month *t,*

R_{Mt} = the return on the market index for month t.

We use interest on Swedish 30-day treasury bill as risk-free rate (R_{ft}) and return of MSCI Sweden as a market index (R_{Mt}). The intercept α is typically referred to as Jensen Performance Index or Jensen's alpha, and denotes abnormal return of portfolio over the period. We run regressions (3.5) and (3.6) on each of the time series available.

3.5.2 Fama-French Model

In order to see if the abnormal returns that we obtain are sensitive to different methods of risk-adjustment, we also estimate abnormal returns following the Fama and French (1993) methodology based on three factors: market risk premium, size premium and book-to-market premium. Abnormal returns are estimated for the hedge portfolio as well as for individual DA-quartile based portfolios:

$$R_{Ht} = \alpha_H + \beta_{1,H} \cdot (R_{Mt} - R_{ft}) + \beta_{2,H} \cdot SMB + \beta_{3,H} \cdot HML + \varepsilon_{Ht}, \tag{3.8}$$

$$R_{Pt} - R_{ft} = \alpha_P + \beta_{1,P} \cdot (R_{Mt} - R_{ft}) + \beta_{2,P} \cdot SMB + \beta_{3,P} \cdot HML + \varepsilon_{Pt}, \tag{3.9}$$

where

α = abnormal return of portfolio,

R_{Ht} = the return of hedge portfolio in month t,

R_{Pt} = the return of individual DA-quartile portfolio (1 to 4) in month t,

R_{ft} = the 1 month risk-free rate at the beginning of month t,

R_{Mt} = the return on the market index for month t.

Following the original methodology of Fama and French (1993) the factors SMB and HML are estimated as follows.

The *SMB portfolios* are based on firm size determined by the market capitalization. For each portfolio formation year we rank all population of companies in our sample in a particular year by their market capitalization and divide into two portfolios: portfolio Big (firms with the highest market capitalization) and portfolio Small (firms with the lowest market capitalization). We assume that the relative market capitalization, hence, portfolio type, will remain unchanged for sample firms during the event year. The SMB factor is the value-weighted return of the Small portfolio minus the value-weighted return of the Big portfolio.

The *HML portfolios* are based on book-to-market ratio. For each portfolio formation year companies are ranked by the book-to-market ratio and divided into three portfolios: portfolio Value (companies with high book-to-market ratio), portfolio neutral (companies with medium book-to-market ratio) and portfolio Growth (companies with low book-to-market ratio). We assume that the relative book-to-market ratio, hence, portfolio type, will remain unchanged for sample firms during the event year. The HML factor is the value-weighted return of the Value portfolio minus the value-weighted return of the Growth portfolio. Returns of both SMB and HML portfolios are measured on a monthly basis.

Thus, we obtain 3 sets of time series for market excess return, SMB and HML premium. We then run regressions (3.7) and (3.8) on all available time series of return observations.

4 Empirical Results

In this section we report the results of our empirical research. The section is structured in the following way:

We start with the evaluation of results for the *total sample* – here we apply Modified Jones and Ibrahim models to the whole sample instead of individual industries, estimate discretionary accruals for all companies and run the hedge portfolio test.

We proceed with the *industry-divided sample* analysis where discretionary accrual models are estimated separately for each industry and then all companies are pooled together when doing a hedge portfolio test.

Then, we take a closer look at the *Industrial Goods industry*. This particular industry complies with restrictions of Ibrahim (2009) model and both Modified Jones and Ibrahim models were found to perform quite well in this industry. Only industrial companies are included in the hedge portfolio test.

We conclude the section with analysis of returns measured during the second year after portfolio formation. Previous studies (e.g., Sloan, 1996; Xie, 2001) found that certain types of accruals may take more than one year to reverse; therefore, there is a reason to expect abnormal returns during the second year.

In each sub-section we compare trading strategies based on discretionary accruals measured with Modified Jones and Ibrahim models. We also compare the two strategies with the one based on total accruals to show if discretionary accruals have incremental information content over total accruals.

4.1 Total Sample

Table 2 provides descriptive statistics for financial variables used in discretionary accrual models for the whole sample of firm-year observations over the period 1998-2010. Companies in our sample range from very small (Total Assets of SEK 2 Mil) to big enterprises (Total Assets of SEK 276.3 Mil). On average, depreciation represents the biggest component of accruals, thus, it is likely to contribute to the negative mean in total accruals.

Table 2
Descriptive Statistics for Financial Variables of Sample (Total Sample)

Descriptive Statistics for Financial Variables of Sample:
***N* = 2,987**

Variable	*Mean*	*Std. Deviation*	*Median*	*Minimum*	*Maximum*
ΔREV_t	0.1495	0.4337	0.0830	-1.5615	5.7675
ΔAR_t	0.0314	0.1107	0.0121	-0.3189	0.9385
ΔINV_t	0.0137	0.0670	0.0004	-0.1957	0.6494
ΔAP_t	-0.0149	0.0670	-0.0047	-0.6571	0.2445
$AR\_TURNOVER_t$	0.2220	0.2325	0.1905	0.0000	5.0248
$INV\_TURNOVER_t$	0.1697	0.1953	0.1416	0.0000	2.5279
$AP\_TURNOVER_t$	0.1396	0.1521	0.1074	0.0000	2.3345
PPE_t	0.2484	0.3066	0.1573	-0.1279	6.3725
$DEPR_t$	0.0576	0.0466	0.0483	0.0000	0.4904
TA_t	-0.0273	0.1223	-0.0351	-0.6295	0.9204
ROA_t	-0.0268	0.2701	0.0383	-2.2927	0.8153
A_t	9 852	30 405	732	2	276 276

Notes:

All variables, other than $AR\_TURNOVER_t$, $AP\_TURNOVER_t$, $INV\_TURNOVER_t$ and ROA_t, are scaled by beginning total assets. Definition of variables as in formulas (2.7)–(2.11). Total Assets reported in 1,000 SEK. TA_t is total accruals. A_t is total assets.

One peculiarity that we can observe in Table 2 is extreme negative ROA of -2.29. We measure ROA using beginning total assets (consistently with Ibrahim, 2009). As a result, when a merger occurs during the year, the magnitude of earnings and beginning total assets may differ substantially. Even though we excluded outliers from our sample, this observation did not fall into the 1% of extreme values and, therefore, remained in the sample.

Overall, magnitude of our variables is similar to that reported in Ibrahim (2009).

