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Earnings Management by Firms Applying International Financial Reporting Standards: Implications for Valuation

Thesis

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CONTENTS

INTRODUCTION

By the time I started working on the present subject it would have been a great surprise to find a person having access to media, who had not heard yet about the accounting scandals that "shook the corporate America". Since then numerous books and articles have been written, conferences held and rules changed. It has almost become a tradition, especially in the popular and business press, to begin a discussion more or less related to the subject of financial reporting with references to and examples of these affairs. I cannot avoid following the tradition just because for the ear of an ordinary person such related terms as "earnings management", "accounting manipulations" and "creative accounting" are necessarily associated with the above mentioned events. However, the subject of my work is by far not these extreme cases of accounting fraud that made so much noise at the turn of the century. A reference to them is nevertheless useful in order to distinguish the place and the objectives of the present thesis from related but different issues of financial reporting, agency settings and regulation.

Before the issue of accounting manipulation became one of the central problems for the financial community, the phenomenon of earnings management had already drawn the attention of academic researchers and regulators. The subject of earnings management (EM hereafter) in accounting literature grew in popularity during the last decade of the 20th century. Numerous published and unpublished papers investigated theoretically and empirically different hypothesis related to EM. Some researchers aimed simply to provide evidence of EM, others investigated its role in agency problems, financial markets and information asymmetry. As a consequence, purely methodological papers appeared testing and criticizing the research designs. At the end of the 90's several articles summarizing what had been done and what should still be

attempted were brought to light. In the first chapter of this work I review the main directions of the past research together with some general methodology aspects. On this I will build the general framework for the EM process providing a classification of its various elements. This part should help the reader to understand the motivation for the following chapters as well as some critical features of the research design.

Chapter 1, however, begins with the introduction to the notion of earnings management and discusses some of the numerous definitions given by academics, practitioners and regulators. Some hypothetical and practical examples of earnings management will be provided. Overall, the first chapter has a relatively general character and serves as a building foundation for the rest of the work. A reader having a good knowledge of EM literature can skip this part without impairing his or her ability to understand the next two chapters. Nevertheless, I strongly recommend the reading of this part because it views and systematizes the EM process from a new angle. In its turn, this new view is the core element of the research design developed in Chapter 2.

The main contribution of this thesis to the literature is the development and application of a conceptually new model intended to estimate the approximate amount of EM from the publicly available information. I call this technique the "Target-Deviation Model" for the reasons which will become clear later. The model overcomes some of the major drawbacks of the existing approaches and permits to test directly for the presence of earnings management in a sample of publicly traded firms. However, as it is the case for the overwhelming majority of earnings management studies, the procedure is statistical and all the inferences are valid only "on average".[1] Given the flexibility of contemporaneous international accounting rules, the ability to

[1] Schipper (1989, p. 97) notes some reasons why researchers are able to detect EM while the practitioners cannot. For example, "A research using large historical data sets might be able to document statistically a pattern of behavior consistent with EM within the sample, without being able to say with confidence whether the earnings were managed for a particular firm in the sample"

identify EM practices in the accounts of a particular firm will remain the privilege of auditors and regulators in the foreseeable future.

Thus, the second chapter begins with the description of the existing techniques, their main assumptions and drawbacks. The following section derives theoretically the generalized form of the Target-Deviation Model accompanied by a discussion of its advantages over the most popular existing models as well as of its weak sides. In section 2.3 I introduce an empirical version of the Target-Deviation Model accompanied by theoretical and empirical motivation for the choice of various variables.

Although the empirical EM literature has grown substantially, most of the studies were applied to Anglo-Saxon countries and especially to US markets. Relatively little is known about this issue in continental Europe. Among one of the reasons for this lack of research is the problem of data availability to which I will have to return later.

One of the contributions of my study is the use of a sample of Swiss and German listed companies in the empirical analysis. All the firms report their annual accounts under the framework of International Financial Reporting Standards (IASB, London)[2]. One of the reasons for choosing such a sample is the decision of the European Commission to make IFRS (IAS) mandatory for the presentation of consolidated financial statements for all listed EU firms beginning from 2005. Consequently, the importance of empirical research related to IFRS is growing considerably in importance. Some hypotheses suggested in the EM literature refer to the comparative ability of standard frameworks to restrict the discretion in the accounting process. Although my thesis does not address this question directly, to the best of my knowledge, it is the first study that selects a sample exclusively of companies reporting under IAS. It is an opportunity for the future research to investigate whether my

[2] The series of standards issued by International Accounting Standards Board (IASB) called International accounting Standards (IAS) was officially renamed as International Financial Reporting Standards in 2001. The separate standards adopted by that time are continued to be called IAS. Accordingly, in this work I refer to these particular standards using the "IAS" abbreviation.

empirical results are attributable to differences in accounting rules or to the research design and selected samples.

Other reasons for focusing on IFRS-reporting companies are discussed in detail in section 2.4. Also, in this section I describe the various data sources and the data collection procedure. Section 2.5 reports and discusses the empirical results of testing the theory exposed in Chapter 2. Finally, in section 2.6 I check the sensitivity of the empirical results to some alternative specifications of the models, the variables and the sample.

There is no doubt that accounting earnings is one of the main indicators of financial performance of a firm. Naturally, the relation of earnings management, of its extent and objectives to the measurement and forecasting of performance are of great interest. Again, the consequences are well known in the extreme cases of creative accounting often having fraudulent character that are detected and made public by the regulators. However, the researchers are also interested in much less blatant EM activity which should not even be in violation of GAAP[3] and consequently, can be measured only by applying econometric procedures to large samples. A few papers addressed the implication of EM for the valuation. However, they were applied to the US markets and estimated the EM magnitudes using the conventional models. Chapter 3 is dedicated entirely to the analysis of EM implications for the valuation process. More precisely, I use the results of Chapter 2 to decompose the earnings into different managed and unmanaged components and compare their properties in relation to performance-related variables. Except for the differences in measurement of some variables, the techniques used in this part are mostly inherited from the previous research. The results often appear to be inconsistent with prior findings. Therefore, I discuss some alternative explanations of such differences. To summarize, Chapter 3 is divided into four main sections. In section 3.1 I test

[3] Generally accepted accounting principals, here and afterwards used to refer to a system of accounting standards compulsory for a reporting entity. In reference to a particular national system the abbreviation will be preceded by corresponding indication as for example, US GAAP or UK GAAP.

and compare the alternative measures of the manipulated portion of earnings in terms of its relationship to the future performance. Section 3.2 investigates how the managed and unmanaged portions of earnings are priced by the market. Again, alternative EM estimates are compared. Section 3.3 logically follows from the two preceding ones investigating how rational the market is in pricing the different earnings components. The chapter ends by examining the sensitivity of the results in the three preceding sections to various factors.

The thesis ends with conclusions, where I summarize the overall results as well as the limitations and implications they bear. Here I also suggest the opening avenues for future research.

CHAPTER ONE

Earnings Management in Practice and in Academic Research

1.1 Earnings Management Defined

There is no common definition of earnings management in the literature and authors use a wide range of expressions to describe the same phenomenon or its different aspects. Providing a complete list of the definitions encountered in the literature is beyond the scope of this thesis[1]. Hence, I discuss some definitions, which, in my opinion, best describe the activity being in the focus of the present study. First of all, however, some additional notions are provided in order to place EM relative to more general phenomena. This will allow to move from wide notions to more specific ones and to create a general framework for the EM process. An attempt is made to create a system, which will encompass the whole process, but at the same time will remain focused on the theoretical settings analyzed in the following chapters.

Notwithstanding the abundance of literature on the subject, there are not many works that try to summarize and classify all the existing knowledge. Mulford and Comiskey (2002) and Stolowy and Breton (2000) are the notable exceptions. As opposed to the paper by Stolowy and Breton, which mainly focuses on academic literature, the book by Mulford and Comiskey is intended for a wider spectrum of financial statement users including less sophisticated investors. The book is entitled “The Financial Numbers Game” and this is maybe the only term which is large enough to embrace all types of activities commonly labeled as *account manipulation, earnings management, fraudulent reporting* and so on. The actions designed by each of these terms are often similar in nature but some differences, albeit sometimes very subtle, do exist.

[1] See Mulford and Comiskey (2002) and Stolowy and Breton (2000) for various definitions and examples.

Thus, Mulford and Comiskey note that EM is generally viewed as an interperiod concept, where some portion of earnings is moved from one period to the next. In comparison, the financial numbers game is a larger notion also comprising, for example, discretionary disclosure practices. However, not all authors make such a distinction. Some papers (see e.g. Kinney and Trezervant (1997)) regard classificatory manipulations and selective disclosures as a form of EM. Simple examples of such a manipulation include a disclosure of operating losses as extraordinary, or netting an unusual gain with recurring expenses. These tricks are not necessarily an alternative but might be also a complement to the interperiod EM. Also, they are most often, but not always, applied to the profit and loss statement, so that one cannot reject unequivocally that this is another type of EM. I believe, however, that in order to obtain a clearly classified view of the whole picture we should understand by EM the manipulation of earnings *numbers*, which are overstated or understated at the expense of the adjacent periods. Another question is which of the earnings measures is the object of EM, given the abundance of pro forma definitions other than the one set by accounting standards. Here we deal with *disclosure* or *impression management.* I classify this type of activity separately for two reasons. First, the bottom line earnings numbers as defined by GAAP are not affected[1] in case the discretion is exercised on classification and disclosures in the income statement. Second, discretionary disclosures and classification can be successfully used on the balance sheet, in the cash flow statement[2] and even in the notes. So, calling these manipulations just "a kind of EM" brings to a loss of generality.

Stolowy and Breton (2000) generalize the literature on the subject under the term of *account manipulations*. Although general enough, this notion emphasizes the accounting nature of the financial numbers game. Meanwhile, a good deal of literature considers real operating decisions like assets sales or

[1] The gains and losses that bypass the income statement to be reported directly to owner’s equity are the exceptions from this rule. However, the range of such transactions is rather narrow and strictly defined, at least by IFRS and US GAAP. US GAAP have recently introduced a notion of comprehensive income where such transactions should be reported.

[2] See Mulford and Comiskey (2002) chapter 11 for examples

varying R&D expenditures as a way to manage earnings. Of course, as far as the real operations are concerned it becomes really difficult to distinguish EM from normal operating decisions of the management. For example, it may be a positive net present value (NPV) decision for a company to sell assets when its cash earnings are low to avoid a short-term liquidity problem. Also, there are authors who do not agree with interpreting any real actions as EM (see e.g. Beneish 2001). Nevertheless, I believe that such activities should not be excluded from the domain of EM. First of all, in many cases it is impossible to affirm with certainty whether the main motivation for a "real" decision is maximizing the firm's efficiency and profitability or just creating a temporary impression. Consider an example of disposal of a piece of equipment. The primary reason for the management may be the desire to replace it with a new one with a higher NPV but the sale maybe also accomplished to realize a book gain. As a matter of fact, in the second case the disposal may logically complement a purely accounting decision to underestimate the useful life of the asset and so to overestimate the regular depreciation. But this is exactly a way to alter the earnings numbers at the expense of the adjacent periods. Besides, there is nothing in the term *earnings management* suggesting that it is a purely accounting phenomenon. Rather there is a kind of EM that does not represent purely accounting manipulations. Notwithstanding this larger scope, this study will focus exclusively on accounting actions to affect earnings. This is done for methodological reasons.

At the same time, maybe more rarely, accounting manipulations are intended to affect not the earnings numbers but, for example, the balance sheet. A popular target is the leverage ratio which is assumed in the literature to be an object of debt covenants. Even though most of the transactions affecting the balance sheet should be reflected in the income statement as well, this is not necessarily the case[1]. Moreover, even if this is the case, the primary object of the

[1] A good example is the revaluation of fixed assets permitted by IAS 16, which is reported directly to equity.

manipulation here is not the earnings numbers. To conclude, not all the accounting manipulations are earnings management, and earnings management does not always imply accounting manipulation.

Another term which is often associated with EM is *fraudulent financial reporting* or simply *accounting fraud.* As opposed to perceptions of ordinary people, it is widely accepted in the literature that a considerable portion of EM remains within the boundaries of the flexibility embedded in accounting standards. This is one of the reasons why auditors might not find formal grounds to undo the EM actions. Moreover, while some authors emphasize the misleading purpose of EM (Healy and Wahlen (1999)), others do not agree with completely negative definitions and try to show theoretically and empirically its informative versus opportunistic nature (Wang 1994).

However, as the accounts deviate substantially from the benchmark set by GAAP and materially misrepresent the financial conditions of a business, the terms *accounting fraud, abusive accounting or accounting irregularities* become more relevant. Mulford and Comiskey note a technical detail pointing out that the determination of fraud requires establishment of the fact that misstatement was to the detriment of someone. Such determination, in its turn, implies that the violations of GAAP are detected and proven usually by the regulatory bodies.[1] As it might be the case that by far not all deviations from the rules are detected, the term *abusive accounting* may be used more generally.

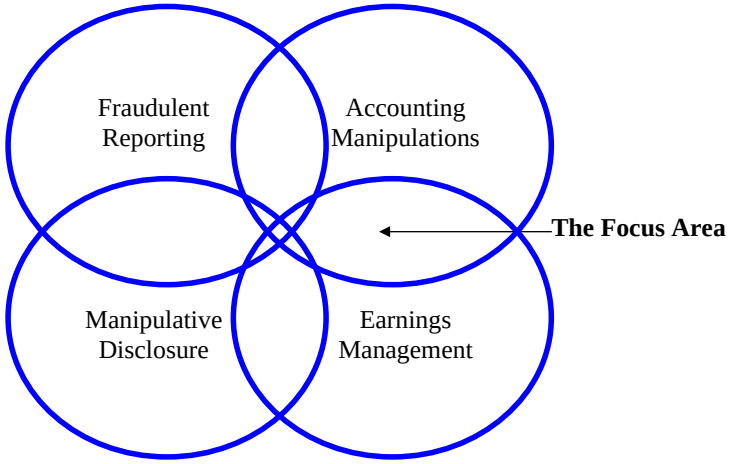
Mulford and Comiskey use the term fraudulent reporting only in conjunction with EM. Again, although the *abusive earnings management* is the most often encountered form of abuse, the balance sheet may also become the primary object of misleading accounting. The classic example is Enron with its off-balance-sheet liabilities. Thus, we conclude that not every accounting fraud is earnings management and it is by far not always the case that EM is fraudulent. Although the fraudulent or abusive accounting is not excluded by the

[1] The richest experience on such cases is gathered from the activity of the US Securities and Exchange Commission (SEC).

research design in the next chapter, to my knowledge none of the firms included in the empirical sample was investigated and censured by regulators. So without ruling out such a possibility we should implicitly assume that the main focus of the study is not the flagrant and extreme cases of accounting misreporting.

Figure 1 shows symbolically the intersection between the close but not identical notions which are sometimes used interchangeably by mistake. The only term which is general enough to encompass all the notions is *financial numbers game.* The intersection of the domains of accounting manipulations and earnings management is the focus area of this study. As it was explained earlier

Figure 1. The Financial Numbers Game



I will consider neither accounting manipulations which are not aimed to affect earnings nor EM actions which do not have purely accounting nature. The fraudulent EM is not ruled out in the following analysis, however, it remains largely beyond the main focus area. As far as the income statement is concerned, the manipulative disclosures will be taken into consideration where it is

necessary and possible. In particular I will discuss the possible impact of the classificatory manipulations on the research design and the results.

Other terms which are often used interchangeably with those in Figure 1 are *creative accounting*, *income smoothing*, *aggressive accounting*, *abusive accounting* and *accounting irregularities.* The term *creative accounting* can be regarded as a synonym for accounting manipulations. *Income smoothing* is just a kind of EM, which will be discussed later in more details. *Aggressive accounting* is also close to *creative accounting* but has a more negative tint. It is often used as opposed to the principles of prudence and conservatism in accounting. In this sense, by *aggressive accounting* we should typically understand the overstatement of earnings and assets or/and the understatement of liabilities. As discussed above, the last two notions usually denote practices beyond the GAAP boundaries and therefore get closer to *fraudulent reporting*.

After having analyzed and distinguished between several related notions let us look closer at some often cited definitions of EM.