To proceed with the hedge portfolio test we applied Modified Jones and Ibrahim models in each sample year from 1998 to 2010 to the whole population of companies, disregarding the industry classification.

For the Modified Jones model we got regression coefficients significant on the 5% level during most years. However, less coefficients were significant for the Ibrahim model, with one exception, that is discretionary accounts receivable regression (see Appendix 1 for number of significant coefficients).

Table 3, Panel A reports descriptive statistics for discretionary components of accruals estimated with the Ibrahim and Modified Jones models. On average, Modified Jones model designates higher portion of total accruals as discretionary than Ibrahim model.

Table 3

Descriptive Statistics of Total And Discretionary Accruals Measures (Total Sample)

Panel A: Descriptive Statistics

Variable	*Mean*	*Std. Deviation*	*Median*	*Minimum*	*Maximum*
TA	-0.0267	0.1290	-0.0351	-0.6295	1.1838
DA_JONES	-0.0124	0.1304	-0.0162	-0.6300	1.1441
DA_IBRAHIM	-0.0070	0.1341	-0.0064	-1.4415	1.3172
DAR	-0.0087	0.1210	-0.0054	-1.4949	1.7118
DINV	-0.0012	0.0784	-0.0016	-0.4054	2.3086
DAP	0.0033	0.0723	0.0047	-1.4360	0.6153
DDEP	0.0004	0.0426	-0.0049	-0.1979	0.4224

Panel B: Pearson Correlation Coefficients

	TA	*DA_JONES$_t$*	*DA_IBRAHIM$_t$*	*DAR$_t$*	*DINV$_t$*	*DAP$_t$*	*DDEP$_t$*
TA	1.0000						
DA_JONES$_t$	**0.8842***	1.0000					
DA_IBRAHIM$_t$	**0.7115***	**0.7755***	1.0000				
DAR$_t$	0.4069*	0.4691*	**0.7142***	1.0000			
DINV$_t$	0.4780*	**0.5329***	**0.5243***	0.1442*	1.0000		
DAP$_t$	-0.0297	-0.0702*	-0.0396**	-0.4304*	-0.3485*	1.0000	
DDEP$_t$	-0.2538*	-0.2466*	-0.2206*	0.1280*	0.0088	-0.0434**	1.0000

Notes:

Panel B: Correlations greater than 0.5 are in bold. *, ** denote 1% and 5% significance level respectively.

The relationship between discretionary components of the Ibrahim and Modified Jones models measured with Pearson correlation coefficients is reported in Panel B of Table 3.

The correlation between discretionary accruals measured by Modified Jones model and total accruals is 0.88, which indicates a nearly-linear relationship. This may seem reasonable: firms with the highest amount of accruals are more likely to have exercised discretion over accruals, though this relationship is not always true. Such high correlation casts doubt on validity of discretionary accrual estimates provided by Modified Jones model. However, the correlation between discretionary accruals estimated using the Ibrahim and Modified Jones model is 0.77, which means that in general both models capture the same underlying earnings component.

There is also considerably high correlation between the total discretionary accruals calculated using the Ibrahim model and discretionary accounts receivable and inventories. In Ibrahim's study, the highest correlation was noticed between the total discretionary accruals and discretionary accounts payable (correlation coefficient = 0.51) (Ibrahim, 2009). In our case it is likely that most unexpected changes in accruals accounts captured by the model occurred due to accounts receivable and inventories. Thus, it is possible that in our case most manipulations were caused by exercising discretion over accounts receivable and inventories.

Following the procedure outlined in Research Design section (see section 3.2) we ranked all companies according to their level of discretionary accruals and total accruals and formed quartile-based portfolios. Table 4 presents the average composition of portfolios comprising the hedge portfolio.

Table 4

Composition of Portfolios by B/M and Size (Total Sample)

Panel A: Average portfolio composition by Book-to-Market ratio

	Modified Jones DA		Ibrahim DA		Total accruals	
Book-to-Market ratio	*1 (low)*	*4 (high)*	*1 (low)*	*4 (high)*	*1 (low)*	*4 (high)*
High (Value companies)	31.5%	34.1%	30.7%	35.1%	29.7%	32.1%
Medium (Neutral companies)	30.9%	33.2%	32.1%	30.6%	33.2%	33.0%
Low (Growth companies)	37.7%	32.7%	37.2%	34.3%	37.1%	34.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Panel B: Average portfolio composition by Size

	Modified Jones DA		Ibrahim DA		Total accruals	
Size	*1 (low)*	*4 (high)*	*1 (low)*	*4 (high)*	*1 (low)*	*4 (high)*
Big companies	37.1%	48.3%	41.2%	42.4%	28.2%	54.2%
Small companies	62.9%	51.7%	58.8%	57.6%	71.8%	45.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Notes:

Prior to forming the portfolios we assign all companies to groups based on their size and B/M ratio, following the Fama-French methodology (see section 3.5.2). Proportion of companies belonging to each group is then measured for every portfolio in every year. Numbers reported are mean proportions over the whole period. Portfolio 1 – low measure of accruals, long position. Portfolio 4 – high measure of accruals, short position.

We do not see any patterns with regard to B/M ratio, however, there is a reason to expect a size effect in portfolio returns. This observation may be due to small companies having more opportunities for accrual manipulation as opposed to big companies which are followed by more professional analysts and have institutional investors. For this reason, more big companies end up in portfolios 2 and 3 (with discretionary accruals closer to 0), while small companies are concentrated mostly in portfolio 1.

Table 5 reports abnormal returns of the portfolios formed using discretionary accrual measures from Modified Jones and Ibrahim models as well as total accruals over the whole period of analysis (1998-2010). Table 6 provides the same results for the soft adoption (1998-2004) and hard adoption (2008-2010) periods separately. In both tables Panel A and Panel B report results after CAPM and Fama-French risk-adjustment respectively.

The results for the whole period and the soft adoption period indicate statistically significant CAPM-risk-adjusted hedge-return to the portfolio formed using discretionary accruals measured with Ibrahim model. However, once we apply Fama-French risk-adjustment, this return is no longer significant, meaning that the abnormal part of return to these portfolios was to a certain extent associated with book-to-market or, more likely, size factors.