> *EM is "a purposeful intervention in the external financial reporting, with the intent of obtaining some private gain (as opposed to say, merely facilitating the neutral operation of the process)."…"A minor extension of this definition would encompass "real" earnings management, accomplished by timing of financing decisions to alter reported earnings or some subset of it." Schipper (1989 p. 92)*

> *"Earnings management occurs when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers." Healy and Wahlen (1999, p.386)*

"Earnings Management is the active manipulation of accounting results for the purpose of creating an altered impression of business performance." Mulford and Comiskey (1996, p. 360)

"Abusive earnings management involves the use of various forms of gimmickry to distort a company's true financial performance in order to achieve a desired result." SEC, Annual Report (1999, p.84)

Let us look at the common points and the particularities of these definitions. All the four definitions can be symbolically divided into two parts. One says *how things are done* and the other puts the emphasis on the objectives of EM. The first three definitions explicitly mention some purposeful intervention in the accounting and reporting process. Although the SEC definition uses the word gimmickry, their accounting nature is assumed implicitly. Only Shipper allows a broader range of EM techniques including the possibility of "real" actions. A bit later we will see what is meant exactly by *intervention in the accounting process* but now let us focus on the other part of the definitions.

Only the definition of Mulford and Comiskey is general enough not to rule out any of the major perspectives on EM suggested in the literature. For example, as it was mentioned above, there are two competing hypotheses in the literature about the nature of EM. The proponents of the *opportunistic* nature argue that management uses discretion to mislead the users of financial statements by hiding the true business performance. Some researchers however argue in favor of the *informative* function of EM, by the means of which management signals about changing performance. In their view this happens because without discretion GAAP rules are not flexible enough to allow such a communication. As Beneish (2001) notes, prior research was not able to establish whether and when any of these functions prevails in practice. Among the practitioners the negative opinion on EM seems to dominate. Thus, in their

survey of financial professionals Mulford and Comiskey (2002) report that they receive 121 written statements indicating how EM can harm investors and only 66 statements on how EM can help investors.

We will still have to come back to these competing hypotheses but for the moment one can note that the word "mislead" in the definition of Healy and Wahlen rules out the possibility for the informative nature[1]. As "to influence contractual outcomes" also does not imply such a possibility the whole definition forgoes a possible positive function of EM. "The intent to obtain a private gain" may also come into contradiction with a possible informative function. Also, some authors argued that in certain circumstances EM maximizes the shareholders' wealth. As is could be expected, the definition of the SEC, emphasizes the abusive, that is, the more flagrant cases of EM. Therefore, this definition is the narrowest among those cited above. Regarding the differences in attitudes of practitioners and regulators from those of academics, Deshow and Skinner (2000, p.235) write:

"Practitioners and regulators often see earnings management as pervasive and problematic and in need of immediate remedial action. Academics are more sanguine, unwilling to believe that earnings management is actively practiced by most firms or that the earnings management that does exist should necessarily concern investors"

The definition of Mulford and Comiskey does not mention the possibility of non-accounting actions and hence, does not precisely fit the EM domain in Figure 1. Nevertheless, as far as the objectives of EM are concerned, it is general enough and appears to be the closest to the focus of my empirical research.

[1] This is also noted in Beneish (2001)

Until now we have seen that EM happens through some intervention in the accounting process. Not a word has been said on how this intervention actually occurs or, simply speaking, how the accounting manipulation of earnings is accomplished. Provision of the whole range of available techniques is beyond the scope of this analysis. Smith (1996) and Mulford and Comiskey (2002) provide a wide spectrum of the possible methods and tricks supported with a rich practical experience and numerous examples. Here, I describe how it happens only in general terms. Some more precise examples will be given when the models of EM estimation are analyzed.

It was already mentioned that EM is accomplished using the flexibility inherent in accounting standards. This flexibility mostly regards accounting accruals, which represent non-cash revenues and expenses as well as book gains and losses. Accrual process is intended to mitigate the timing and matching problems of cash flows, so that earnings better reflect the firm's performance. Management has relatively low discretion in reporting the cash inflows and outflows as at the end of the fiscal period the cash balances must be equal to the beginning balances plus the net flows occurred during the period. Researchers also assume that cash is costly to manipulate. Consequently, except for the studies that consider real operating decisions, the literature has focused on management of accrual earnings[1]. Examples of most important accruals for the majority of manufacturing firms are depreciation and trade accounts receivable, which accrue the earned but not yet received revenues. Empirical studies showed (see e.g. Dechow 1994) that accruals perform their function on average, enhancing the information content of earnings over cash flows. At the same time, EM studies hypothesize that at least some portion of accruals may result from management discretion and have other purposes than neutrally reflecting the current financial performance.

[1] Although it is difficult to manipulate the total cash flows and doing so requires actions, which are surely in contradiction to law, the classificatory manipulations are still relatively easy. As EM estimation models usually ignore this fact, I will have to get back on this issue later.

The flexibility and consequently the discretion in accrual accounts come from two sources. These are the flexibility in choosing accounting methods and the flexibility in making estimates and assumptions. This choice is left to reporting firms to allow for industry diversity and changing business conditions. By flexibility in methods it is usually meant the availability of "hard" accounting choices. The examples are LIFO versus FIFO inventory costing, linear as opposed to declining balance depreciation, capitalizing or expensing R&D costs. There are reasons to believe that the continuing elaboration of accounting standards and enhanced disclosure requirements should have significantly reduced the use of the accounting method choice for EM purposes in recent times. For example, FASB[1] virtually abolished the use of pooling of interests method in accounting for corporate mergers. Allowing the capitalization of development expenses IASB set quite strict criteria for the application of this method. Also, alternative methods are often allowed by the standards but firms must disclose the impact on earnings of the other than the adopted alternative. Under both US GAAP and IFRS the impact of method changes on earnings should be disclosed separately. That permits the readers of financial statements to identify whether the earnings changes result from changes in real performance or they are simply accounting notes.

As opposed to the flexibility in method choice the accounting estimates still largely remain in the obscure corner of the financial reporting area. In spite of the more and more detailed disclosures imposed by standard settlers it often becomes impossible to see the boundary of objectivity and discretion as it comes to probabilities and uncertain amounts. Auditors are supposed to waive an accounting estimate when they establish that it goes too far from the objective grounds or if management cannot provide sufficient justification for their judgement. Often, however, auditors do not have sufficient ground to judge an estimate as overstated or understated. In such contentious cases they can also

[1] Financial Accounting Standards Board is the organization responsible for establishment and improvement of the US GAAP.

prefer to close the eyes even if they believe the assumptions to be slightly biased. In doing so they think to avoid potential allegations and preserve good relationships with valuable customers. Consider a case where the management decides to reduce the allowance for bad debts from 3% to 2.5% of total receivables outstanding. The decision may be justified by "some signs of improvement of the market conditions" or "improvements in customer portfolio". The change in the estimate may be not significant enough to judge the "improvements" unsatisfactory but important enough to help report the desired earnings numbers. Interestingly, if such EM actions take place, the auditors and regulators are less likely to detect them than the approximate statistical models. It will become clear why this might be possible during the discussion of these models.

The above discussion helps to understand why more and more EM studies explicitly or implicitly assume manipulations to occur through changes in estimates rather than by method choice or change. Moreover, the empirical evidence suggests that voluntary changes of accounting methods are relatively infrequent.[1] On the other hand, given the large number of circumstances in which EM was hypothesized to be present, many researchers tend to accept its widespread nature. Consequently, it is reasonable to suppose that most of the EM activity happens by playing with estimates in accrual accounts. This, opinion will be implicit throughout the rest of this study.

The use and even the abuse of the mentioned flexibility in accrual accounting mostly results in EM cases which are either within or on the edge of boundaries defined by GAAP. Some manipulations of accrual accounts, however, clearly go beyond the discretionary choice of methods or estimates. Such actions are almost irrevocably dubbed as fraudulent because the intent to deceive is quite obvious. Examples include fictitious recognition of receivables without acceptance of goods by customers or distributors and backdating sales

[1] See Moses (1987) and section 2.6 of this study.

invoices among others. As such actions are more costly in terms of potential penalties they must be supposed to be less frequent.

To this point we have defined in general terms what EM is, and how it is accomplished. However, I have not spoken purposefully about the objectives of EM. This will be done along the discussion of the main directions in prior literature that follows.

1.2 Earnings Management in the Academic Literature

There are at least two possible ways to classify the literature on EM: according to the research design used or according to the various variables hypothesized to be related to EM, such as objectives or incentives. In this section the terms *objectives, determinants, motivation, purpose, incentives* and so on will be used interchangeably which reflects their often unsystematic utilization in prior research. In the following section, however, I provide stricter definitions and classification of various elements of the EM process. As the objectives often make part of the research design, let us begin with the first classification criteria.

McNichols (2000) distinguishes three main research designs commonly used in the EM literature: those based on aggregate accruals, those based on specific accruals and those based on the distribution of earnings after management. Let us discuss separately each of them together with their main advantages and drawbacks. A more technical and detailed analysis of some methodologies is carried out in the next chapter.

The central feature of the aggregate accrual studies is the use of a statistical procedure to decompose total accruals into presumably discretionary and nondiscretionary components. The basic versions of total accrual models appeared in the early papers by Healy (1985) and DeAngelo (1986), who used correspondingly levels and changes in total accruals as a proxy for management's discretion over earnings. Later, Jones (1991) introduced a linear

regression approach to control for nondiscretionary determinants of accruals, including changes in sales and property plant and equipment (PPE) as explanatory variables. This model and some of its modifications have become by far the most popular methodology for the following decade.

After having obtained an estimate of discretionary accruals (DA) in the first stage, a usual approach for the second stage is to test for the relationship of this estimate with some variable(s) supposed to be related to EM activity[1]. This is done in an attempt to provide simply an evidence of EM or an evidence of EM in some particular context. When a statistically significant relationship is found between the DA estimate and those EM-related variables, researchers interpret it as an evidence of earnings manipulations. McNichols and Wilson (1988) point to a potential drawback of such a research design. The authors characterize a test of EM in terms of a regression of the DA estimate on a partitioning variable (PART) which splits up the sample into two groups[2], for which differences in EM behavior are predicted. However, researchers do not observe the true DA but only its estimate containing a measurement error. If this measurement error is correlated with the partitioning variable the estimate of the coefficient on PART will be biased. In particular, if the true DA is not at all correlated with the partitioning variable but the measurement error is significantly related to the latter the test of EM may lead to falsely rejecting the null of no EM.

In some cases the assumption of no correlation between the measurement error and PART is clearly unreasonable. This is the case when the theory suggests that the indicator variable should be related to the nondiscretionary accruals (NDA). As it is often suggested the unexplained variation in the latter may be a major component of the measurement error. Even if researchers may somehow be confident that the measurement error is not an issue we still have some problems.

[1] Examples of such variables will be provided when I discuss the EM literature in the context of related factors.
[2] Although McNichols and Wilson (1988) used an indicator or a dummy variable the conclusions are equally applicable to any continuous or discrete variable.

First, if the described tests do not show a significant relationship an alternative explanation is that the DA is not precise enough. The other problem is related to a different research question which is the subject of Chapter 3. Thus, a number of studies (see e.g. Subramanyam (1996) and Xie (2001)) used the estimates from the aggregate accrual models to test how the market prices the different accrual components. In such a context the precision of accruals decomposition is of a greater importance. Moreover, as no partitioning variable is used in estimating EM amounts in these studies, we cannot be sure if the differences in implications for valuation are attributable to managerial discretion or something else. This problem has led many authors to change the terminology and call *abnormal* or even *unexpected* what they used to designate by *discretionary* accruals. Healy (1996) notes that what researchers are used to call *discretionary accruals* are only residual accruals not captured by factors supposed to proxy for changes in real business conditions. As these residuals may contain, besides management discretion, various effects not controlled for by those factors, these models are rather *accrual expectation models.*

The second by popularity research design involves specific accrual tests for EM.[1] McNichols (2000) identifies some advantages and disadvantages to this approach relative to aggregate accrual models. One advantage is that the knowledge of GAAP can be exploited more effectively to identify the factors that influence the behavior of a specific accrual account. Second, in some industries particular accrual accounts are very material because of the specific nature of the business. A good example is the property and casualty insurance industry where the claim loss reserve is a very material account. McNichols and Wilson (1988) chose industries with the highest ratios of receivables to total assets to identify firms for which the allowance for uncollectibles is likely to be a material account. Another advantage of specific accrual modeling is that it is easier to identify how some factors would influence a single account in the

[1] See Table 2 Panel C in McNichols (2000).

absence of discretion. For example, we can assume how a shock to the price of raw materials may influence the changes in the inventory accounts. The impact, of the same variable on receivables and payables is less clear, however. When including all the range of factors in one equation to explain the total accruals, the model may quickly become extremely cumbersome and costly.

McNichols (2000) points out three potential disadvantages of the specific accrual approach. If a researcher focuses on one accrual account, while the management may manipulate the others, the power of a test will be reduced. Moreover, the goal may be to estimate the magnitudes of EM, as one needs to do, for example, in valuation studies. In such a case one would require a model for each separate accrual account likely to be manipulated. The second problem is that specific accrual analysis generally requires more institutional knowledge and more detailed data than aggregate accrual approaches. Finally, the number of firms for which a specific accrual is managed may be small relative to the number of firms that managed at least one of the accounts and so the aggregate accruals. This may limit the generalizability of findings.

There are also some problems with modeling specific accruals less emphasized by McNichols. For example, there are really few industries where a single accrual can be identified to be significantly more important than the others in terms of materiality and available discretion. Insurance and banking industries are the few exceptions. Here the loss reserve account is obviously distinguished from other accruals and in most countries it is subject to special regulations and disclosure requirements. On the contrary, for most manufacturing companies several accrual accounts are equally important and there are no good reasons to focus only on one of them. Furthermore, when the focus is on individual industries, the industry-average parameters are usually chosen as a benchmark to gauge the extent of manipulation. At the same time most researchers agree that the EM activity is not independent from the firm's performance. The performance of firms in the same industry can be expected to be highly correlated because of similar market conditions or business cycle

effects. This implies that in the same fiscal period firms from the same industry can have similar incentives to manage their earnings. In these circumstances comparison with industry peers only permits to detect "stronger than average" EM.[1] There might be cases when this will limit the power of the tests. Also, in order to use an industry benchmark the "industry" should be sufficiently narrowly defined. In this case, however, the number of firms in the industry decreases raising statistical issues. Finally, the correlated measurement error problem mentioned in the context of the aggregate accruals approach cannot be completely ruled out in the specific accrual design. One should hope that using the latter methodology the measurement error can be minimized or at least it might be easier to assume that it is not likely to be correlated with partitioning variables.

Even if all of the above mentioned problems are somehow overcome, the biggest issue with using specific accrual approach is, in my opinion, the data availability. The problem is especially crucial for studies of non-US firms, which are subject to less stringent disclosure requirements. In addition, the quality of easily available databases leaves much to be desired. Even the standards of IASB, considered to be the closest to US GAAP, still have substantially less detailed disclosure requirements in some cases. For example, the US standards require disclosing the allowance for doubtful accounts receivable and the current period provision. There is no a similar explicit requirement under IFRS, which makes a study in the spirit of McNichols and Wilson (1988) virtually impossible[2]. It is reasonable to acknowledge that accounting standards are in a process of continuous evolution with a trend of increasing disclosure requirement. We should hope that one day the study of specific accrual accounts will become a more available technique. The potential

[1] A similar problem arises with some versions of the aggregate accrual models. I return to this question in section 2.1.

[2] Although many firms of those included in my sample make voluntary disclosures on this allowance, it is obviously impossible to make inferences from studying only these companies because of the potential sample selection bias.

results of the specific accrual studies might be of a greater use in answering some questions than the implications of aggregate accrual studies. Particularly, investors and standard setters are interested to know which accrual accounts are used to influence the reported numbers more often and which less often.

The third research design, considered relatively new in the literature, refers to distributional tests. Burgstahler and Dichev (1997) and Degeorge et al. (1999) suggested and applied a new approach, which consists in focusing on the density of the distribution of earnings after management. The main hypothesis of these studies is that firms usually have greater incentives to achieve some benchmarks. Hence, the distribution of earnings after management should have fewer observations than expected just below the benchmark, and more observations than expected just above the benchmark. Burgstahler and Dichev (1997) use annual numbers and find such discontinuities around zero earnings and prior period's earnings. Degeorge et al. (1999) use quarterly numbers and find the anomaly around the analysts' consensus forecast in addition to the above mentioned two benchmarks.

The evidence from these studies seemed to strongly confirm the presence of intent to influence the numbers. No arguments could be found to justify why earnings should have such distributional properties absent any purposeful intervention. Also, the research design involves no decomposition of accruals subject to measurement error. These considerations led some authors to refer to these papers as to the most convincing evidence of EM. This opinion has been recently questioned by Dechow et al. (2003). The authors combine the distributional approach with aggregate accruals models and fail to confirm that boosting of discretionary accruals is the driver of the "kink" in the distribution around zero. Although they acknowledge that such a conclusion may be a result of the low power of accrual models, they also provide a number of alternative explanations for the observed discontinuities. Even though Dechow et al. (2003) focus on non-EM explanations for the kink around zero earnings, some of the arguments equally apply to the other thresholds.

One of their explanations is that management takes real actions to improve performance. As making profits is among the firm's objectives, mangers can simply make themselves and employees work harder and more efficiently when the profitability comes into question.

Dechow et al. (2003) also show that listing requirements and scaling by market value can each provide a partial but not complete explanation of the kink. The first factor is present because stock exchanges usually state minimal profitability requirements causing what the authors call a listing bias. The second argument is supported by the findings that small loss firms have significantly higher market values than small profit firms, which may be consistent with different valuation methods being applied to profit versus loss firms.

The next potential explanation for the kink in the distribution is the accounting conservatism. Accounting rules encourage immediate loss recognition, but restrict premature gain recognition. The effect of these types of rules is that the numbers move from the small loss region to the left tail of the earnings distribution.

Finally, Dechow et al. (2003) suggest that the presence of financial assets on the balance sheet can contribute to a concentrated mass of small profit firms. Because financial assets earn dividends or interest, neither of which can be negative, adding the distribution of financial income to the distribution of operating income could result in a kink.

The thorough discussion of each of these potential alternatives to EM is beyond the scope of this study. However, these views and findings on the distributional discontinuities are worth mentioning because the latter play an important role in the application of the Target-Deviation model developed in the next chapter. Here, I would only mention, that from all the alternative explanations for the kink only the first one can be plausible for the other thresholds such as meeting analysts' expectations and avoiding decreases from prior periods. Also, although some of these alternatives to EM cannot be

rejected, some research design issues in Dechow et al. (2003) do not allow us to rule out completely the EM hypotheses.

Coming back to the distributional approach it should be mentioned that some of its advantages are at the same time its disadvantages. For example, we do not have to rely on an error-prone accrual decomposition model but we also cannot measure the magnitudes of EM. In addition, suppose we observe a kink in the distribution of reported earnings and we are sure that it is produced by EM. It still remains unknown which firms among those that just crossed the threshold appeared there by means of manipulating accounts and which firms are there according to the underlying distribution of pre-managed earnings. We also cannot infer anything about the EM activity in the other regions of the distribution. So the researches were only able to derive that there is an increased probability of finding a manipulator in the region around the kink without being able to identify such firms.[1] Consequently, using the distributional approach per se does not allow to infer anything about the context in which earnings are managed. It is silent about the features of the firms engaging in EM, about the incentives and constraints faced by management. We also cannot say whether the EM is exercised through accrual estimates, timing of asset sales, fraudulent tricks or some other method.

Another problem with distributional approach being of smaller concern for the US studies is the sample size. For example, Burgstahler and Dichev (1997) and Degeorge et al. (1999) use several thousands of observations to plot the earnings distributions. A great number of observations is necessary in order to allow the sample histogram to well approximate the true distribution and make a potential kink salient enough. Moreover, the tests comparing the frequency of observations in small areas around the hypothesized threshold require a minimal number of observations to be meaningful.

[1] The indication of the frequency of EM hinges on an assumption about the distribution of earnings absent manipulation. The assumption is that the expected frequency in a given region is the average of observed frequencies in the adjacent regions of the distribution.

There are also two significant research designs that have lost popularity in recent times and were not discussed in McNichols (2000). The first one involves using the amount of impact of accounting method changes as a proxy for discretion. Similar to aggregate and specific accrual studies the estimated amounts were used then in conjunction with some EM-related variables. Because of the reasons mentioned in previous section this approach has been rarely used in recent times.

The second research design has a narrower application as it has been used in the context of a specific form of EM known as *income smoothing* (IS). IS has been given special place in the literature. The reason is that as opposed to other EM forms supposed to affect the level of earnings, IS is mainly intended to reduce the temporal volatility of earnings. At least, this is the opinion of most authors. Among the first papers, that suggested the existence of IS, were Hepworth (1953) and Gordon (1964). Stolowy and Breton (2000) provide a detailed summary of the literature on smoothing. Here, I only discuss the subject to the extent necessary to understand the research design often employed and particular to IS studies. I will have to return to more technical aspects in the next chapter. Let us first look at some definitions given by researchers to IS.

> *"By smoothing, we mean the dampening of the variations in income over time." Ronen and Sadan (1975)*

> *"Income smoothing is the process of manipulating the time profile of earnings or earnings reports to make the reported income stream less variable, while not increasing reported earnings over the long run." Fudenberg and Tirole (1995)*

> *"…to characterize income smoothing as earnings management, we need to define the point at which managers' accrual decisions result in "too*

much" smoothing and so become earnings management." Dechow and Skinner (2000)

At early stages researchers simply separated firms into groups with more and less smooth reported earnings according to some over-time volatility measure. Then different characteristics of those groups were compared. Already Imhoff (1977) recognizes the problems of this approach suggesting that naturally smooth earnings should be distinguished from intentionally smoothed earnings. Thus, it is now common knowledge that some industries because of the product nature are less affected by business cycles and so should have a less volatile income *ceteris paribus.*

Researchers responded to this issue integrating some specifications of *normalized* earnings into their methodologies. The presence of artificial smoothing was gauged by testing if the volatility of normalized earnings is reduced by the inclusion of a potential smoothing variable on which management has some discretion. This has been the most popular research approach in IS studies in recent times. Because of its focus on volatility, I believe this approach should be classified separately from those previously mentioned. However, it should be noted that this *smoothing design* should not be necessarily opposed to aggregate or specific accruals approaches discussed earlier. Moreover, these methodologies were often used to complement the smoothing design, particularly by estimating the smoothing variable (see e.g. Scheiner (1981) and Subramanyam (1996)).

Imhoff (1977) and Eckel (1981) suggested using the variability of sales to approximate the normalized volatility of earnings. Therefore, if the variance of profit is smaller than the variance of sales the firm should be seen as a potential smoother. In later papers, as for instance in Wang and Williams (1994), it was suggested using the volatility of cash flows as a control for real smoothing. The idea is that cash flows are less subject to discretion than accruals. So, firms with high volatility of cash flows relative to earnings volatility are likely to engage in

IS. Potential smoothing variable or variables should be selected from accrued or deferred revenues or expenses. Such an approach was applied in many studies. In recent times, however, this idea has been also criticized as reflected in the third definition of IS cited above. The critics argue (see e.g. Dechow and Skinner 2000) that the very purpose of accrual accounting inherent in GAAP is to smooth earnings relative to cash flows in order to provide better information to investors. An obvious example of such smoothing is the matching principle incorporated in many accounting standards. According to the matching principle expenses should be recognized in income statement not in the period the related cash outflows occur but when the corresponding revenues are earned. Given the above, it becomes extremely difficult to separate empirically the normal smoothing provided by GAAP, from excessive smoothing through recognition of accruals not related to the period. Incorporating into the research design variables more closely related to the objectives of the artificial smoothing and at the same time unlikely to be related to the natural smoothing process might be a solution to the problem.

After reviewing the main research designs used in the empirical literature, I turn to the discussion of variables suggested to be somehow related to EM activity. Later it will become clear that all these variables are directly or indirectly used as partitioning variables in the sense of McNichols and Wilson (1998). To the best of my knowledge no general and exhaustive classification of such factors has been proposed until present.

Dechow and Skinner (2000) focus on *incentives* to manage earnings. They distinguish the papers that address capital-market incentives from those covering incentives entailed by contractual arrangements. Furthermore, the authors separate four sets of studies that build on the market incentives for EM: 1) analysis of incentives provided by stock market participants to meet relatively simple earnings benchmarks, 2) analysis of EM around seasoned equity offerings (SEO), 3) tests of whether investors are fooled by EM, and 4) evidence on capital market consequences of EM.

The simple benchmarks already mentioned previously comprise avoiding losses and decreases and meeting analysts' expectations. Although researchers usually try to explain the incentives, the empirical tests are first of all intended to provide an evidence of such benchmarks usually employing the distributional design. Some studies, like for example Dechow et al. (2003), compare statistics on such variables as growth, size, age or leverage between firms that miss or beat a benchmark. Then researchers try to infer about incentives from these indirect indicators. Bartov et al. (2002) examine the rewards to meeting or beating analysts' expectations providing an ex post indirect explanation of incentives.

Studies of equity offerings are motivated by the following argument. If managers can undetectably increase reported earnings in the period(s) preceding share issues, they can improve the terms on which the shares are sold to the public. For instance, Theoh et al. (1998) find that reported earnings of firms are unusually high at the time of SEOs and these high earnings are attributable to discretionary accruals. Also the earnings and stock price performance of the firms with highest accruals is unusually poor in the years following the SEO. This evidence is consistent with investors being misled by EM.

Among the studies testing whether the market is "fooled" by EM Dechow and Skinner (2000) mention the papers by Sloan (1996) and Xie (2001). We return to these studies in Chapter 3.

Finally, the papers investigating the capital market consequences of EM focus on those extreme cases that result in SEC enforcement actions. Dechow et al. (1996) find that for their sample of SEC enforcement actions occurred in the period from 1982 to 1992 the stock price fell on average by 9% in reaction to the announcement. They also show that a firm's identification as a GAAP violator is associated with an increase in bid-ask spreads, a decline in following by analysts and an increase in short interest.

Although Dechow and Skinner (2000) identify the capital market incentives as the common criterion for all the mentioned studies most of them

rather motivate the choice of the partitioning variable by the existence of such incentives. That is to say, they do not directly model those incentives. Later it will become clear why this might happen.

Regarding EM as intended for stock market participants is a relatively new direction in the literature as opposed to EM exercised to influence contractual outcomes. These contractual agreements include lending contracts, management compensation contracts and regulation as summarized in Healy and Wahlen (1999). There are a few reasons for such a shift in direction. First, earlier the view of at least semi-strong form of market efficiency prevailed among accounting academics. Their opinion was that markets were efficient and information-processing costs were low. Managers were also supposed to understand this and consequently, the possibility that EM could affect the market was ignored. On the other hand, the contractual terms are usually available to a much narrower scope of users of financial statements and so the information costs should be higher. This makes EM more likely to be effective. The reflection of this view is the positive accounting theory suggested by Watts and Zimmerman (1978)[1]. Second, as noted by Dechow and Skinner (2000), the stock market valuations, relative to accounting benchmarks such as earnings, substantially increased during the 1990s making prices more sensitive to changes in accounting measures of performance. At the same time, in an attempt to align the interests of shareholders and management, the importance of equity-based compensation also grew significantly. Consequently, managers' personal wealth becomes more sensitive to their firm's stock prices and ultimately on earnings. On the other hand, there is growing evidence, especially from the behavioral field of finance that markets are far from being efficient and participants are far from being rational.[2] All this has influenced researchers to shift the attention to the market-related contexts.

[1] The positive theory focuses on accounting choice in general rather than only on a particular case of EM.
[2] See for example Montier (2002) for numerous examples of irrationality and Hirst and Hopkins (2000) for evidence that many analysts do not see through simple forms of EM.

Notwithstanding this shift in focus, it is useful to review some studies based on contractual settings. Thus, a number of papers investigated whether the firms close to violation of debt covenants manage earnings to avoid the pending breach. For example, DeAngelo et al. (1994) suggest the dividend constraint as a potential covenant. They examine whether the firms close to cutting their dividend change accounting methods or accounting estimates to avoid such an action. This and similar studies find little evidence of EM close to their dividend covenant.

DeFond and Jiambalvo (1994) and Sweeney (1994) focus on a sample of firms that actually violated a lending covenant. The evidence from these studies is mixed. For example, Sweeney (1994) concludes that from 22 firms that violated a debt covenant only 5 managed to delay the technical default by a few quarters through accounting choice. However, because the sample does not include firms that successfully avoided a technical default the frequency of EM can be understated. One potential reason for the failure to provide evidence of EM is that covenant terms were not directly observed and researchers had to use observable proxies. Dichev and Skinner (2001) use a large database of private corporate lending agreements including extensive actual covenant details. They report that debt to equity ratio, which is often used as a proxy for closeness to covenant, was embedded only in 144 from 8'804 identified loan agreements.

The studies of management compensation are classified with those based on contractual motivations because they consider that contracts do not explicitly link the remuneration to the market performance but only to some accounting measures. As long as the equity-based compensation plans are taken into consideration (see e.g. Gao and Shrieves (2000)) the incentives cannot be considered as purely contractual. Healy (1985) and Holthausen et al. (1995) examine the bounds of management bonus plans linked to earnings numbers. They show that firms with an upper bound on bonus awards are more likely to report accruals that defer income to later periods when the bound is reached.

Several studies have suggested considering top manager's job security as an implicit compensation contract. DeAngelo (1988) finds that during a proxy fight, incumbent managers exercised accounting discretion to report higher earnings. On the whole, the evidence reported in the compensation contract studies is consistent with managers using accounting judgement to maximize their awards.

In many countries some industries such as banking, insurance and utility face regulations often based on accounting measures. There is considerable evidence that banks close to capital adequacy requirements overstate reserves or recognize book gains selling securities (see e.g. Moyer (1990), Collins et al. (1995)).

A number of studies examine the incentives to avoid anti-trust investigations, to obtain government protection or subsidy by appearing less profitable. In her well-known paper[1] Jones (1991) reports that firms in the industries seeking import relief tend to recognize negative abnormal accruals to defer income in the year of application. Key (1997) examines accruals for US firms in the cable TV industry at the time when deregulation plans were being debated in Congress. The evidence is again consistent with earnings understatement.

Another possible objective of EM related to regulation is the minimization of income tax. Given the separation of tax and financial reporting in the US this objective was not paid much attention in the empirical EM literature. Chaney and Lewis (1995) showed analytically that if taxable income were linked to accounting income it would create an automatic safeguard against EM within the suggested framework.

Until here, following Dechow and Skinner (2000), I classified the partitioning variables according to their relationship to capital market incentives versus contractual incentives. However, some variables used in the literature

[1] The paper is one of the most often cited in the EM literature because of the suggested accrual decomposition model mentioned previously and analyzed in detail in section 2.1.

cannot be attributed unequivocally to one of these two groups. Furthermore, some partitioning variables are related to constraints rather than to incentives to manage earnings.

It was already mentioned that as far as compensation contracts are concerned, it becomes difficult to distinguish between market and contractual incentives. Whether EM is intended directly to the market participants or to the remuneration committee depends on whether the remuneration is linked to accounting or to market performance measures. Studies that take into consideration the whole compensation structure use proportions of different forms of pay as partitioning variables (see e.g. Gao and Shrieves (2002) and Baker et al. (2003)). Therefore, these variables implicitly reflect the interaction between the two incentive sources.

Several papers examined the ownership structure in relation to EM. For example, Dempsey et al. (1993) find that non-owner managers selected income-increasing reporting alternatives more often than owner-managers. The authors present two theoretical arguments to support such a relation. According to the first, an owner-manager with a controlling interest has a higher job security and less fear of a hostile takeover or of claims from unsatisfied shareholders. A manager with no or insignificant ownership is more likely to engage in EM trying to mask the poor performance in order to keep shareholders satisfied. The second explanation is that firms with non-owner managers are more likely to have an earnings-based bonus plan, which were shown to induce EM. On the whole, without inclusion of additional variables, one cannot deduce whether EM related to the ownership structure is intended to influence either contractual outcomes, or the market participants, or both.

Articles in the financial press suggest that institutional investors have short-term focus leading managers to manipulate earnings. They do so fearing that a short-term profit disappointment will lead institutions to liquidate their holdings. Radjgopal et al. (1999) show that, contrary to the above opinion, the absolute value of discretionary accruals declines with institutional ownership.