With regard to the hard adoption period, none of the CAPM-risk-adjusted hedge returns is significant, though there is a negative Fama-French risk-adjusted return (significant on the 10% level) to the hedge portfolio formed using using discretionary accruals measured with the Modified Jones model. Even though 10% is the extreme level of statistical significance the observed negative return raises concern. The possible explanation could be the misspecification of the Modified Jones model, since it does not account for the differences in performance and accounting policies across firms included in the sample. This problem becomes especially acute since the estimation of the Modified Jones model on the total sample violates the uniform accruals generating principle: regression coefficients used in the estimations are not industry-specific coefficients measured within one industry as required by the model (Jones, 1991; Dechow et al., 1995; Dopuch et al., 2011). Thus, one should be cautious when evaluating results for the hedge-portfolio based on the Modified Jones model estimated using the total sample of mixed industries. Returns of portfolios formed using Ibrahim model do not cause such a big concern, since this model accounts for accrual determinants such as ROA and turnover ratios, and may be applied to a sample of mixed industries.

Table 5
Abnormal Returns for Period 1998–2010 (Total Sample)

Panel A: Monthly abnormal returns using CAPM risk-adjustment			
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	-0.00312	-0.00076	-0.00386
	(0.3677)	*(0.8075)*	*(0.2263)*
2	0.00190	0.00401	0.00282
	(0.4929)	*(0.1404)*	*(0.3548)*
3	0.00279	0.00077	0.00206
	(0.3688)	*(0.7916)*	*(0.4723)*
4 (high)	-0.00301	-0.00507	-0.00129
	(0.3373)	*(0.1357)*	*(0.6682)*
Hedge return	-0.00011	0.00430	-0.00258
	(0.9697)	*(0.0605)*	*(0.2557)*

Panel B: Monthly abnormal returns using Fama-French risk-adjustment			
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	0.00799	0.00803	0.00591
	(0.0066)	*(0.0033)*	*(0.0299)*
2	0.00670	0.00849	0.00920
	(0.0070)	*(0.0005)*	*(0.0004)*
3	0.00810	0.00636	0.00684
	(0.0017)	*(0.0103)*	*(0.0054)*
4 (high)	0.00492	0.00485	0.00613
	(0.0781)	*(0.0806)*	*(0.0168)*
Hedge return	0.00308	0.00318	-0.00022
	(0.3181)	*(0.2031)*	*(0.9263)*

Notes:
Monthly abnormal returns are measured as alpha in regressions (3.6–3.9). We use time-series of all portfolio return observations available in the period 1998-2010. Only returns in the first year after portfolio formation are considered. Numbers in parenthesis denote p-values.

Tables 5 and 6 allow us to make two more observations:

First, while abnormal returns of individual portfolios are insignificant, there is significant hedge return to the strategy based on Ibrahim discretionary accruals (Table 5 Panel A, Table 6 Panel A). Applying discretionary accrual models to the whole sample instead of industry sub-samples results in very "rough" estimates of discretionary accruals for many companies in the sample. Consequently, some companies may be allocated to the wrong portfolios. Companies engaging in income-decreasing activity (those, that should be placed in portfolio 1) and income-increasing activity (those, that should be placed in portfolio 4) may end up in portfolios 2 or 3, bringing the abnormal return of these portfolios closer to 0. Nevertheless, abnormal return of portfolio 1 is still higher than that of portfolio 4, which results in positive hedge return (although, significant only on a 10% level).

Second, we see inverse situation in Table 5 Panel B. Even though we do not observe the accrual anomaly in this case (none of the hedge portfolios generates significant return), abnormal returns to individual portfolios are significant. The fact that all returns are positive (for portfolios based on both discretionary and total accruals) and there is no significant variation in their values lead us to believe that this is a result of improper risk-adjustment and omitted risk factors.

Table 6

Abnormal Returns for Periods of Soft and Hard Adoption of IFRS (Total sample)

Panel A: Monthly abnormal returns using CAPM risk-adjustment

	1998–2004			2008–2010		
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	-0.00073	0.00190	-0.00246	-0.00837	-0.00740	-0.00509
	(0.8863)	(0.6687)	(0.5845)	(0.2889)	(0.3269)	(0.5217)
2	0.00380	0.00699	0.00443	-0.00158	-0.00222	-0.00102
	(0.3011)	(0.0559)	(0.3090)	(0.8349)	(0.7595)	(0.8930)
3	0.00461	0.00075	0.00262	-0.00625	-0.00507	-0.00439
	(0.3100)	(0.8519)	(0.5001)	(0.3723)	(0.4916)	(0.5492)
4 (high)	-0.00382	-0.00489	0.00048	-0.00458	-0.00543	-0.00722
	(0.3548)	(0.3028)	(0.9049)	(0.6158)	(0.5525)	(0.3664)
Hedge return	0.00309	0.00679	-0.00294	-0.00379	-0.00197	0.00214
	(0.4805)	(0.0467)	(0.3501)	(0.4780)	(0.6754)	(0.6379)

Panel B: Monthly abnormal returns using Fama-French risk-adjustment

	1998–2004			2008–2010		
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	0.01041	0.00980	0.00629	0.00370	0.00496	0.00821
	(0.0107)	(0.0090)	(0.0838)	(0.6755)	(0.5507)	(0.3404)
2	0.00743	0.01027	0.01025	0.01267	0.01083	0.01300
	(0.0199)	(0.0011)	(0.0040)	(0.1131)	(0.1570)	(0.1099)
3	0.00793	0.00475	0.00596	0.00588	0.00851	0.00936
	(0.0287)	(0.1566)	(0.0576)	(0.4228)	(0.2643)	(0.2168)
4 (high)	0.00305	0.00435	0.00680	0.01391	0.01187	0.00712
	(0.3941)	(0.2187)	(0.0390)	(0.1252)	(0.2040)	(0.3849)
Hedge return	0.00736	0.00545	-0.00052	-0.01021	-0.00691	0.00109
	(0.1179)	(0.1412)	(0.8791)	(0.0868)	(0.1969)	(0.8458)

Notes:

Monthly abnormal returns are measured as alpha in regressions (3.6–3.9). We use time-series of all portfolio return observations available in the periods 1998-2004 and 2008-2010. Only returns in the first year after portfolio formation are considered. Numbers in parenthesis denote p-values.

4.2 Industry-Divided Sample

As it was mentioned earlier, for many industry-year groups in our sample the number of observations is not enough to calculate discretionary accruals reliably, since Ibrahim model requires at least 20 observations in each industry (Ibrahim, 2009). The results obtained by running regressions for each industry-year separately from 1998 to 2010 (117 industry-years in total) support this argument. For most industry-year sub-samples coefficients obtained from Modified Jones and Ibrahim models were not significant on the 5% level. This presents an issue since any analysis based on insignificant coefficients would result in meaningless measures of discretionary accruals and, consequently, unreliable conclusions regarding the accrual-based trading strategy. For overview of how the two models perform on industry-divided sample refer to Appendix 1.