Among the explanations for such results the authors suggest that managers recognize institutional owners as being more informed and sophisticated than individual owners. This fact reduces the perceived benefits of EM. If this explanation is valid, then the institutional ownership should be viewed as a constraint to EM rather than in the context of any incentives. Koh (2003) completes the above findings. Using a sample of Australian firms the author finds non-linear associations between institutional ownership and income-increasing accruals. A positive association is found at low ownership levels, consistent with short-term oriented institutions creating incentives for EM. On the other hand, a negative association is found at the higher institutional ownership levels, consistent with the view that monitoring by the long-term oriented institutions would limit the managerial discretion.

Some partitioning variables used in the literature are more closely related to constraints rather than to incentives to manage earnings. One of them is the auditors' quality. The underlying hypothesis is that auditors of high quality are either more able, or more determined, or both, to prevent EM. An indicator variable taking value of one (high quality) if a firm's auditor is one of the biggest international auditing companies is a standard proxy for the audit quality. Becker et al. (1998) showed that clients of non-Big Six auditors report income-increasing discretionary accruals relatively more often than clients of the Big Six auditors.

Many more studies investigated the influence of different corporate governance characteristics on EM. The general hypothesis is that stronger corporate governance structures are more likely to prevent excessive manipulations. For instance, Klein (2002) investigates the independence of boards and audit committees. Measuring independence as the relative number of outsider board members the author finds negative relation between the board independence and the abnormal accruals. A negative relationship is also found between the audit committee independence and abnormal accruals. Xie and al. (2003) go further and examine the financial sophistication of the board and audit

committee members. They report that the board and audit committee members with corporate or financial backgrounds are associated with firms that have smaller discretionary current accruals. Alonso et al. (2001) use a sample of 450 non-financial companies from 10 OECD countries. Their findings support the idea of a positive impact of board size on EM through limiting the discretion. However, the results do not show a significant effect of board composition and meeting frequency.

It should be noted that most of the studies described above use aggregate accrual decomposition models. Most often these are the Jones and Jones-type models, and therefore their limitations should be considered when interpreting the results.

As I noted earlier, a particular feature of the studies of income smoothing is the construction of a *smoothing variable, which* categorizes firms as smoothers and non-smoothers, or as stronger smoothers and weaker smoothers[1]. A particular feature of this variable is that it was used as a partitioning variable in some studies and as a measure of discretion in many others. In the first case, some measure of discretionary accruals from those discussed earlier in this section is hypothesized to be the smoothing variable. Hence, statistical tests are applied to examine whether the firms identified as *smoothers* have on average higher discretionary activity. In the latter case, the extent of smoothing is used in relationship with some partitioning variables often supposed to be associated with incentives for artificial smoothing. This approach was also used to answer a frequently asked question, whether IS is good or bad. Most authors agree that the objective of IS is to reduce the perceived volatility of earnings and consequently the perceived risk of the firm. The smoothing may be intended to shareholders in order to increase the firm's valuation and the manager's job security, or to creditors in order to reduce the borrowing costs. Wang and Williams (1994) provide evidence that accounting IS is viewed favorably by the

[1] As it was also noted this variable can have different specifications depending on what is considered to be "normal" smoothing.

market, and firms with smoother income are seen as less risky. Bitner and Dolan (1996) test two hypotheses: equity markets pay a premium for smooth income streams; and market valuation differentiates between natural versus accounting smoothing. The overall results support both hypotheses. Although the findings indicate that purposeful smoothing is detected and discounted, they also suggest the market does not fully discount to the pre-smoothed level[1].

The papers directly relating incentives and the smoothing behavior were mostly theoretical (see e.g. Trueman and Titman (1998) and Fudenberg and Tirole among others). Among the empirical papers one can mention Moses (1987). The author shows empirically that the smoothing activity is positively related to the existence of a bonus plan and to the firm size. As in many early studies the size was suggested as a proxy for political cost. Another empirical paper by Carlson and Bathala (1997) examine the impact of ownership structure on IS behavior. The authors dichotomize firms as smoothers or non-smoothers based on the variability of earnings relative to the variability of revenues. Next they run a logistic regression where management control, debt financing[2], institutional ownership and ownership dispersion are used as explanatory variables. They find that the lower the proportion of inside ownership is, the higher is the probability of a firm being a smoother.[3] Moreover, firms with higher proportion of institutional ownership and higher leverage are more likely to be in the smoother category. Finally, the wider the dispersion of stock ownership, the greater the probability of IS.

In this section I have reviewed the main directions in the EM literature. The emphasis was mainly on the empirical studies, which can be classified according to the employed methodology as well as by the partitioning variables

[1] Given the approximate nature of smoothing variables this result is hard to interpret.

[2] Debt financing is measured by the ratio of book value of long-term debt to total assets and is supposed to represent the debt-covenant hypothesis.

[3] The problem of the potentially correlated measurement error raised by McNichols and Wilson (1988), in conjunction with the aggregate accrual approach applies also to this and similar methods. Thus, some firms, because of a more flexible cost structure, are able to adjust costs more quickly in response to the sales chocks. If for some reason this flexibility is correlated with some of the ownership variables the conclusions of the study are misleading.

hypothesized to be associated with EM activity. Although the review is far from being exhaustive, I believe it should help the reader to understand the current state of art in the EM literature, to get familiar with the various variables potentially involved in the EM process, to learn about some findings and to be aware of their limitations. In the following section I build on this knowledge in order to provide a general classification of various factors potentially associated with the EM phenomenon. I also construct a generalized scheme of the EM process. This should be useful to better understand the particular nature of every element in the process and to provide help in modeling the earnings management behavior.

1.3 A Generalized Framework of the Earnings Management Process

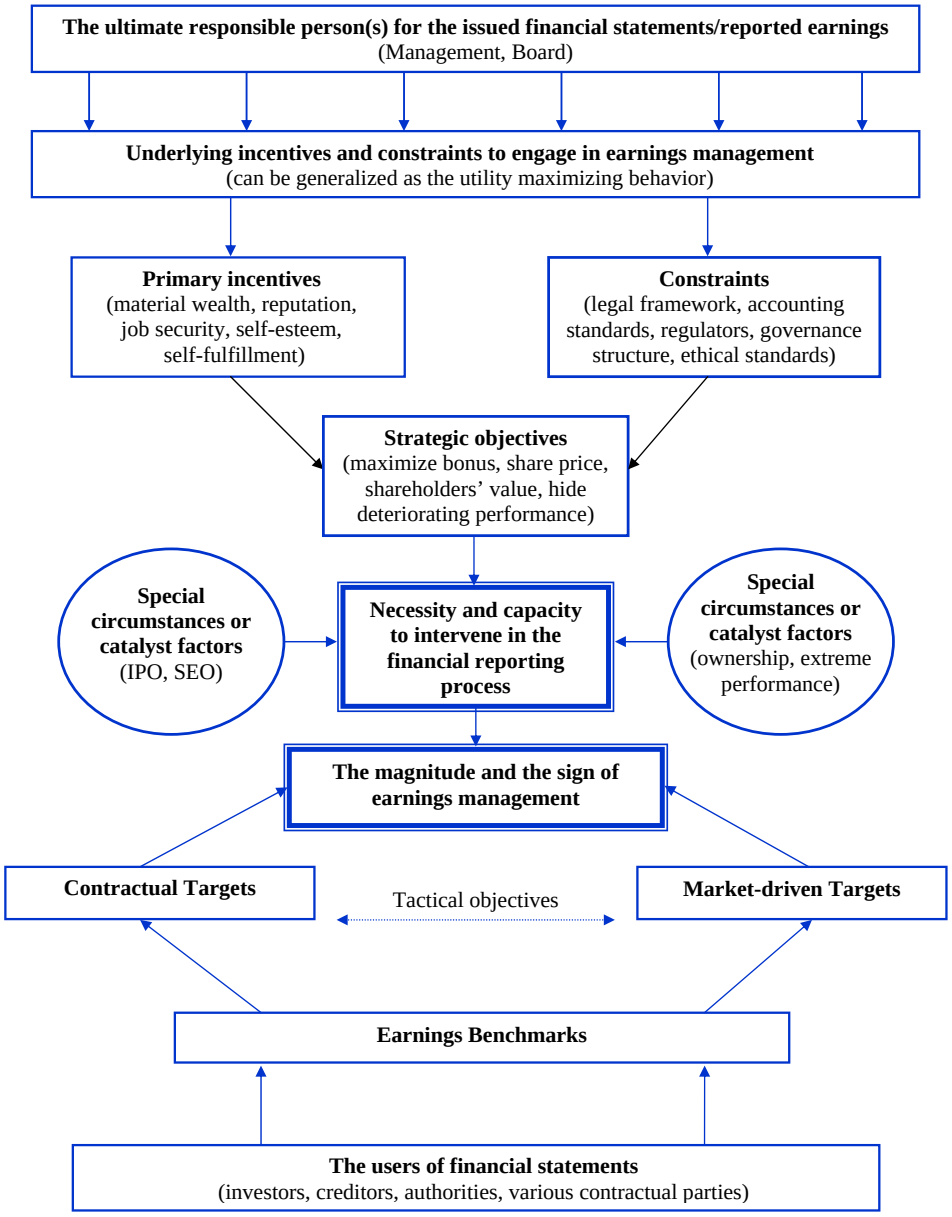
The description of the EM process should naturally start with defining who the "manager" of earnings is. In the preceding discussion we have often seen that a firm's management is held responsible for manipulating earnings. Sometimes researchers have to go further, especially when trying to model the incentives, and they focus on the company's CEO as the principal individual responsible for EM actions. This choice is, of course, not without grounds. In most countries the CEO is regarded as the ultimate responsible for the operating performance of the company. At the same time he or she is often the main responsible for the financial reporting. The role of the Chief Executive Officer has been traditionally more important in Anglo-Saxon countries with more dispersed ownership than for example in continental Europe. This core role supported by anecdotal evidence often leads researchers to assume the CEO as the only or at least the main responsible for EM actions.

In some situations, however, a CEO might have much less discretion in any decision regarding the management of the business including financial reporting. For example, a major shareholder, having enough voting rights to

adopt any decision at the shareholders' meeting and largely represented at the board of directors, may exercise a significant influence on the CEO. In this case the ultimate decision to intervene in the reporting process may be taken by the major shareholder, while the CEO might be forced to execute such a decision fearing for the job security. Thus, although I will often use the terms *management* or *managers* to indicate the potential authors of EM, the possible influence from other related parties should be kept in mind.

The next question that follows logically is why managers do manipulate earnings. In the literature on EM one can often read the following answers: managers manipulate earnings to "beat the market consensus forecast", "to alter the true performance", "to avoid violating debt covenants"; or "the income is smoothed to reduce the risk perceptions", "to reduce political costs". Although all of these answers may be true, none of them indicates the primary incentives or, in other words, the ultimate objectives of the EM activity. As one could guess the answer appears to be quite trivial: managers manipulate earnings to maximize their own utility. The utility maximization, however, should not be regarded narrowly as the maximization of the remuneration and the wealth. Other arguments of the utility function such as job security, reputation, self-esteem and self-fulfillment might be likewise important. Although these incentives seem quite obvious most authors do not explicitly mention them and they remain implicit behind some intermediate objectives. This happens because these primary incentives are very difficult or impossible to quantify. Instead there exist more tangible objectives which directly or indirectly approximate the primary incentives. Examples of these objectives include the maintenance and maximization of bonus payments and of the stock price, increase of shareholder value, creating appearance of lower risk and/or higher performance. For example, managers can try to maximize the stock price in order to increase their wealth in case its substantial portion is represented by the shares or the stock-options of the company. At the same time they can try to do it in order to maintain their reputation.

Figure 2. The generalized earnings management process



They might attempt to maximize the shareholder value in order to insure their job security but also in order to satisfy the self-esteem and the self-fulfillment. In other words, the achievement of the ultimate objectives is provided by the achievement of some intermediate goals. Let me call these *strategic objectives*.

But why should it be possible to achieve all of these strategic objectives by manipulating accounting earnings? Whether managers were successful indeed in using EM to help achieving these objectives is rather an empirical question. Here we are more interested to know why managers think EM to be useful or why researchers assume that managers do so. To understand this we should look at the opposite side of the EM process, that is, who the EM is intended for. Of course, here we find various users of financial statements including investors, creditors, authorities and different contractual parties. Each of these groups uses the information in earnings for its specific purposes. But as it is often the case, the information is easier and cheaper to proceed when it is interpreted in relative and not in absolute terms. For this reason, each of the user groups has learnt to rely on some specific benchmarks in order to evaluate earnings for their decision making purposes.

It depends on the decisions of the financial statements (FS) users, whether managers will succeed to achieve the strategic and therefore the ultimate objectives. Naturally, when managers are aware of such benchmarks or at least they believe in their existence, they can be expected to make en effort to report earnings that look favorably relative to those benchmarks. Thus, managers regard these benchmarks as earnings targets. When the true underlying performance translated into GAAP does not permit to hit a target, the accounting discretion may be brought to help.

It is fair to mention that the term *earnings targets*, as it is defined here, is more general than the *earnings thresholds* analyzed in Degeorge et al. (1999). These thresholds that firms are striving to cross in order not to deceive the market are only some special cases of earnings targets. Moreover, a target is not

necessarily a precisely defined threshold that a firm must cross for the EM to be considered successful. For example, in the case of income smoothing an imaginary smooth line can be the manager's target but the goal is just to push the earnings towards it. It is not necessary to reach or to cross the "line" for the EM to be successful. The distinction between the market-driven and contractual targets is made through identifying which group of FS users would employ these targets in their decision making. This is not to say that some targets are always contractual and others are always used by investors. For example, the zero earnings level is suggested in the literature as an important benchmark for investors. But at the same time, a profitable firm under an anti-trust investigation can manipulate to report losses. In this case the zero earnings will be a contractual target. Also, smoothing can be used to reduce the risk perceptions by the market but also to maximize the bonus payments. In spite of the possibility of such situations, I will follow the general trend in the literature and denote as *market-driven* the targets which are visible to market participants.

It is clear that if managers were entirely free to "cook" the accounts, the users of FS would hardly rely on them in making decisions. They do so because there exist a number of constraints supposed to limit the managerial discretion. The obvious examples are the general legal framework, accounting standards, audit, corporate governance structure and, of course, the ethical standards of those responsible. Clearly, it is the quality and the efficiency of these institutions that set the boundaries of EM in practice. Managers are aware of these constraints and the latter together with primary incentives influence the formulation of strategic objectives. After having defined all the main elements of the EM process we can now put them together to create an entire picture.

The box-and-arrow diagram in Figure 2 presents schematically the elements of the process and the interaction between them. On the opposite sides of the process we find the *initiators* and the potential "*recipients*" of the manipulated numbers. Being rational economic agents the initiators act so as to maximize their utility function under constraint. The *primary incentives* and

constraints to EM enter as arguments in the optimization problem, the solution of which is seen in achieving the *strategic objectives.*[1] In order to reach these objectives, the *initiators* might need to influence the decisions of those on the opposite side. To make such an influence possible, the decisions should be based on some benchmarks which are also known to the *initiators*. At least, the latter must believe that these benchmarks are considered by decision makers. Given those benchmarks, managers define *earnings targets* or *tactical objectives*. If the real earnings translated into GAAP language deviate from a target, EM might be used to fill up the gap. Thus, intuitively the magnitude and the sign of manipulation should depend on the situation of the "true" earnings relative to a target.

The earnings targets can be classified as *contractual* and *market-driven.* The distinction hinges on the fact that stock market participants are the targeted group of FS users in the case of market-driven targets. In turn, *contractual* targets are associated with all others groups of users. They may be based on formal contracts, as in the case of bonus plans or debt covenants, but also on implicit contracts as in the case of political costs. Now it becomes clear that when researchers talk about capital market incentives versus contractual incentives the distinction is based on the *targets* or, equally, on the targeted group of users.

On the other hand, when it comes to *primary incentives* or even to related *strategic objectives* it is often not possible to say without fixing the *tactical objectives* whether the EM should be destined to the market or to some contractual parties. Suppose for example, the strategic objective is to maximize the stock price. Management intentionally underestimates earnings to report losses and in doing so, succeeds to obtain government subsidies or to avoid

[1] It must be mentioned that the achievement of some objectives is among the main functions attributed to corporate managers. They are supposed to achieve them through hard working and efficient management skills. So, the EM is should not be regarded as the main instrument of achieving these goals. Rather, it is a reserve measure.

undesirable regulation. The effect on the stock price may be expected to be positive, even though EM is not intended for investors.

An important feature of earnings targets is that they are products of FS users while the *primary incentives* are idiosyncratic to the *initiators* of EM. So, as opposed to the underlying incentives, the targets are by nature observable to the users of financial information. This does not mean that all targets are publicly disclosed. For example, as it happens with contractual targets in the context of management compensation or debt covenants, only the parties directly engaged in the contract, for instance, the remuneration committee or the lenders, may know the exact target. The disclosure of such contractual targets is a function of local requirements. Focusing on market-driven targets, Degeorge et al. (1999) write: "Executives focus on thresholds for earnings because the parties concerned with firms performance do." This visibility feature of earnings targets will play an important role in modeling EM in the next chapter.

Besides the already mentioned elements there are special circumstances in which the incentives to manage earnings become particularly strong. This happens because under these circumstances, either primary incentives are more dependent on the successful achievement of strategic objectives, or the achievement of strategic objectives becomes more sensitive to the ability to hit the targets. Such circumstances may be one-time events such as SEOs and IPOs. They can also be more lasting factors such as ownership structure or underlying performance. In the first example the special situation is created by the fact that current shareholders or managers are selling a significant amount of their ownership in one transaction to less informed investors. In the second example, a high level of managerial ownership increases the sensitivity of the manager's wealth to movements in the stock price. Also, other conditions set equal, a firm with a stronger volatility of the true performance is more likely to engage in artificial smoothing. As these circumstances increase the potential pay-off from EM and *ceteris paribus* increase its probability, I denote them as *catalyst*

factors. The catalyst factors interact with incentives and constraints determining the necessity and ability of a firm to engage in EM activity.

In the upshot, we have defined all the elements of the process represented in Figure 2. The advantage of this scheme is that virtually all the partitioning variables that are used or could be used in the literature can be classified as one of its elements. Knowing the place of a particular variable in the entire process should help a researcher to identify the closely related factors or potential omissions of his or her research design. This generalized model can also help a practitioner in detecting potential EM action. Many authors advise practitioners to look at the various circumstances, which could incline managers to manipulate earnings, in addition to searching abnormal movements in published accounts. None of them, to the best of my knowledge, provides a general classification of such factors. In the next chapter I will refer to some of the points discussed in this section.

1.4 Beyond the Anglo-Saxon Environment

Until present, the discussion of EM problem has been hold mainly in the context of the Anglo-Saxon institutional environment. The reason is that the overwhelming majority of empirical literature and practical evidence comes from these countries. The empirical studies using samples from other markets are quite scanty. The existing papers in most cases do not bring major methodological contributions but rather try to adapt the existing methodologies to the local context.[1]

As the empirical part of my work exploit data on Swiss and German companies it is worthwhile to review the institutional features related to

[1] Among the few exceptions are the papers with evidence from Finland (Kasanen et al. 1996). Very loose Finish accounting standards and specific institutional environment allow to measure the EM as the difference between the reported earnings and the earnings restated according to international standards.

financial reporting in these countries. In case the empirical results in the following chapters are inconsistent with previous findings, the differences may be attributed to the research design, but also to the various singularities of the institutional environment. A complete discussion of the particularities of the local financial markets and related institutions would be impossible within the scope of this work. Hence, I only briefly review the main differences of Swiss and German systems from that of the Anglo-Saxon countries, and notably the US. I also discuss the results of some EM studies on Swiss and German firms.

The main differences of the institutional background can be traced to the legal systems and the traditional role of financial markets in providing capital. Historically, stock markets played a more important role in capital provision in Anglo-Saxon countries with the common law system. Germany and Switzerland belong to the countries with a civil law system where the importance of the stock market financing has been relatively low. These differences are reflected in a wide range of institutions, among which the national accounting systems, ownership structure, contractual mechanisms as well as the attitudes towards transparency and confidentiality.

Family-controlled firms, heavily relying on debt financing, represent an important part of the economy in the countries of the Continental Europe, especially in Germany and Switzerland. Many big exchange-listed firms in these countries are fully controlled by one or a few shareholders. The pharmaceutical giant Roche and the major international cement producer Holcim are some of the numerous examples.[1] In Germany the big financial institutions such as banks and insurance companies traditionally hold important participation in owners' capital not limiting themselves to the role of creditors. Consequently, until the recent times, the stock exchange was not considered as the main source of capital, thus hampering the progress of transparency and causing scarce information policy. The institutions, which have been developed in Anglo-

[1] Examples of German companies are provided in Raffournier et al. (1997), p.6.

Saxon countries with the emphasis on the investor protection, received much less attention in continental Europe.

The main function of the financial accounting in the US and the UK is providing investors with *the true and fair view* of the economic situation of a firm. On the contrary, in the continental Europe the creditor-oriented accounting rules put the emphasis on the preservation of capital. Given this objective, *the prudence* becomes the core accounting principle. Consequently, the balance sheet is given the priority over the income statement, which becomes a by-product of the accounting process. Usually widely dispersed ownership of American companies created the need for detailed disclosure requirements necessary to reduce the information asymmetries between the shareholders and the often weakly controlled management. In contrast with this, a major blockholder, if not personally engaged in the firm's management, exercises a strong control over the latter. Consequently, the detailed public disclosure is not necessary and can be even undesirable as the major shareholder gets an informational advantage over the small shareholders. Because of the lower value relevance of earnings, the external shareholders are supposed to rely on it to a lesser extent when taking decisions.

The development and the role of regulations and regulatory bodies also bear the influence of the above factors. Although institutions with functions similar to that of the US SEC do exist in Switzerland and Germany, their practical importance seems to be considerably lower.[1] One reason is that the resources allocated to these bodies are considerably lower than in the US. Moreover, the considerably less stringent accounting rules make it more difficult to decide when the estimates become abusive.

The traditional ownership structure also has impacted various features of the stock market. For example, until recent times many Swiss companies have

[1] In Switzerland it is the Admission Board of the SWX, so there is no special state structure in charge of the supervision and enforcement of listing rules. In Germany it is the State Supervisory Authority attached to the governments of the German federal states.

been issuing a relatively small number of shares in circulation compared to the represented amount of capital. This results in a very high price per share, making the participation inaccessible for small individual investors. The small number of shares and their high price negatively affect the liquidity of the Swiss stock market.

In recent years, however, the globalization of financial markets and the increase of foreign investment in European companies created a new trend in the development of reporting and disclosure practices. More precisely, the financial markets and the related institutions both in Switzerland and in Germany are experiencing a strong influence of the North-American model. Thus, the Swiss Stock Exchange (SWX) was among the first in Europe to authorize the standards issued by IASB as an alternative reporting framework for the listed firms. The parsimony of the national reporting requirements[1] and the need for foreign investments prompted many companies to opt for more transparent and "shareholder-friendly" rules. As a result, by the year 2002 more that the half of the firms listed on the SWX have adopted IFRS. The German stock exchange (Deutschebörse) went even further. Besides allowing an optional adoption of the international standards, the Deutschebörse made mandatory the application of either IFRS or US GAAP for the firms in particular market segments.[2]

The additional disclosure requirements regarding the ownership, remuneration of management and board members and the various aspects of corporate governance have also experienced a significant progress in recent years. Only a decade ago one would hardly believe that the listed Swiss firms would be obliged to provide any information on the remuneration of their governing bodies. The Corporate Governance Directive of the SWX entered into force on 1 July 2002 requires issuers to disclose the important information on the management and control mechanisms at the highest corporate level, or to

[1] See Chapter 4 by Achleitner in Raffournier et al. (1997) for a detailed discussion.
[2] See Exchange rules for the Frankfurt Stock Exchange available on www.deutsche-boerse.com.

give specific reasons why this information is not disclosed.[1] Despite the last clause, most of the companies generally complied with the requirements in the 2002 annual reports.[2] Similarly, the German Corporate Governance Code introduced in 2001 significantly widened the scope of disclosures.

The stock market boom of the second part of the 90s also contributed to the convergence of many other aspects of the financial system to the North-American standards. For example, there has been a significant increase of the role of equity compensation both in Germany and in Switzerland. A waive of share conversions and splits rushed trough the Swiss market during that period. It is still typical for many Swiss companies to have two types of ordinary shares: bearer and registered. The only difference is the nominal value which affects proportionally the relative price. The bearer shares are usually issued to the public and give several times fewer voting rights than the registered shares for the same amount of invested capital. This permits the major blockholder, often the founder family, to attract capital without dispersing the control over the company. However, in recent years several companies introduced a single class of shares renouncing the discrimination of small shareholders. More widespread were the share splits that significantly reduced prices per share potentially contributing to the market liquidity.

The regulatory bodies also begin enforcing the control over financial reporting and other areas of compliance. The following is an excerpt from a SWX Admission Board Communiqué of 25 November 2002:

> "…The Admission Board will expand its controls in effort to ensure enforcement of the financial reporting regulations. It is the intention of the Admission Board, as a general rule, to publish any violations of the financial reporting regulations (Art. 82 para. 1 point 9 Listing Rules)."

[1] Corporate Governance Directive, www.swx.com.
[2] The details of a study by the foundation Ethos can be found on www.ethosfund.ch. The results of another study ordered by the SWX indicate that the listed companies have made a huge progress at the informational level since the adoption of the Directive. See the press release of the SWX as of 01.02.2003.

The practice entered into force on 1 January 2003 and by the end of the year 25 sanctions have been published of which 14 in the field of accounting.[1] Only one of the sanctioned firms, LEM Holding SA is present in the sample selected for this study. The enforcement was related to the breach of IFRS in respect of disclosure of important elements of the segment reporting as well as of further information on provisions, tax and financial risks in the notes to consolidated FS. However the presentation of business results was not the subject of the proceedings.[2]

Despite this important convergence trend, significant differences in market structure, corporate culture, ownership and transparency have been still present during the last five years, the sample period examined in the empirical part of my work. It should be also noted that the majority of sample firms have voluntarily opted for the IFRS mainly to attract foreign investors. It would not be unreasonable to suggest that these firms are likely to get closer than other listed companies to the Anglo-Saxon practices in other investor-related fields as well.[3]

Notwithstanding the similarity of the Swiss and German institutional background, mainly due to the geographic and linguistic vicinity, there are also many differences. Unlike Germany, Switzerland is not a member of the European Union and remains beyond the direct influence of the common European regulation. As it was mentioned, the standards of the IASB become mandatory for all listed companies in the countries of the Union beginning from 2005. In force from the same year, a choice between IFRS and US GAAP is left to the companies having shares traded on the SWX. Moreover, the choice is mandatory for the companies of the main trading segment and the SWX New

[1] http://www.swx.com/admission/publicity_sanctions_en.html.
[2] It should be mentioned that group's auditors also qualified their report as a result of the incomplete segment reporting. Also, after the proceedings LEM published a new annual report which did not contain any qualification on the part of auditors.
[3] Murphy (1999) empirically examines firm characteristics of Swiss companies that utilize IAS and reports that the orientation to foreign stakeholders is a major factor.

Market. Meanwhile, firms listed on Swiss Local Caps or a few other specialized segments can continue reporting under Swiss GAAP[1,2].

There are also important differences in the corporate governance structures. In Germany a dual board system is prescribed by the law. The Management Board is responsible for managing the enterprise. The Supervisory Board appoints, supervises and advises the members of the Management Board and is directly involved in the decisions of fundamental importance.[3] A member of the Management Board cannot be at the same time a member of the Supervisory Board. On the other hand, the Swiss system is closer to the US one-board model. About 30% of Swiss listed firms have a CEO which is at the same time the Chairman of the Board of Directors (Administrative Board), which is lower than in the US (about 85%) (Ruigrok 2002). However, much more often the CEO is a member or a "delegate" of the Board of Directors. Also, in Germany one third (one half) of the Supervisory Board of companies having more than 500 (2000) employees should consist of the employee representatives. Hence, at least theoretically, Supervisory Boards are expected to be more independent of the executives in Germany than Administrative Boards in Switzerland.

The differences in the national accounting standards would be of a principal concern for the application of the empirical model in the way it is done in the next chapter. However, this problem is controlled for by selecting uniquely the companies reporting under the IASB standards. Where the empirical results may differ for two countries because of factors not directly integrated in the research design, the sensitivity analysis attempts to shed light on their existence.

To my knowledge, the only empirical study of EM in Switzerland is the paper by Cormier et al. (2000). The authors focus on a special institutional

[1] See below for comments on Swiss reporting rules.
[2] Admission Board Communiqué No. 2/2003 of 10 February 2003.
[3] German Corporate Governance Code, English version available at www.deutsche-boerse.com under Being Public Checklist.

environment, which is characterized, by the investors' focus on dividends and a large accounting discretion. They bring the following arguments. Switzerland's equity markets are characterized by relatively high share prices and thin trading. This contributes to making stock investments less liquid for the investors, who therefore give a higher importance to dividend income than to capital gains. At the same time, the Swiss corporate law provides an explicit link between dividends and reported earnings. Also, the financial reporting framework is relatively unregulated giving firms extensive accounting discretion. Overall, the authors infer that such conditions lead to dividend-based EM. For example, the fear of negative investors' reaction may lead managers to keep dividend at the same level despite some financial problems. To do so, they engage in income-increasing accrual management. Moreover, it is supposed that investors are aware of the financial reporting discretion held by managers, which leads to the establishment of a strong implicit contract between the Swiss firms and their shareholders with respect to dividend payments.

Cormier et al. (2000) model the accrual management as having for objective to avoid earnings decreases from the previous period and report that the empirical evidence confirms their conjectures. The empirical results are based on a rather questionable research design, but I will not go into its details here. This will be done in the first section of the next chapter, while here I would like to make some comments on the institutional background described in the paper.

The period under investigation in Cormier et al. (2000) is from 1990 to 1995. This period can be characterized by a relative stagnation of the stock market compared to the second half of the 90s. The relatively low capital gains further reduced by high transaction costs were increasing the role of dividend payments, so that the Swiss stocks, according to the authors, could be considered by investors as quasi-bond investments. However, in the second half of the 90s the capital gains increased substantially driven by the well-known technology boom. These gains were followed by a strong decline of market

values in 2001 and 2002. Such strong price fluctuations could be expected to change the investors' view of stocks as quasi-bond investments. Moreover, as I already mentioned, a wave of share splits and conversions should have mitigated the liquidity-related high transaction costs, decreasing the relative importance of dividends. Finally, one should not ignore the fact that in Switzerland capital gains as opposed to dividends are not taxable for individuals. Given the above, I believe that the importance of dividend payments, although being generally higher that in American markets, has decreased in recent years relative to the first half of the 90s.

Furthermore, to describe the financial reporting standards as relatively free of constraints, the authors put the emphasis on the requirements of the Federal Code of Obligations.[1] Being general and limited in their content, these are not allowed for the presentation of consolidated financial statements by the SWX. Effectively, a minimal requirement for the listed firms is the application of the standards issued by the Foundation for Accounting and Reporting Recommendations (FAAR)[2]. The standards issued by this body, although still very limited in coverage and disclosure requirements, nevertheless are based on the IAS model and are much more shareholder-oriented than the Swiss law.[3] Moreover, as more than half of the Swiss listed companies nowadays utilizes IFRS, the overall reporting environment can hardly be seen as particularly loose any longer. At least not in comparison with many other countries of the continental Europe. Again, as it was mentioned, focusing exclusively on IFRS-reporting companies in my study should allow mitigating many characteristics of the local institutional background.