4.3 Industrial Goods Sample

In order to draw some conclusions regarding the performance of a trading strategy based on discretionary accruals when methodology is fully consistent with original publications (Jones, 1991; Ibrahim, 2009), we select one industry – *Industrial Goods* – where both Modified Jones and Ibrahim models perform well (Appendix 1). In this section we estimate all coefficients for Modified Jones and Ibrahim models and conduct hedge portfolio test based on the sample of Industrial Goods companies only.

We have selected this particular industry for the following reasons: (1) *Industrial Goods* is the most homogeneous industry in terms of accounting policies and accrual generation processes, all companies in this group are involved in manufacturing and have a substantial amount of inventories and (2) this group has enough firm-year observations to comply with the requirements of the two discretionary accrual models.

Even though many coefficients for *Technology & Telecommunications* are significant too, we decided to exclude it from analysis because it is much less homogeneous: this industry includes both service and manufacturing companies. Also, this industry does not have enough observations before 2002. Splitting this industry into more homogeneous sub-samples is not a viable solution due to its small size.

We do not consider other industries due to very low number of significant coefficients (Appendix 1) and, as a result, unreliable estimates of discretionary accruals measures.

The advantage of focusing on one industry is that it allows getting a better approximation of discretionary components, since the regression coefficients are estimated using the sample of companies with the similar business model and accrual-generating process (Dopuch et al., 2011). Therefore, it allows us to test whether this knowledge creates additional benefit for investors. Focusing on just one industry would ensure that our results are unaffected by variation of accounting policies across industries which Modified Jones cannot capture.

Table 7
Descriptive Statistics of Total and Discretionary Accruals Measures (Industrial Goods)

Panel A: Descriptive Statistics

Variable	*Mean*	*Std. Deviation*	*Median*	*Minimum*	*Maximum*
TA	-0.0272	0.1188	-0.0299	-0.6295	0.5019
DA_JONES	-0.0106	0.1146	-0.0104	-0.6146	0.4821
DA_IBRAHIM	-0.0132	0.1153	-0.0110	-0.7069	0.5092
DAR	-0.0101	0.0948	-0.0082	-0.7203	0.4208
DINV	-0.0032	0.0669	-0.0044	-0.3223	0.6751
DAP	0.0010	0.0672	0.0013	-0.6257	0.4123
DDEP	0.0009	0.0378	-0.0003	-0.1810	0.3437

Panel B: Pearson Correlation Coefficients

	TA	*DA_JONES_t*	*$DA\_IBRAHIM_t$*	*DAR_t*	*$DINV_t$*	*DAP_t*	*$DDEP_t$*
TA	1.0000						
DA_JONES_t	**0.8295***	1.0000					
$DA\_IBRAHIM_t$	**0.6878***	**0.7825***	1.0000				
DAR_t	0.4117*	**0.5243***	**0.7079***	1.0000			
$DINV_t$	0.4658*	**0.5297***	**0.5702***	0.2519*	1.0000		
DAP_t	0.0578	0.0093	0.0196	-0.3781*	-0.4055*	1.0000	
$DDEP_t$	-0.1375*	-0.1168*	-0.2296*	0.1228*	-0.0579	0.0527	1.0000

Notes:
Panel B: Correlations greater than 0.5 are in bold. *, ** denote 1% and 5% significance level respectively.

Correlations of total accruals and measures of discretionary accruals are quite close to those reported for the total sample: there is a strong correlation between discretionary accruals measured with Modified Jones and Ibrahim models (Table 7 Panel B). However, there is one difference: both Modified Jones and Ibrahim models on average denote the same amount of total accruals as discretionary (Table 7 Panel A). One possible explanation is high homogeneity in this group: when all companies have similar accrual generation processes, it does not matter whether we decompose total accruals into their components and predict normal level for each component separately or predict normal total accruals as a whole. Therefore, it is reasonable to expect Modified Jones model to provide similar estimates of discretionary accruals to those obtained from Ibrahim model.

Table 8 reports average composition of portfolios by B/M ratio and size. Again, we see that portfolios with low accrual measures is dominated by small companies, while there is no clear pattern with regard to B/M ratio.

Table 8
Composition of Portfolios by B/M and Size (Industrial Goods)

Panel A: Monthly average portfolio composition by Book-to-Market ratio

	Modified Jones DA		Ibrahim DA		Total accruals	
Book-to-Market ratio	*1 (low)*	*4 (high)*	*1 (low)*	*4 (high)*	*1 (low)*	*4 (high)*
High (Value companies)	35.9%	31.0%	30.5%	28.3%	33.6%	31.4%
Medium (Neutral companies)	35.2%	40.2%	35.7%	43.2%	36.5%	42.1%
Low (Growth companies)	28.9%	28.8%	33.8%	28.5%	29.9%	26.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Panel B: Monthly average portfolio composition by Size

	Modified Jones DA		Ibrahim DA		Total accruals	
Size	*1 (low)*	*4 (high)*	*1 (low)*	*4 (high)*	*1 (low)*	*4 (high)*
Big companies	40.5%	45.0%	38.3%	46.8%	39.8%	45.8%
Small companies	59.5%	55.0%	61.7%	53.2%	60.2%	54.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Following the same procedure we form portfolios based on the level of discretionary and total accruals and track returns during the whole period (Table 9) and then during soft and hard adoption periods separately (Table 10) in the first year after the date portfolio is formed.

None of the abnormal returns measured over the whole period of analysis are significant. But if we consider abnormal returns over soft and hard adoption periods, there is significant abnormal return to hedge portfolio before 2005.

In case of Modified Jones model, there is abnormal return of 1.2% per month (14.4% p.a.) significant on 5% level. The return remains unchanged after Fama-French risk-adjustment, yet only on 10% level, meaning that this return is not explained by size or book-to-market factors. Return generated by trading strategies based on Modified Jones and Ibrahim models does not differ considerably.