Daske et al. (2003) replicate the distributional design of Burgstahler and Dichev (1997) and Degeorge et al. (1999) applying it to the data from the European Union countries. Similar to prior studies in the US and the UK the

[1] The Swiss corporation law was the only source of national accounting regulation until 1984.
[2] This body was established in 1984 with functions similar to those of US FASB.
[3] The scope of FAAR recommendations has been also substantially enlarged since 1995.

authors find that more firms than expected (1) report small positive earnings, (2) report small positive earnings increases and (3) have zero or small positive analysts' forecast error in the total EU sample. Furthermore, they find that the discontinuities in distributions are much more pronounced in their sample as compared to the US and the UK evidence. Also, the avoidance of losses and decreases is more heavily practiced in the Continental European and particularly in the German accounting origin countries than in the British accounting origin countries. Finally, for a subsample of mostly Continental European firms which already apply the IFRS or US GAAP, the authors report the same severe discontinuities as for the local GAAP groups. They argue that to the extent that such discontinuities really proxy for EM, the results would suggest that even under a more strict and transparent Anglo-American accounting regime, EU firms would practice EM to the same extent as under the local GAAP. Therefore, the results indicate that a mere imposition of stricter accounting standards, without strengthening other related institutions, will not restrict the EM activity. Nevertheless, when the authors attempt to examine whether short-term accruals are used to achieve the targets, the results remain inconclusive.

The measures adopted in Germany and Switzerland to increase the corporate transparency and the value relevance of financial reporting were not in the last place motivated by the US scandals that undermined investors' confidence. The above-mentioned theoretical argument and the scarce statistical evidence indicate that EM is not of a smaller concern in these countries. A few hotly debated affairs that came into light in Switzerland in recent years showed that accounting abuse is not a purely theoretical issue. Thus, in January 2003 a scandal burst out around La Banque Cantonale Vaudoise (BCV) a mid-size bank listed on the SWX. According to the conclusions of a special audit the management of BCV has underestimated provisions for the credit risks by an amount of CHF 316 millions in 1996.[1] This allowed the bank to report an annual profit of 90 million instead of reporting losses. Another scandal that had a much

deeper resonance spreading far outside the Swiss frontiers was related to the bankruptcy of the national airline carrier the SAirGroup. According to the ex-post investigation by Ernst & Young, the consolidated accounts for the years 1999 and 2000 "did not fairly present the economic and financial situation" of the group.[2] Among other irregularities, two subsidiaries were not fully consolidated, although the economic benefits and risks lay entirely within the SAirGroup. A number of off-balance-sheet transactions were not correctly and completely reported in the financial statements.

As far as Germany is concerned, I am not aware of any major accounting scandals that happened in recent times. Given the above discussion one might think that there are some other mechanisms preventing the manipulations from becoming excessive and fraudulent.

After having introduced the phenomenon of earnings management in various contexts, I end this chapter and go ahead to the main purpose of this work, that is, estimating the magnitudes of EM.

[1] L'agefi of 30 January 2003. "Plainte pénal est déposée contre les anciens dirigeants de la BCV" p. 1 and 8.
[2] "Results of Ernst and Young's Investigation regarding SwissAir" available at www.liquidator-swissair.ch.

CHAPTER TWO

Measurement of Earning Management

2.1 Critique of Existing Approaches

In order to understand the motivation for a new model of estimating EM one should first recognize the problems inherent to existing techniques. As mentioned previously, the data availability problem strongly undermines the application of the specific accrual and distributional approaches to samples such as the mine. Besides, examining the implications for valuation necessitates the estimation of total EM amounts. This is virtually impossible with the distributional approach and very costly with the specific accrual methods. Consequently, aggregate accruals remain the focus of the new model. The following discussion is entirely devoted to the drawbacks of the models using the aggregate approach.

The models applied to aggregate accruals rely on the double-entry nature of accounting. Thus, firms managing earnings cannot inflate revenues or understate expenses without simultaneously distorting a balance sheet account. Researchers decompose earnings into cash and non-cash components and assume that cash earnings are relatively costly to manipulate. Therefore, the issue is to split the non-cash part, that is accruals, into discretionary or abnormal and non-discretionary or normal accruals. The estimated DA is a measure of EM activity. This decomposition can be described by the following equalities:

$$\begin{aligned} TA_t &= Earnings_t - CFO_t \\ TA_t &= DA_t + NDA_t \\ Earnings_t &= CFO_t + DA_t + NDA_t \end{aligned} \qquad (1)$$

Here, TA_t denotes total accruals, CFO_t denotes cash flow from operations and DA_t and NDA_t discretionary and non-discretionary accruals respectively in period *t*. The exact accounting definition of each variable varies from study to study and will be discusses later. However, it should be mentioned that CFO_t, at least as it is defined by IFRS and US GAAP, is not a completely correct measure of cash earnings in period *t*. For example, cash collection for the goods sold in year *t-1* increase CFO_t. So the decomposition of earnings into cash and non-cash portions should not be regarded within the bounds of a single accounting period.

A reader somehow familiar to the EM literature would agree that the discussion should begin with the Jones (1991) model. Firstly, the model has been the most popular one for more than a decade in studies of EM. Secondly, despite the heavy critique on the model most of the suggested alternatives are often only slight modifications of the original model that do not bring much empirical improvement.

Jones (1991) estimated the following regression:

$$\frac{TA_t}{TASS_{t-1}} = b_0 \frac{1}{TASS_{t-1}} + b_1 \frac{\Delta REV_t}{TASS_{t-1}} + b_2 \frac{GPPE_t}{TASS_{t-1}} + \varepsilon_t \qquad (2)$$

where TA_t is the total accruals for period *t*, ΔREV_t is the change in revenues (net sales) from the previous year, $GPPE_t$ refers to gross property plant and equipment at the end of the period and $TASS_{t-1}$ stands for the total assets at the beginning of the period. Empirically, in many papers TA_t is computed as the sum of net current or working capital accruals and depreciation expense. Growth in sales is supposed to be the main determinant of changes in net working capital absent EM. The level of gross property plant and equipment (PPE) is included to control for the normal depreciation expense. All the variables are scaled by lagged total assets to reduce heteroscedasticity. The original Jones Model is estimated by OLS using firm-specific time-series observations. Hence, the

estimated parameters are firm-specific. Given the coefficient estimates and dropping $TASS_{t-1}$ for the simplicity of presentation, the NDA_t is computed as

$$\overline{NDA}_t = \hat{b}_0 + \hat{b}_1 \Delta REV_t + \hat{b}_2 GPPE_t \quad (3)$$

and

$$\overline{DA}_t = TA_t - \overline{NDA}_t \quad (4)$$

where $\overline{NDA}_t$ and $\overline{DA}_t$ denote the estimated values as opposed to the true ones.

In a usual research design the obtained $\overline{DA}$ is regressed (normally in cross-section) on some variable(s) supposed to be related to EM activity. Using the notation of McNichols and Wilson (1988) the estimated regression is

$$\overline{DA}_{ti} = \alpha + \beta PART_{ti} + v_{ti} \quad (5)$$

where $PART_{ti}$ is the partitioning variable and the index i shows that firm-period observations are used in the estimation. A significant β is interpreted as an evidence of EM. It was already explained in the previous chapter that if the error in the DA estimate, $\overline{DA}_{ti} - DA_{ti}$, is correlated with $PART_{ti}$, a researcher obtains a spurious evidence of EM. Here, we are going to discuss the possible reasons for such estimation errors.

The original time-series formulation of the Jones Model requires a minimal number of observations for each firm. Thus, researchers usually require at least 10-15 yearly observations for a firm to be included in the sample. Such a condition significantly reduces the sample size and potentially introduces survival bias problems. Moreover, even when 20 or 25 yearly observations are available for a firm, the sample is still statistically small, which hinders any asymptotic inference from the estimators. Another problem ignored in the time-series formulation is the parameter stability. The parameters b_1 and b_2 are functions of such economic variables as the working capital (WC) turnover and useful life of the PPE[1]. The rapidly changing technology during the last decades

[1] In section 2.3 we take a closer look on the economic interpretation of the coefficients.

and the increased merger and acquisition activity make it unreasonable to assume that those parameters remained stable for the majority of firms. From equations (3) and (4) it is obvious that misspecified coefficient estimates lead to NDA and DA measured with error.

Beginning from DeFond and Jiambalvo (1994) the cross-sectional version of the Jones model gained currency in the literature. Typically, observations on firms from a single industry in a given year are pooled in a regression. Thus, a separate regression is estimated for each industry-year combination. The cross-sectional approach imposes milder data requirements, at least in the US case, mitigating the potential survival bias. In larger samples parameter estimators are more likely to be consistent. Nevertheless, this procedure also has its drawbacks. The downside is that instead of the temporal parameter stability one has to impose cross-sectional parameter restrictions. As a matter of fact, the model is estimated industry by industry, and not on the economy-wide level, in order to allow parameter variation across the industries. The hypothesis is that firms from the same industry should have similar business characteristics and technology. So, the theoretical parameters in (2) should be also similar. The narrower is the definition of industries, the more plausible this assumption appears. There is some evidence that the industry groups as defined by 2-digit SIC codes, most often used in US literature, include firms with quite different theoretical parameters. The problem is more severe for smaller markets. For example, if the firms from my sample are classified according to the industry definitions close to those of SIC 2-digit, many industry groups will contain 1-3 firms (see Annex A). Based on the empirical findings a consensus emerged that the cross-sectional version of the Jones Model performs better. Also, the time-series estimation seems to disappear from the literature. Despite the alleged empirical superiority, the cross-sectional version still produces estimation errors by imposing common parameters. The estimated coefficients are actually the estimates of the industry average parameters. In the absence of EM the procedure will produce overestimated and underestimated magnitudes of NDA

and DA for the firms with above- and below-industry-average parameters. Another drawback of these cross-sections is that firms from the same industry can have similar incentives to manage earnings in a given period. This can happen, for example, because of the industry-wide performance shocks. To the extent EM actions are synchronized, DA magnitudes remain underestimated. In section 2.3 I suggest a modification in the research design that should attenuate the problems of both the time-series and cross-sectional formulations. Section 2.5 reports the results of this modification.

Another weak point of the Jones model is the potential errors-in-variables problem. When extended to the whole class of Jones-type models[1], this issue can be seen as a general problem of the regressor exogeneity.

Let us first consider the Jones Model. Estimation of DA requires a specification of the estimation and test samples. The model hinges on the hypothesis that there is no EM in the estimation sample. So, the true model parameters, b_0, b_1 and b_2 describe the accrual generating process absent EM. Suppose for the moment that the above hypothesis is true. Then the OLS procedure consistently estimates the model parameters. Assuming the parameter values are the same in the estimation and test samples, NDA for a particular firm-period in the test sample is obtained by multiplying the parameter estimates by regressor values from the corresponding firm-period. In other words, equation (2) is estimated using the observations of the estimation sample, and the coefficient estimates are used in (3) and (4) with ΔREV_t and $GPPE_t$ from the test sample.

Another assumption implicit in the model is that even in the test period, the regressors do not contain any manipulation. In particular, revenues are supposed to be entirely non-discretionary and thus, EM occurs uniquely through the expense accounts. However, if earnings are managed through discretionary

[1] The delimitation of this class will become clear later in this discussion. Although most of these models are obtained by some adjustment to the original Jones Model, I group them by another common feature. This feature allows inclusion of a much wider range of models.

revenues, this part of the manipulation will be removed from the DA proxy. Jones recognizes this limitation, and Deshow et al. (1995) propose the Modified Jones Model designed to alleviate the problem. The only modification relative to the original Jones Model is that the changes in revenues are adjusted for the changes in accounts receivable in equation (3). Thus, while the Jones Model implicitly assumes that revenues are not manipulated, the modified version implies that all changes in credit sales in the event period result from EM.[1] While this overly pessimistic assumption has been heavily criticized, the model became quite popular in empirical studies. In any case, no systematic superiority over the original model has been documented in the literature. To conclude, if the assumption of no EM in the estimation period holds, the only way to avoid errors in the Jones-type models is to choose regressors that cannot be affected by discretion. This turns out to be not an easy task.[2]

In practice the distinction between the estimation and test samples is usually made in two ways depending on which, the time-series or the cross-sectional formulation is used. In many applications a small group of firms in a particular year is suspected to engage in EM. In the first case, the regression coefficients are estimated for each firm using all observations except those in the event period. The obtained parameters are used to "forecast" normal accruals in the EM period. In the second case, the parameters are estimated using data on firms from the same industry and the event or adjacent-to-the-event years. It is implicitly assumed that, in the first case, the suspected firm has no EM incentives in the years other than the event year. The second case implies that the firms other than the suspected one do not have such incentives. Given the wide range of contexts discussed in the previous chapter that potentially give

[1] Event period is another way of denoting the test sample, given that the event, the EM action, is supposed to occur in a particular reporting period.

[2] Beneish (1998) suggests using change in cash sales instead of change in revenues in the Jones Model. It is, however, not clear how this variable should be obtained. Thus, under IFRS there is no requirement to separately disclose either cash sales or credit sales during a period. Change in accounts receivable on the balance sheet is a noisy proxy as it includes currency and acquisitions/divestiture effects. Also, it does not seem that Beneish's suggestion has been implemented in US studies.

rise to EM, these assumptions are difficult to justify. This fact has been recognized by some authors (see e.g., McNichols (2000) p. 324). Moreover, in many settings it is difficult to separate a relatively small sample of firm-years in which high EM activity can be expected. This is often the case when the partitioning variable is continuous. Consequently, in many studies the distinction between the estimation and the event period becomes quite vague.[1]

Now let us see what happens if the assumption of no EM in the estimation period fails. In such a case the observed TA_t will contain DA_t. Assume for simplicity that ΔREV_t is the only regressor and denote the observable TA_t as $TA_t = TA_t^* + DA_t = NDA_t + DA_t$. The equation (2) which actually specifies a (linear) relation between NDA_t and ΔREV_t becomes[2]

$$TA_t = TA_t^* + DA_t = b_0 + b_1 \Delta REV_t + v_t$$

and so
$$TA_t^* = b_0 + b_1 \Delta REV_t + (v_t - DA_t) = b_0 + b_1 \Delta REV_t + \varepsilon_t \qquad (6)$$

DA_t appears in the error term and if revenues are manipulated we get $E(\Delta REV_t \varepsilon_t) \neq 0$. The regressor is not predetermined and the OLS estimator of b_1 is not consistent.

Even if we suppose that all the regressors are uncontaminated by EM, exogeneity is still a problem. Several authors suggested including different cash flow measures as a control for normal accruals. The motivation is provided by the findings in Dechow et al. (1995), where DA estimates are reported to be biased for firms with extreme cash performance. Also, Dechow (1994) and Dechow et al. (1998) show under a set of assumptions that accruals and cash flows are negatively correlated in the absence of EM. Conceptually, the negative correlation is caused by the matching function of accruals evoked in the first chapter. Based on several assumptions of constant parameters, Dechow et al. (1998) (equation 7) show that the variation in WC accounts can be entirely

[1] No distinction is made in studies of market pricing of DA, such as Subramanyan (1999) and Xie (2001).
[2] Again assuming all variables are deflated by lagged total assets.

explained by current and past sales shocks. As a matter of fact, the expression for the correlation between accruals and cash flows is derived through the relationship between accruals and sales. Therefore, if the mentioned assumptions are valid, incorporating cash flow measures as regressors in the Jones Model must not add any information in excess of that already carried in ΔREV_t. However, if any of these strong assumptions fails[1], the nice linear relationship between changes in sales and accruals breaks. Meanwhile the relationship between accruals and some cash flow measure should still hold. This is guaranteed by the fact that any normal accruals, unlike a discretionary one, has its cash flow counterpart in one of the adjacent periods.[2] Dichev and Dechow (2001) use the fact that accruals are the mirror of cash flows, and model the changes in non-cash working capital as a linear function of cash flows from operations (CFO) from three adjacent periods. In the periods of extreme cash flow performance the assumptions of constant parameters in Dechow et al. (1998) are more likely to break. This suggests that including some measure of cash flow in the Jones Model should reduce the measurement error.

Motivated by the expected relationships between cash flows and accruals Subramanyam (1996) and Chaney et al. (1998) add CFO_t as an explanatory variable to the Jones Model. Kasznik (1999) includes changes in CFO as a regressor in the Modified Jones Model. Despite the apparent appeal of adding a cash flow variable to accrual models neither of the suggested modifications gained general acceptance in the literature. Although I am not aware of any publication that directly criticizes the inclusion of cash flow variables in the DA models, the reasons for such reluctance may be found in the recognition of the exogeneity problem. Thus, even though CFO_t, as opposed to REV_t, cannot be contaminated by accrual management by definition, a non-zero correlation with DA, and consequently with the error term in (6), cannot be ruled out on

[1] One of the assumptions, for example, is the constant net profit margin.
[2] Assumption errors are an exception from this rule, as in this case the expected cash flow do not occur and accruals reverse without corresponding cash flow. However, there is no obvious reason that this portion of NDA be correlated with EM partitioning variables. That is why it is usually ignored by EM researchers.

reasonable grounds. This occurs because in many contexts DA is a response to a lower or higher than expected true underlying performance and so must be correlated with the latter.[1] In turn CFO, being a proxy of cash earnings, is a major component of this pre-managed performance. Consequently, imposing orthogonality between CFO and DA appears rather unrealistic. Of course, as far as performance is concerned, a similar argument can be applied to revenues. It turns out that the exogeneity problem is rather ubiquitous. In order to control for normal accruals, we must choose regressors not correlated with the firm's performance, because DA is very likely to be related to the latter. It is hard to imagine any such regressors, given that normal accruals are by definition employed in measuring earnings performance.