Table 9
Abnormal Returns for Period 1998–2010 (Industrial Goods)

Panel A: Monthly abnormal returns using CAPM risk-adjustment			
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	0.00499	-0.00073	0.00227
	(0.2180)	*(0.8535)*	*(0.5588)*
2	0.00434	0.00647	0.00144
	(0.2137)	*(0.0929)*	*(0.6989)*
3	0.00220	0.00225	0.00635
	(0.5215)	*(0.5113)*	*(0.0737)*
4 (high)	-0.00625	-0.00520	-0.00452
	(0.1360)	*(0.2754)*	*(0.2428)*
Hedge return	0.00515	-0.00028	0.00339
	(0.2229)	*(0.9485)*	*(0.4033)*
Panel B: Monthly abnormal returns using Fama-French risk-adjustment			
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	0.00961	0.00358	0.00432
	(0.0153)	*(0.3717)*	*(0.2691)*
2	0.00583	0.00811	0.00673
	(0.0804)	*(0.0213)*	*(0.0522)*
3	0.00558	0.00604	0.00874
	(0.0900)	*(0.0597)*	*(0.0088)*
4 (high)	-0.00279	-0.00046	-0.00061
	(0.4955)	*(0.9217)*	*(0.8721)*
Hedge return	0.00254	0.00203	-0.00001
	(0.5883)	*(0.6613)*	*(0.9975)*

In case of Ibrahim model, abnormal return is insignificant for CAPM risk-adjustment, but significant on 10% level for Fama-French. This may seem counterintuitive, since Fama-French model includes more factors than CAPM and these factors are supposed to capture some part of CAPM risk-adjusted return and, as a result, decrease abnormal return. However, the situation that we observe here is not impossible[13]. From a purely statistical perspective, intercept in the models is not supposed to always decrease when we include additional factors in the model. CAPM and Fama-French are two different models and there is no strict relationship between their intercept measures.

[13] In fact, the same observation is reported in LaFond (2005, p. 22).

None of the abnormal returns remain significant in the hard adoption period.

Table 10

Abnormal Returns for Periods of Soft and Hard Adoption of IFRS (Industrial Goods)

Panel A: Monthly abnormal returns using CAPM risk-adjustment

	1998–2004			2008–2010		
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	0.01123	0.00203	0.00847	-0.01251	-0.01021	-0.01303
	(0.0154)	(0.6655)	(0.0562)	(0.2905)	(0.3831)	(0.2150)
2	0.00781	0.00911	0.00423	-0.01038	-0.00684	-0.01735
	(0.0622)	(0.0634)	(0.3614)	(0.2079)	(0.4641)	(0.0598)
3	-0.00302	0.00160	0.00275	0.00280	-0.00346	-0.00245
	(0.5763)	(0.7334)	(0.6060)	(0.6631)	(0.6284)	(0.7208)
4 (high)	-0.00175	-0.00760	-0.00369	-0.01647	-0.00903	-0.00966
	(0.7540)	(0.2871)	(0.5246)	(0.0639)	(0.4096)	(0.1104)
Hedge return	0.01206	0.00363	0.00887	-0.00272	-0.01450	-0.00709
	(0.0450)	(0.5402)	(0.1075)	(0.7221)	(0.1252)	(0.3819)

Panel B: Monthly abnormal returns using Fama-French risk-adjustment

	1998–2004			2008–2010		
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	0.01311	0.00585	0.00793	0.01045	0.00610	-0.00030
	(0.0051)	(0.2241)	(0.0760)	(0.3526)	(0.6328)	(0.9806)
2	0.00956	0.01013	0.00901	-0.00021	0.00366	-0.00328
	(0.0222)	(0.0266)	(0.0370)	(0.9811)	(0.7208)	(0.6996)
3	-0.00162	0.00305	0.00255	0.00773	0.00595	0.00946
	(0.7319)	(0.4694)	(0.5816)	(0.3231)	(0.4858)	(0.2089)
4 (high)	-0.00236	-0.00764	-0.00191	-0.00228	0.00271	-0.00396
	(0.6486)	(0.2190)	(0.7348)	(0.8137)	(0.8366)	(0.5784)
Hedge return	0.01235	0.01081	0.00523	0.00253	-0.00291	-0.00339
	(0.0625)	(0.0732)	(0.3645)	(0.7885)	(0.7869)	(0.7372)

4.4 Abnormal Returns during Second Year

To see whether discretionary accruals reverse more than 12 months after portfolio formation we track returns to each portfolio for 24 months. If this is true, then we can expect positive risk-adjusted returns to the hedge portfolio in second year. Sloan (1996) showed that in the U.S. risk-adjusted returns of hedge portfolio diminished only by the third year.

A limitation of this part of our work is that we are unable to estimate abnormal returns during the hard adoption period of IFRS reliably, possibly due to a low number of observations. The first month when we start to measure the returns is April 2009, which leaves us with 31 monthly return observations until October 2011. All CAPM and Fama-French regressions show R^2 close to 0 and fail F test of overall significance of regression estimates. We omit all tables related to this period.

The following results are based on monthly return observations for months 13–24 after portfolio formation. Table 11 reports abnormal returns measured over the whole period of analysis (1998-2010) for total sample not divided into industries and for Industrial Goods sample. The results for soft adoption period are similar (for table refer to Appendix 2).

We can observe that the trading strategy does not generate significant abnormal returns on a two-year investment horizon. Abnormal returns are no longer positive after holding the portfolio for one year and none of them are significant on 10% level.

Contrary to Sloan (1996), we do not see significant abnormal returns during the second year. Possible explanation could be that estimates and accruals resulting from management discretion are reversed within one year. When the new financial statements are published, allocation of companies to discretionary accruals quartiles no longer remains the same. Thus, high (low) abnormal return is no longer associated with first (fourth) quartile portfolio that we are holding. As a result, we observe significant positive abnormal return in the 4th quartile portfolio with the companies that used to have the highest discretionary accruals a year ago and are expected to have negative abnormal return. Return of the 1st quartile portfolio is insignificant in most cases.

Table 11

Abnormal Returns Measured in Second Year (1998–2010)

Panel A: Monthly abnormal returns using CAPM risk-adjustment

	Total Sample			Industrial Goods Sample		
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	-0.00132	0.00083	-0.00156	0.01105	0.00871	0.00690
	(0.7065)	*(0.7958)*	*(0.6474)*	*(0.0134)*	*(0.0297)*	*(0.0857)*
2	0.00137	0.00307	0.00387	0.00943	0.01101	0.01244
	(0.6259)	*(0.2975)*	*(0.1698)*	*(0.0048)*	*(0.0025)*	*(0.0003)*
3	0.00485	0.00285	0.00529	0.00959	0.00957	0.01036
	(0.1159)	*(0.3668)*	*(0.0656)*	*(0.0346)*	*(0.0117)*	*(0.0092)*
4 (high)	0.00297	0.00160	0.00182	0.00457	0.00822	0.00494
	(0.3584)	*(0.6309)*	*(0.5762)*	*(0.3664)*	*(0.0763)*	*(0.2300)*
Hedge return	-0.00428	-0.00077	-0.00338	0.00647	0.00049	0.00196
	(0.1375)	*(0.7607)*	*(0.1675)*	*(0.2311)*	*(0.9248)*	*(0.6797)*

Panel B: Monthly abnormal returns using Fama-French risk-adjustment

	Total Sample			Industrial Goods Sample		
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	0.00765	0.00860	0.00702	0.00925	0.00775	0.00363
	(0.0105)	*(0.0023)*	*(0.0102)*	*(0.0469)*	*(0.0650)*	*(0.3902)*
2	0.00567	0.00699	0.00839	0.00695	0.00654	0.00933
	(0.0227)	*(0.0053)*	*(0.0007)*	*(0.0331)*	*(0.0743)*	*(0.0072)*
3	0.00903	0.00694	0.00941	0.00691	0.01191	0.00906
	(0.0005)	*(0.0113)*	*(0.0002)*	*(0.1415)*	*(0.0019)*	*(0.0256)*
4 (high)	0.00898	0.00938	0.00702	0.01188	0.01439	0.01160
	(0.0021)	*(0.0013)*	*(0.0133)*	*(0.0237)*	*(0.0020)*	*(0.0049)*
Hedge return	-0.00133	-0.00078	0.00000	-0.00263	-0.00664	-0.00796
	(0.6692)	*(0.7808)*	*(0.9990)*	*(0.6447)*	*(0.2338)*	*(0.1024)*

Notes:

Monthly abnormal returns are measured as alpha in regressions (3.6–3.9). We use time-series of all portfolio return observations available in the period 1998-2010. Only returns in the second year after portfolio formation are considered. Numbers in parenthesis denote p-values.

5 Discussion

In this section we give an overview of our conclusions, discuss possible reasons for the results that we obtained and how our findings relate to existing research.

5.1 Accrual Anomaly in Sweden

We have run our tests on two different samples: whole population of Swedish companies (total sample analysis) and Industrial Goods sector.

We do not find any strong evidence that the accrual anomaly exists in Sweden based on the total sample analysis. Even though we see some traces of mispricing in portfolios based on discretionary accruals measured with Ibrahim model, the abnormal return is no longer significant when we adjust for risk with Fama-French three-factor model. Therefore, the abnormal return that we observed could be the manifestation of size effect and not market mispricing of accruals. However, one should be very careful when evaluating this result, because the analysis is not entirely consistent with methodologies of Jones (1991) and Ibrahim (2009) as opposed to Industrial Goods analysis.

When we consider Industrial Goods sample only, we observe Fama-French risk-adjusted hedge return significant on the 10% level during the soft adoption period. This result is consistent with that reported in LaFond (2005), who confirmed abnormal returns in Sweden significant on a 10% level in about the same time period.

We believe that one can generalize this finding and conclude that there was mispricing in the Swedish stock market, given the role industrial companies play in the Swedish economy: industrial production accounts for 26.6% of the GDP in Sweden (CIA Factbook).

However, in contrast to Sloan (1996), we do not observe any mispricing in total accruals. This finding is consistent with Subramanyam (1996) and subsequent studies showing that discretionary accruals have incremental information content over total accruals and investors overprice discretionary accruals (Xie, 2001).

Studies show that it may be possible for some discretionary accruals to reverse after more than 12 months (e.g., Xie, 2001). Hence, returns to the trading strategy may not be realized until the second year of keeping the portfolio. We test the hypothesis that it takes more than 1 year for discretionary accruals to reverse in Sweden (and thus, to observe the anomaly), but find that none of the hedge portfolios generate abnormal returns during the second year in either sample.

Thus, we conclude that the accrual anomaly previously observed in the U.S. and several European countries could be observed in Sweden, though to a limited extent.

5.2 Effect of IFRS Adoption

Even though we find evidence of the accrual anomaly in Sweden during the soft adoption period, abnormal returns in the hard adoption period are insignificant.

There are three possible explanations for this finding:

- returns diminished in a natural way due to sophisticated investors trading on the anomaly,
- introduction of IFRS in Sweden limited opportunities for exercising discretion over accruals and improved information content of financial statements, thus reducing the mispricing,
- period of analysis is too short to detect any significant abnormal returns.

We are unable to differentiate between the first two explanations in our analysis, but evidence suggests that investors are actively exploiting the anomaly (Green at al., 2011) and it could be the case in Sweden.

Pincus et al. (2007) argue that analysis of the accrual anomaly is very sensitive to sample size, which is why they were unable to detect the anomaly in Sweden. Pincus et al. based their analysis on 9 years of data, while we only have less than three years in the hard adoption period, which could be an alternative reason for the lack of significant returns in the hard adoption period.

To see if IFRS may have had an effect on the accrual anomaly we present an overview of the most significant changes in accounting standards compared to Swedish GAAP as of 2005 (see Appendix 3).

According to Hellman (2011), we should expect companies to have fewer opportunities for earnings manipulation (i.e., opportunity to exercise discretion over accruals) under hard adoption of IFRS regime, which is consistent with our observation that the trading strategy is no longer profitable

We also consider the possibility that companies have greater opportunity for discretion under IFRS. Even though most of the changes concern fixed assets rather than accrual accounts, these assets still require extensive estimates, so the reasoning remains the same.

More extensive use of fair value accounting, where management estimates are required, as in case of biological assets, may give managers more opportunities for exercising discretion. However, it may take more than 1 year to find whether the estimates were false, which would explain why we have not observed any abnormal returns in the hard adoption period.

Overall, our findings with regard to IFRS adoption are inconclusive and require further analysis when more observations are available.

5.3 Comparison of Modified Jones and Ibrahim models

Our tests show that trading strategies based on both Modified Jones and Ibrahim models generate abnormal returns, which is no surprise given the very high correlation between the measures of discretionary accruals estimated with these two models.

However, there are certain constraints of Ibrahim model that limit its usefulness.

First, the model has higher data requirements. To estimate discretionary accruals not only are total accruals required but also all individual accrual accounts, which are not available for many companies in the sample. Especially, "minor" accounts such as other working capital.