Generally speaking, the common feature of the Jones-type models is that DA is measured as a residual or a "forecast error" of an accrual model absent EM. This design imposes orthogonality between DA and NDA. McNichols (2000, page 323) refers to some theoretical papers suggesting that the assumed orthogonality is too restrictive. The above example shows that to impose orthogonality we have to assume at least that DA is not related to the true performance.

There seems to be two ways to deal with the problem of exogeneity. One is to continue modeling accruals in the absence of EM but to use estimation techniques that overcome the exogeneity restriction. The other way is to abandon the idea of modeling only the normal accruals and to directly estimate both the discretionary and non-discretionary components. The first approach was used in Kang and Sivaramakrishnan (1995) (KS hereafter). The second will be exposed in the next section.

KS use an instrumental variable method (IV), which is the standard econometric procedure for dealing with non-predetermined regressors. The other distinctive features of their model are the use of accrual account balances as

[1] A classic example is income smoothing when positive DA are accrued if pre-managed earnings fall below a long-term expected trend.

opposed to changes in these balances and inclusion of expenses in addition to revenues as a regressor. Based on the simulation results, the authors present evidence that their model is more powerful than the standard Jones Model at detecting abnormal accruals.[1] Given the claimed superiority, it is surprising that the model failed to gain popularity in applied investigations. Peasnell et al. (2000) note that they are not aware of any published EM study except the original KS paper that has used this procedure to estimate accrual manipulation. To this I can add the comparative study of Thomas and Zhang (1999), which is, however, not a typical EM study. As recognized by the authors, they rather compare the relative ability of accrual models to forecast total accruals rather then to detect discretionary accruals.

There may be different reasons for such a disregard of the KS model in the literature. One is that the procedure is more cumbersome in application than the standard OLS technique. Another reason might be that the model does not perform so well when applied to real data as it does in simulation studies. On the other hand, it is possible that the model performs "too well", in the sense that it does not generate spurious correlation between DA and partitioning variables mentioned before. In such a case, if an application of Jones-type models leads to the confirmation of the researcher's hypothesis and the KS model do not, the investigator might be biased towards choosing the former ones.[2]

There are, however, a couple of objective reasons that prevent me from applying the KS model in the empirical part of this work. First, the procedure uses the lagged regressors as instrumental variables. As the authors suggest, using once-lagged values may be inappropriate because of the possible first-order autocorrelation in accruals. If DA in year *t-1* are correlated with contemporaneous regressor values, there are good reasons to believe that their

[1] The authors mention errors-in-variables, simultaneity and correlated omitted variables as sources of the exogeneity problem.
[2] The editorial bias mentioned by McNichols (2000) can create incentives for such decisions.

reversal in year *t* will be also correlated, violating the orthogonality condition.[1] The departure point is the assumption common in the literature that at least short-term accruals reverse in the next period. Given this caveat, KS use twice-lagged and thrice-lagged values of the regressors in the instrument set. Employment of such instruments, however, turns out to be very problematic in small samples like the one in this study (see section 2.4). The requirement to have observations of twice-lagged and thrice-lagged values of the regressors would reduce the effective sample up to one forth of its original size. Also the correlation between the current and past values of the regressors should decrease with the lag length. In some samples this may cause a problem of weak instruments.

Another problem of the KS model might result, in my opinion, from the use of accrual account balances as opposed to changes. Collins and Hribar (2000) show that accruals calculated from balance sheet accounts contain measurement error mainly due to currency translation and mergers and acquisitions effects. Computing accruals as changes in balance sheet accounts had been a usual procedure before the appearance of that paper. The alternative to it consists in using the cash flow statement information to compute accruals. Obviously, one can obtain only changes during the reporting period but not the balances of accrual accounts from the cash flow statement. Also, to my knowledge, neither IFRS nor US GAAP require to show the balances of each account net of exchange rate effects and changes in consolidation scope.[2] Therefore, a researcher who decides to apply the KS model is constrained to use account balances that contain components irrelevant for non-cash earnings. If the IV procedure guarantees that parameters are consistently estimated, these irrelevant components will anyway appear in the DA estimates.

[1] Some studies, as Dechow et al. (2003), for example, ignore this problem including once-lagged TA in their OLS-estimated model.

[2] IAS 7 requires disclosure of assets and liabilities in the subsidiaries acquired or disposed of, summarized by each major category. However, in most cases the disclosed information is highly aggregated and no reasonable adjustment to the balance sheet is possible.

Before proceeding to the next section it is worthwhile to discuss another modification of the Jones Model that gained substantial acceptance in recent times. Many studies following DeFond and Jiambalvo (1994) focus exclusively on the working capital component of total accruals. At the same time $GPPE_t$ is removed from the equation (2). There are a few reasons for such a modification. First, to manipulate depreciation expense managers should either change the assumptions related to the assets' useful life or/and residual values, or change the depreciation method, for example, from declining to straight line. However, accounting standards require to disclose the nature and the effect of such changes,[1] making potential manipulations transparent for more or less sophisticated investors. Moreover, as noted in Young (1999), in case of multiperiod EM suggested in many contexts, long-term depreciation accruals are a rather costly source of manipulation. Since the nature and composition of long-term assets is not expected to change very often, the consistent year-on-year changes in estimates would almost certainly attract the attention of the firm's auditors.

Second, the cross-sectional formulation of the Jones Model implies that the average useful life of firms' property plant and equipment is the same within an industry. A number of arguments including anecdotal evidence and simple economic consideration suggest this is not the case in reality.[2] On the other hand, if we accept that some firms in the industry overestimate and others underestimate the useful lives, it would imply that the former consistently manage earnings downward and the latter upward. Such a scenario, however, is inconsistent with the EM hypothesis in most studies.

Third, the existing formulations of the Jones Model assume a linear relationship between GPPE at the end of the period and depreciation expense during the period. Obviously this requires that all the sample firms use the

[1] IAS 16, par. 63.

[2] Even if two firms produce exactly the same range of goods, one that has renewed the equipment more recently could have acquired it with improvements that increase the useful life compared to the previous technology.

straight-line depreciation method. Even if this is the case for a given sample, the relationship implies that PPE acquired during the year is amortized as if it were in use during the whole period. If, taking an extreme case, a major equipment acquisition is made at the end of the year, its depreciation will be recognized only beginning from the next period. In such a case, the Jones Model produces a lower than "normal" depreciation accrual in the current period showing an income-increasing EM.

Finally, the desired effect of an EM action is more questionable when depreciation rather that WC accruals are manipulated. Since some pro forma earnings measures used by analysts, such as EBIDTA, do not include the depreciation charge, manipulations might fail to influence the decision makers.

Also, the relatively high magnitudes of the depreciation accrual mean that when discretionary depreciation is estimated with error, this error is likely to dominate the variation in DA (see Young (1999 p. 842)). Given the above considerations, it seems reasonable that the potential loss of test power from treating depreciation accruals as primarily non-discretionary is much smaller than the loss caused by measurement errors. This idea seems being accepted in more and more studies.

The above discussion does not provide an exhaustive list of all potential problems of the Jones and similar models suggested in the literature. Much of the critique relates to the circumstances where changes in revenues fail to explain a non-discretionary accrual behavior of current accruals.[1] The solutions are usually seen in including additional explanatory variables in the regression. However, unless the exogeneity problem is resolved, the inclusion of additional regressors, simply because they are significantly related to total accruals, may lead to serious misspecifications. The next section proposes a solution to the problem.

[1] McNichols (2000) and Young (1999) provide quite a comprehensive summary.

2.2 The Generalized Target-Deviation Model

As it was previously mentioned, the exogeneity problem arises in the Jones-type models primarily because they impose orthogonality of DA and NDA and assume no EM in the estimation period. An alternative is to drop the idea of modeling accruals absent EM and attempt to estimate simultaneously both discretionary and non-discretionary components of total accruals. Such estimation requires a model of discretionary behavior and observable variables to make the model feasible. The question is where one can find variables that will explain the variation in DA. An obvious idea is to search among the numerous partitioning variables presented in the previous chapter. The problem with this solution is that the so called partitioning variables, even when significantly related to the estimated DA, usually provide a very low explanatory power. Moreover, their choice is most often based on intuitive considerations and not on a comprehensive model of EM. This is not surprising as it is quasi-impossible to model the virtually infinite number of factors such as the underlying incentives and constraints that influence EM decisions in reality. Some of them are difficult to quantify, others are not observable at all for the researcher. For example, a manager having stronger ethical values is less likely, *ceteris paribus,* to engage in discretionary EM to mislead FS users.

The picture becomes more optimistic if we move from the incentives and constraints downward in Figure 2 towards the tactical objectives. As it was suggested in Chapter 1, intuitively the EM magnitudes and signs should be related to the deviation of pre-managed earnings from the targets. It can be inferred from the received literature that the number of earnings targets is rather limited relative to the number of all possible combinations of incentives, constraints and catalyst factors. The reason is that the benchmarks adopted by FS users arise from a consensus emerging on some objective grounds. Hence, these are consistently and sometimes even routinely applied to many companies by many decision makers. Also, the very role of the benchmarks hinges crucially

on the fact that their number is limited. It follows that even two managers, having different utility functions and incentives/constraints combinations, might still pursue the same tactical objectives. Moreover, many of such targets are publicly observable or can be approximated more or less successfully.

Suppose now that the manager of a firm maximizes his or her utility by recognizing DA that minimize the deviation of reported earnings from some target in a given period. Since a firm can face more than one earnings target in the same period, the management might have to make a trade-off and give priority to some of the targets. At the same time, the ability to recognize discretionary accruals is not unlimited because of the existing constraints. It is reasonable to suppose that these constrains intensify with the magnitudes of DA, as the latter become more visible and material. Assuming for convenience that there are only two targets in a given period, we can write the utility maximization problem as a cost minimization problem,

$$\underset{DA_t}{Minimize}\, C(DA_t) = \alpha_1 (RE_t - TG_{1t})^2 + \alpha_2 (RE_t - TG_{2t})^2 + \alpha_3 (DA_t)^2 \qquad (7)$$

where $C(DA_t)$ is the manager's cost function, RE_t denotes reported earnings, TG_{1t} and TG_{2t} the two earnings targets and α_1, α_2, α_3 represent the weights assigned by management to each component of the function. Writing RE_t as a sum of pre-managed earnings (PME_t) and DA_t the expression (7) becomes

$$\underset{DA_t}{Minimize}\, C(DA_t) = \alpha_1 (PME_t + DA_t - TG_{1t})^2 + \alpha_2 (PME_t + DA_t - TG_{2t})^2 + \alpha_3 (DA_t)^2 \qquad (8)$$

Given $\alpha_1, \alpha_2, \alpha_3 \geq 0$, the function is globally convex and the DA_t value at which the unique minimum is achieved can be obtained from the first order conditions:

$$\frac{\partial C(DA)}{\partial DA} = 2\alpha_1 (PME_t + DA_t - TG_{1t}) + 2\alpha_2 (PME_t + DA_t - TG_{2t}) + 2\alpha_3 DA_t = 0 \qquad (9)$$

Solving for DA_t and rearranging terms, gives

$$DA_t = \frac{-\alpha_1}{\alpha_1 + \alpha_2 + \alpha_3}(PME_t - TG_{1t}) + \frac{-\alpha_2}{\alpha_1 + \alpha_2 + \alpha_3}(PME_t - TG_{2t}) \qquad (10)$$

Thus, DA_t is expressed as a linear function of the deviations of pre-managed earnings from some targets. The idea of relating discretionary accruals to the deviation of pre-managed earnings from a target is not new in the literature. Directly or indirectly, this method was employed in DeFond and Park (1997), Peasnel et al. (2000), Cormier et al. (2000). In contrast to these studies that regard only one target at a time, Hunt et al. (1996) develop a comprehensive multi-target model using a quadratic cost function.[1] However, all of these studies have the same shortcoming. An attentive reader would have already guessed looking at the expression (10), that the problems arise when researchers attempt to measure the pre-managed earnings. Clearly, had we known the true pre-managed earnings, there would be no need to derive a model that estimates DA. Although the derivation of such a model is not the purpose of the mentioned studies, which mostly try to provide evidence of EM around some targets, the problem is still the same, albeit it might seem less obvious. The first three papers obtain a "proxy" for pre-managed earnings by subtracting from reported earnings the DA values estimated by some of the Jones-type models. Without a loss of generality such a research design adds up to estimating the following regression:

$$\overline{DA}_t = \alpha(RE_t - \overline{DA}_t - TG_t) + \varepsilon_t \qquad (11)$$

[1] Unlike the objective function in (7) the minimizing argument is TA and not DA in this paper. Furthermore, the TA are decomposed into three components: inventory, other current accruals and depreciation and partial derivatives are taken with respect to each of these variables. Although the departure point in the derivation of the Target-deviation Model is similar to that of Hunt et al. (1996), the final formulation, as it becomes clear further in the text, differs conceptually in several aspects.

where RE_t is the reported income, $\overline{DA}_t$ refers to the discretionary accruals estimated by the Jones or similar models and TG_t is the earnings target used by the researcher. Actually, a new variable is computed equal to $\left(RE_t - \overline{DA}_t - TG_t\right)$, and a negative sign on the estimated α is interpreted as an evidence of EM. It is not difficult to notice, that even in the absence of EM, when the whole amount of $\overline{DA}_t$ is a measurement error, the presence of $\overline{DA}_t$ on both sides of the equation may cause spurious correlation.[1] Therefore, the estimate of α appears negative and significantly different from zero leading to a false rejection of the hypothesis of no EM**.** DeFond and Park (1997), for example, recognize this problem. After applying a number of robustness checks the authors cannot rule out the possibility that their findings are influenced by the research design.

Hunt et al. (1996) obtain pre-managed earnings by subtracting tax-adjusted total accruals from reported earnings. This proxy, however, is simply the after-tax cash flow from operations. Although not subject to the mechanical correlation problem, CFO may be quite a poor approximation for pre-managed earnings especially for firms with long operating cycles (see Dechow 1994). If the objective is merely to provide evidence of EM around a target, then in some cases such an approximation to the deviation from a target might be satisfactory. However, if the goal is to derive a model that measures the magnitudes of EM, a higher precision is required.