Second, Ibrahim requires bigger sample in order to estimate the model coefficients reliably. Ibrahim model is theoretically sound and may in fact give a more precise measure of discretionary accruals under perfect conditions. But life is not perfect, and estimates of Ibrahim model coefficients are often insignificant or very unreliable, which in turn diminishes the precision of discretionary accruals. This is not an issue for big markets such as the U.S., but the use of this model is quite limited in countries such as Sweden.

Therefore, we do not see a clear advantage in using Ibrahim model, when Modified Jones performs equally well and lacks most of Ibrahim model's limitations.

6 Conclusion

In this paper we investigate whether the accrual the accrual anomaly documented by Sloan (1996) could be observed in Sweden between 1998 and 2010. Using measures of discretionary accruals obtained from Modified Jones (Dechow et al., 1995) and Ibrahim (2009) models we take a long (short) position in companies with low (high) amount of discretionary accruals and test whether this trading strategy generates abnormal returns.

We show that there is positive abnormal return when strategy is applied to companies in Industrial Goods sector. Before 2005 return adjusted for systematic risk, size and book-to-market effects was on average 14.4% per year, significant on a 10% level. Similar result is reported in LaFond (2005) who observed return of 8.3% significant on a 10% level between 1989 and 2003, although for the whole population of Swedish companies. However, we do not observe significant returns in the hard adoption period, starting from 2008. These results can be related both to an impact of new accounting standards and the fact that the anomaly has been arbitraged away.

Considering the whole population of companies in Sweden our result is not robust. We do not observe significant returns in this sample. However, the lack of results may be explained by poor quality of model coefficients used in discretionary accrual estimations.

We also consider the possibility that it takes more than one year to realize abnormal returns to this strategy, but find no supporting evidence in case of both samples, in contrast to Sloan (1996) and Xie (2001). The reason may be that in Sweden accruals take less time to reverse, or, more likely, investors actively trade on the anomaly pushing return of the trading strategy to the point when it is no longer profitable in the second year.

We do not observe significant abnormal return when portfolios are formed based on total accruals in any of the analyzed time periods and samples, meaning that discretionary accruals convey superior information content over total accruals.

Finally, we conclude that using Ibrahim model is not justified in countries where the sample size is quite small. Even though we observe high correlation between discretionary accruals measured by Modified Jones and Ibrahim models, Ibrahim model imposes more restrictive requirements on the data and may provide less reliable coefficients, thus, reducing the decision-usefulness of discretionary accrual measures.

Our study suffers from certain limitations which reduce the strength of our conclusions:

First, we do not replicate the original methodology of estimating coefficients for individual industries or firms and instead run regressions for the whole population of companies due to small size of our sample.

Second, we have to omit one of the regressions in Ibrahim model due to the lack of data on other working capital components. This may have had a negative effect on the usefulness of Ibrahim-measured discretionary accruals.

Third, we do not control for effects of mergers and divestitures, even though these factors were shown to explain part of abnormal return to the anomaly (Zach, 2003).

The study raises several questions for future research.

First, to make conclusions in the hard adoption period more robust, future studies could run hedge portfolio test on a more extensive period.

Second, even though we accounted for factors such as size and book-to-market ratio, we cannot completely rule out the explanation of improper risk-adjustment. Our analysis based on Fama-French regressions indicates that abnormal return of individual portfolios may be due to omitted risk factors. Inclusion of other factors, such as momentum (Carhart, 1997), may reduce abnormal return to accrual-based trading strategy.

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Appedices

Appendix 1
Number of Significant Coefficients for Discretionary Accruals Models

	Industry-divided sample									Total Sample
	CGS	*ENT*	*HCC*	*IG*	*PS*	*RED*	*RES*	*RET*	*TEC*	*All industries*
Modifies Jones model										
Total coefficients	39	39	39	39	39	39	39	39	39	39
Significant at 10%	24	14	17	30	17	16	20	21	29	32
Significant at 5%	24	10	13	28	12	15	15	18	26	29
Significant at 1%	16	7	8	25	9	13	10	12	21	27
Ibrahim DAR										
Total coefficients	65	65	65	65	65	65	65	65	65	65
Significant at 10%	25	23	26	48	47	28	26	16	43	54
Significant at 5%	20	20	17	46	40	21	16	11	41	52
Significant at 1%	13	13	13	34	27	14	10	4	37	44
Ibrahim DINV										
Total coefficients	65	65	65	65	65	65	65	65	65	65
Significant at 10%	23	15	18	35	18	20	25	22	31	35
Significant at 5%	21	13	15	26	16	14	20	16	26	33
Significant at 1%	15	10	10	22	9	8	10	9	16	24
Ibrahim DAP										
Total coefficients	65	65	65	65	65	65	65	65	65	65
Significant at 10%	24	27	18	47	40	26	31	21	35	38
Significant at 5%	20	18	13	38	27	21	23	17	26	36
Significant at 1%	14	12	7	31	20	13	10	4	15	28
Ibrahim DDEP										
Total coefficients	65	65	65	65	65	65	65	65	65	65
Significant at 10%	39	26	34	50	30	30	31	35	42	44
Significant at 5%	33	22	34	49	27	25	22	31	41	44
Significant at 1%	24	12	25	43	24	17	15	25	31	42

Notes:

Table reports total number of coefficients pooled accross all years in 1998-2010 and number or significant coefficients at different levels. Jones model estimates 3 coefficients in every year, each of Ibrahim models estimates 5. Numbers are reported both for individual industries and total sample not divided into industries.

Industries are denoted as follows:

CGS = Consumer Goods and Services,
ENT = Entertainment,
HCC = Health Care & Chemicals,
IG = Industrial Goods,
PS = Professional Services,
RED = Real Estate & Development,
RES = Basic Resource,
RET = Retail,
TEC = Technology & Telecommunications.

Appendix 2
Abnormal Returns Measured During Second Year (Soft Adoption Period)

Panel A: Monthly abnormal returns using CAPM risk-adjustment

	Total Sample			Industrial Goods Sample		
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	0.00295	0.00531	0.00176	0.01489	0.01054	0.01071
	(0.4140)	(0.1126)	(0.6353)	(0.0003)	(0.0058)	(0.0036)
2	0.00317	0.00446	0.00547	0.01140	0.01443	0.01521
	(0.2649)	(0.1292)	(0.0539)	(0.0002)	(0.0000)	(0.0000)
3	0.00629	0.00454	0.00811	0.01165	0.01073	0.01246
	(0.0571)	(0.1831)	(0.0075)	(0.0314)	(0.0042)	(0.0038)
4 (high)	0.00424	0.00275	0.00281	0.00764	0.01207	0.00683
	(0.2033)	(0.4311)	(0.4011)	(0.0935)	(0.0105)	(0.1121)
Hedge return	-0.00128	0.00257	-0.00105	0.00726	-0.00153	0.00387
	(0.6993)	(0.3742)	(0.7029)	(0.2027)	(0.7853)	(0.4454)

Panel B: Monthly abnormal returns using Fama-French risk-adjustment

	Total Sample			Industrial Goods Sample		
Quartile	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*	*Modified Jones DA*	*Ibrahim DA*	*Total Accruals*
1 (low)	0.01050	0.01152	0.00837	0.01320	0.01049	0.00784
	(0.0002)	(0.0000)	(0.0021)	(0.0025)	(0.0067)	(0.0376)
2	0.00590	0.00646	0.00835	0.00919	0.00955	0.01198
	(0.0148)	(0.0056)	(0.0003)	(0.0032)	(0.0108)	(0.0002)
3	0.00940	0.00741	0.01074	0.00387	0.00946	0.00699
	(0.0005)	(0.0113)	(0.0000)	(0.4762)	(0.0097)	(0.0979)
4 (high)	0.00754	0.00855	0.00654	0.01172	0.01374	0.01229
	(0.0111)	(0.0038)	(0.0201)	(0.0121)	(0.0046)	(0.0043)
Hedge return	0.00296	0.00298	0.00183	0.00148	-0.00325	-0.00445
	(0.3950)	(0.3457)	(0.5286)	(0.8100)	(0.6039)	(0.4002)

Appendix 3
Overview of Changes in Accounting Standards in Sweden

	Pre-2005 Swedish GAAP	*IFRS*
Current liabilities	▪ Liabilities continue to be classified as non-current if the original term is for a period longer than 12 months and when a non-current refinancing is completed before the financial statements are authorized for issue	▪ Liability that is payable on demand because of certain conditions are breached should be classified as current
PPE	▪ No requirement to review the useful life, residual value and method of depreciation. The useful life and method of depreciation must be reviewed periodically.	▪ The useful life, residual value and method of depreciation must be reviewed at least at each financial year-end.
	▪ Components accounting is encouraged but not required except for certain major inspection and overhaul costs	▪ When an item of PPE comprises individual components for which different depreciation methods or rates are appropriate, each component is accounted for separately (component accounting)
	▪ Subsequent expenditure is capitalized only when it is probable that future economic benefits will flow to the entity in excess of the originally assessed standard of performance of the asset, or when the costs are for replacing a component that is accounted for separately	▪ Subsequent expenditure is capitalized when it is probable that future economic benefits will flow to the entity, or when the costs are for replacing a component that is accounted for separately
	▪ May be revalued on ad hoc basis when the fair value exceeds the carrying value and the excess value is considered to be significant, reliable and of permanent nature	▪ PPE may be revalued to fair value if all items in the same class are revalued at the same time and revaluations are kept up to date
Goodwill and Intangible assets	▪ Acquired goodwill and all other intangible assets are amortized. Annual impairment testing is required for goodwill and intangible assets with useful lives exceeding 20 years. No intangible assets with indefinite lives	▪ Acquired goodwill and intangible assets with indefinite lives are not amortized but must be tested for impairment at least annually
	▪ No revaluation for intangible assets is permitted	▪ Intangible assets may be revalued to fair value if there is an active market
Investment property	▪ Investment property is accounted for as PPE	▪ Investment property accounting is required
	▪ Should be measured using cost model. May be revalued like PPE on ad hoc basis	▪ Subsequent to initial recognition should be measured using either fair value model or cost model
Biological assets	▪ No specific accounting for biological assets	▪ Measured at fair value or at cost if it is not possible to use the fair value model
Revenue	▪ Specific guidance on software revenue recognition provided in the SSX listing rules	▪ No specific guidance on software revenue recognition
Impairment	▪ Impairment loss on a previously revalued asset is charged directly to the revaluation reserve. Any excess is recognised through P&L	▪ Impairment loss on a previously revalued asset is charged directly to P&L directly

Appendix 3 (Continued)

	Pre-2005 Swedish GAAP	*IFRS*
Contingent liabilities	▪ Cont. liabilities assumed in a business combination are recognized if their fair value is reliably measurable	▪ Cont. liabilities assumed in a business combination are not recognized
Share-based payments	▪ Equity-settled grants are measured at fair value with no subsequent remeasurement. ▪ Cash-settled are remeasured at each balance sheet date and at the settlement date. The liability incurred is recognized for cash-settled transactions	▪ No recognition or measurement requirements for equity-settled share-based payments to employees
Extraordinary items	▪ Presentation or disclosure of items of income or expense net of taxes characterized as extraordinary items in the IS or notes in prohibited	▪ Items may be classified as extraordinary in certain circumstances. Presentation of these items net of taxes is also prohibited

Source: KPMG

Appendix 4
Descriptive Statistics for Financial Variables of Sample (Industrial Goods)

Descriptive Statistics for Financial Variables of Sample:
***N* = 703**

Variable	*Mean*	*Std. Deviation*	*Median*	*Minimum*	*Maximum*
ΔREV_t	0.1013	0.3185	0.0759	-1.3224	2.2877
ΔAR_t	0.0252	0.0978	0.0181	-0.6481	0.5922
ΔINV_t	0.0176	0.0689	0.0096	-0.2526	0.7370
ΔAP_t	-0.0123	0.0666	-0.0053	-0.6557	0.3572
$AR\_TURNOVER_t$	0.2938	1.2897	0.2065	0.0000	31.7473
$INV\_TURNOVER_t$	0.2403	0.1459	0.2225	0.0000	1.2696
$AP\_TURNOVER_t$	0.1349	0.0991	0.1155	0.0086	1.7604
PPE_t	0.2514	0.1892	0.2225	0.0025	1.9731
$DEPR_t$	0.0567	0.0430	0.0491	0.0015	0.4349
TA_t	-0.0468	0.1341	-0.0413	-0.8635	0.6653
ROA_t	-0.0267	0.2583	0.0426	-2.0748	0.5344
A_t	13 098	38 202	938	2	276 276

Notes:

All variables, other than $AR\_TURNOVER_t$, $AP\_TURNOVER_t$, $INV\_TURNOVER_t$ and ROA_t, are scaled by beginning total assets. Definition of variables as in formulas (2.7)–(2.11). Total Assets reported in 1,000 SEK. TA_t is total accruals. A_t is total assets.