Now suppose that normal accruals in a given period can be expressed as a linear combination of *m* observable variables plus an unobservable error term. Written in vector form,

$$NDA_t = \boldsymbol{B}_m' \boldsymbol{X}_m + u_t \qquad (12)$$

[1] In most studies, the estimates of DA are somewhat better "disguised" in the expressions in the spirit of (11). Even if less obvious at the first sight, the problem is still present.

where $\boldsymbol{X}_m$ is the $(m \times 1)$ vector of variables, $\boldsymbol{B}_m$ is the $(m \times 1)$ vector of coefficients, β_1, $\beta_{2, \ldots}$ β_m, and u_t is a scalar error term with $E(u_t)=0$. Instead of defining pre-managed earnings as RE_t minus DA_t, from the third line of (1) we obtain

$$PME_t = CFO_t + NDA_t = CFO_t + \boldsymbol{B}_m' \boldsymbol{X}_m + u_t \qquad (13)$$

Substituting (13) in (10) and denoting $\left(-\alpha_1\right)/\left(\alpha_1 + \alpha_2 + \alpha_3\right) = \gamma_1$ and $\left(-\alpha_2\right)/\left(\alpha_1 + \alpha_2 + \alpha_3\right) = \gamma_2$ we get

$$\begin{aligned} &DA_t = \gamma_1\left(PME_t - TG_{1t}\right) + \gamma_2\left(PME_t - TG_{2t}\right) = \\ &\gamma_1\left(CFO_t + \boldsymbol{B}_m' \boldsymbol{X}_m + u_t - TG_{1t}\right) + \gamma_2\left(CFO_t + \boldsymbol{B}_m' \boldsymbol{X}_m + u_t - TG_{2t}\right) = \\ &\gamma_1\left(CFO_t + \boldsymbol{B}_m' \boldsymbol{X}_m - TG_{1t}\right) + \gamma_2\left(CFO_t + \boldsymbol{B}_m' \boldsymbol{X}_m - TG_{2t}\right) + \left(\gamma_1 + \gamma_2\right)u_t \end{aligned} \qquad (14)$$

To make this operational we use $TA_t = DA_t + NDA_t$, obtaining from (13) and (14)

$$TA_t = \gamma_1\left(CFO_t + \boldsymbol{B}_m' \boldsymbol{X}_m - TG_{1t}\right) + \gamma_2\left(CFO_t + \boldsymbol{B}_m' \boldsymbol{X}_m - TG_{2t}\right) + \boldsymbol{B}_m' \boldsymbol{X}_m + \varepsilon_t \qquad (15)$$

This expression can be treated as a regression equation with an error term $\varepsilon_t = \left(1 + \gamma_1 + \gamma_2\right)u_t$. It is nonlinear in the unknown parameters γ_1, γ_2 and $\boldsymbol{B}_m$ and can be estimated using some of the nonlinear optimization algorithms[1]. Unlike equation (10), the regression does not contain any unobservable variable except for the error term. Neither it contains variables estimated outside the model, possibly with a large error.

It is now straightforward to generalize the model to an indefinite number of earnings targets. Suppose the management of a firm faces a trade-off among *k* different earnings targets in a given reporting period. Using (14), the vector $\boldsymbol{Z}_k$ $(k \times 1)$ of the target deviations is

[1] Estimation issues are discussed in detail in the next section.

$$\boldsymbol{Z}_{kt} = \boldsymbol{i}_k' CFO_t + \boldsymbol{i}_k' \boldsymbol{B}_m' \boldsymbol{X}_m + \boldsymbol{i}_k' u_t - \boldsymbol{TG}_{kt}, \quad (16)$$

where $\boldsymbol{i}_k$ is a $(1 \times k)$ vector of ones and $\boldsymbol{TG}_k$ the $(k \times 1)$ vector of targets faced by the firm.

Denoting by $\boldsymbol{\Gamma}_k = (\gamma_1, \gamma_2, \ldots \gamma_k)$ the $(1 \times k)$ vector of coefficients on target-deviation terms, the multivariate version of (15) can be written as

$$TA_t = \boldsymbol{\Gamma}_k \left(\boldsymbol{i}_k' CFO_t + \boldsymbol{i}_k' \boldsymbol{B}_m' \boldsymbol{X}_m - \boldsymbol{TG}_{kt} \right) + \boldsymbol{B}_m' \boldsymbol{X}_m + \varepsilon_t \quad (17)$$

where $\varepsilon_t = (\boldsymbol{\Gamma} i' + 1) u_t$ and $E(\varepsilon_t)=0$. The important feature of the model is that each of the coefficients $\gamma_1, \gamma_2, \ldots \gamma_k$ is constrained to be equal for all the elements in the parentheses.

Suppose the parameters in $\boldsymbol{\Gamma}_k$ and $\boldsymbol{B}_m$ can be estimated with data from some sample.[1] With the estimates in hand, we can proceed to the measurement of DA and NDA. Thus,

$$\overline{NDA}_t = \hat{\boldsymbol{B}}_m' \boldsymbol{X}_m \quad (18)$$

where $\hat{\boldsymbol{B}}_m$ is the estimated value of $\boldsymbol{B}_m$. At first sight, the equation resembles the forecast equation (3) of the Jones Model. However, the parameters in (18) are estimated in a conceptually different way. Similarly,

$$\overline{DA}_t = \hat{\boldsymbol{\Gamma}}_k \left(\boldsymbol{i}_k' CFO_t + \boldsymbol{i}_k' \hat{\boldsymbol{B}}_m' \boldsymbol{X}_m - \boldsymbol{TG}_{kt} \right) \quad (19)$$

where $\hat{\boldsymbol{\Gamma}}_k$ is the estimated value of $\boldsymbol{\Gamma}_k$. I call the expressions (17)-(19) the *Generalized Target-Deviation Model.* The generality comes from the fact that

[1] The equation (17) can be also reparametrized and estimated in a linear form $TA_t = \boldsymbol{\Gamma}' \left(\boldsymbol{i}_k' CFO_t - \boldsymbol{TG}_{kt} \right) + \tilde{\boldsymbol{B}}_m' \boldsymbol{X}_m$, with $\boldsymbol{B}_m = \tilde{\boldsymbol{B}}_m / (1 + \gamma_1 + \gamma_2 + \ldots + \gamma_k)$. A potential problem of this approach is the need to construct a test statistic for $\boldsymbol{B}_m$, which is a non-linear function of several parameters. Another concern is that the estimate of NDA becomes dependent on hypotheses about targets. Finally, some applications of the model suggested later in this chapter cannot be linearized as above. Hence, the generality of the model would be lost.

no particular earnings targets are specified. Also, no complete list of variables supposed to control for NDA is provided at this stage. Of course, the application of the model requires a proper specification of these variables. Still, we have to bear in mind, that these variables, and among them, the earnings targets in particular, may differ from sample to sample. The formulation in (17)-(19) allows the adaptability of the Target-Deviation Model to a rich set of institutional backgrounds. In the next section it will be clear how the model can be applied to the sample selected for this study. For the present, note that regression (17) does not impose orthogonality between DA and NDA. The exogeneity problems mentioned previously do not arise and the model can be estimated in any sample without making the no-EM assumption.

Given (17)-(19) the estimation residuals can be computed as

$$\hat{\varepsilon}_t = TA_t - \overline{DA}_t - \overline{NDA}_t \quad (20)$$

I design this residual as a measure of *unexpected accruals* (UEA) in the sense that it can be explained neither by changes in normal operating factors not by target-directed discretionary behavior. Hence, as opposed to all the accrual models suggested previously, the Target-Deviation approach distinguishes between discretionary and unexpected accruals. The failure to distinguish between these two is the shortcoming of many preceding studies.

Although the model has quite solid theoretical grounds at this stage, some additional conditions should be met to make it effective in practice. Broadly speaking, we can distinguish two important sets of conditions. First, looking at the target-deviation terms in the parentheses, we notice that their precision directly depends on how well the combination $\boldsymbol{B}_m' \boldsymbol{X}_m$ controls for normal accruals. Given the usually low explanatory power of the aggregate accrual models reported previously, finding such a combination of variables might be not an easy task. Nevertheless, recall that no orthogonality between NDA and DA is now imposed. Therefore, we are now freer to choose control variables,

without fearing their possible correlation with DA. Second, assuming that no DA appears in the error term requires that an empirical version of the Target-Deviation Model (TDM hereafter) includes all the earnings targets considered by firms in the studied sample. This might be impossible, if some of the targets are unobservable for the researcher. It is fair to mention, that for the omitted target to cause exogeneity problem in practice, it must be omitted systematically in the study sample and, at the same time, be correlated with some of the regressors. The first condition implies that the same omitted target has an important weight in the cost function in a significant proportion of firm-periods used in the estimation. Although the assumption of no omitted targets might be fairly binding, it is still much weaker than that of DA/NDA orthogonality, which virtually ignores all the targets.

In the next section I derive an empirical version of the target deviation model trying to comply as closely as possible to the conditions and restrictions stemming from the theoretical formulation.

2.3 Application of the Target-Deviation Model

In order to make the model derived in the previous section empirically tractable we must select the earnings targets and the variables controlling for normal accruals. Besides, we will need to impose or relax some restrictions to accommodate the model to the available data. Let us first begin with the discussion of earnings targets.

In the choice of targets I am mostly guided by the findings in prior literature. As the sample studied in this work is random, in the sense that no particular EM activity is suspected in advance, the focus must be on targets usually identified in such samples. Another criterion is the observability or measurability of the variables. The obvious candidates are the three earnings thresholds initially identified by the distributional research designs. These are

avoiding losses, avoiding decreases from the past period and meeting analysts' expectations. Dechow et al. (2003) and Beaver et al. (2003) show that some portion of the discontinuities previously entirely attributed to EM can be explained by some other factors. However, these studies do not preclude EM contributing to the discontinuities in earnings distributions. Although much has been written on the nature of these targets, some review is relevant in order to justify certain features of the empirical model.

Degeorge et al. (1999) explain the existence of these targets by a psychological phenomenon. For example, the need to report small profits versus losses arises from a psychologically important distinction between positive and negative numbers. From the valuation perspective the difference between one penny EPS and minus one penny is immaterial. However, the negative sign has a strong negative impact on the investor's mood. At the same time, the difference between -1 and –2 penny as well as between +1 and +2 penny would rather be deemed as immaterial. Stated in other terms, the share price response as a function of reported earnings is discontinuous near zero.[1] A year back earnings and the analysts' consensus forecast can be considered as some kind of industry norm and meeting or slightly beating these targets becomes critical to influence the analysts and investors.

Such a behavior suggests that a firm having pre-managed earnings below one of those targets is expected to recognize income-increasing DA to reduce the deviation. Taking one target in isolation, this story does not tell us why a firm with pre-managed earnings largely above the target should recognize income-decreasing accruals. This is implied, however, by the quadratic cost function in (7). There are at least two factors contributing to such a behavior. First, the discrete nature of those thresholds suggests that largely exceeding the target has weaker additional impact on the perceptions of users compared to just

[1] Degeorge et al. (1999) characterize these thresholds as mainly driven by the stock market. As it was mentioned in the first chapter they might also make part of numerous explicit and implicit contracts.

crossing the threshold. At the same time, taking into account the dynamic perspective, managers are expected to care about crossing the threshold in the next reporting period. Given the uncertainty about the pre-managed earnings in the next period, the optimal strategy is to create so called "cookie-jar" reserves by recognizing income-decreasing accruals. Taken together these two factors suggest that minimizing the deviation when pre-managed earnings are above the target is consistent with cost-minimizing behavior. [1]

Returning to the multi-target situation, the described "storing-for-tomorrow" strategy strengthens the trade-off among targets. In its absence, the preference for some targets and so the weights in (7) lose their sense in some situations. For example, consider a firm that faces two targets, avoiding to report losses and exceeding the past performance. Suppose, the pre-managed earnings are at an equal distance between zero and the past period numbers. Absent the possibility to "store" accruals for tomorrow and assuming sufficiently low cost of EM, the optimal strategy is to recognize income-increasing accruals and thus, hit both targets at a time. If storing-for-tomorrow is possible, management could decide to create reserves for tomorrow and give up the upper target. The optimal strategy would depend on the relative importance assigned to each threshold.

The quadratic function also assumes that the cost of deviating from a target depends on the magnitude but not on the sign of the deviation. Given the objective to *exceed* the thresholds as formulated above, such symmetric treatment does not seem realistic. Other things being equal, it is more costly to fall slightly short of a target than to exceed it by the same amount. In fact, this is one of the suggested reasons for discontinuities in the earnings distribution. Later in this section I show how one can adjust the Target-Deviation Model to take this asymmetry into account.

[1] Hunt et al. (1996) implicitly assume that mangers know the pre-managed earnings of the next period and include additional terms in the cost function. If separate target-deviation terms control for the forward-looking cost minimization, in some cases the choice of quadratic loss function is difficult to justify. The authors face this problem in the case of the leverage target. Later in this study I distinguish the targets for which the quadratic cost function can be applied without taking future periods into consideration.

The described three targets have gained substantial attention in the literature and the evidence suggests they are rather widespread. However, they do not cover all the possible strategies of EM and particularly such an important one as income smoothing. In spite of the popularity of this strategy in the EM research, there is no unanimously accepted definition of this term. Thus, some authors use the term "smoothing" to describe the "storing for tomorrow" behavior, when pre-managed numbers fall far above the target. Some others use the term smoothing to describe the strategy of reducing but not eliminating the negative gap between reported numbers and the benchmark. In this work I adopt the "classic" definition cited in the previous chapter. Thus, smoothing is regarded as artificially reducing the fluctuations in earnings numbers from year to year in order to report a smooth income stream along time.

Creating an impression of lower risk among investors and creditors in order to reduce the cost of capital is among the most plausible and often cited strategic objectives of IS. Such an explanation permits some authors to describe smoothing as a value maximizing informative strategy as opposed to other opportunistic forms of EM. I argue that one cannot determine whether the decision to smooth earnings is misleading or informative ex-post by looking at the companies with smooth income numbers. The reason is that at the moment when management makes the smoothing decision it is not clear whether the strategy will eventually succeed. Assuming that accounting smoothing within certain bounds remains undetected, a necessary condition for it to be effective is the reversal of the performance to its mean or to the expected trend. A number of studies confirm that performance is mean-reverting on average[1] but this should not hold for every firm in every period. Suppose the CEO of a firm with unexpectedly poor performance relative to the recent periods, who believes that the deterioration is temporary. He or she decides to recognize income-increasing accruals hoping to reverse them against the improving performance in the

[1] See Fama and French (2001) for some recent evidence.

following period. In case the expectations realize, the smoothing strategy is successful and the market assigns a valuation premium for reporting stable performance. Consequently, researchers examining firms that reported less volatile figures conclude that smoothing is informative. If, on the contrary, the expected reversal does not occur, and it turns out that the deteriorated performance was only the first sign of a serious long-lasting problem, the situation is further aggravated by the reversal of income-increasing DA. In such situations researcher would conclude ex-post that management recognized income-increasing accruals *opportunistically*, attempting to hide the deteriorating performance or postpone the bad news. The upshot is that, although at the moment of taking the accrual decision the CEO has similar purposes in both cases, the first case would be identified as informative while the second one as opportunistic. Hence, it appears to be difficult to distinguish the two types of behavior ex-post. To do it ex-ante, however, the researcher has to know whether at the moment of taking the accrual decision managers really believe that the performance will reverse or, on the contrary, it is likely to deteriorate further. As there is a range of probabilities between these two outcomes, and the beliefs are unobservable for the researcher, it seems impossible to differentiate between opportunism and informative content.

Given the above, it is important to choose a smoothing target so as to reflect the position of a manager at the moment the accrual decision must be taken. In this way we capture discretionary accruals regardless of whether future outcomes will make them look like opportunistic or informative. In fact, the proposition that firms smooth earnings towards some increasing linear trend is widely accepted in the literature. However, there is not a single common method of making this "line" operational. Some authors keep close to the definition and measure a firm-specific time trend by the OLS-fitted straight line (Hunt et al. (1996)). But such an ex-post approach implicitly assumes that at any moment in time managers know the earnings numbers of every sample period including the future ones. Others suppose the income is smoothed relative to its recent level or

some "mean" level. The first approach does not reflect the expectations of performance reversal and it is already captured by the objective of avoiding decreases. The second one requires a rather complicated model of long-term expectations, which is rather unlikely to be observed by management.

I use a much simpler proxy for the smoothing target, which is nevertheless quite likely to be close to what managers see in reality. It hinges on two observations. The first refers to the phenomenon of information decay, which suggests that in rapidly changing business environment the more distant years get little or no weight in performance measurement. The second follows from the going concern concept that makes managers consider the future performance and accrual reversals.[1] Given the basic geometry axiom saying that only one straight line can be drawn through two points, I measure the smoothing target as the point on the straight line that passes through previous year's reported earnings and next year's consensus analysts' forecast in two-dimensional time-earnings space. Algebraically the target for the current year is calculated as the simple average of earnings reported in the preceding year and the consensus forecast for the one-year-ahead earnings. I use the analysts' forecast for the next year as the closest proxy for the management's expectations at the moment of taking the EM decision. Quantifying the smoothing strategy in this way permits to define another "explanatory" variable for DA.

The smoothing target is conceptually different from those discussed previously. First, it is not directly observable. The fact that different authors measure it in different ways shows that FS users also do not have a precise and unique number to benchmark the reported earnings. Second, unlike the three targets, which are period-specific, the income smoothing has a dynamic nature. For example, for the analysts' forecast target the consensus on year *t-1* plays no role when the year *t* earnings are soon to be released. On the other hand, to determine whether the income stream is smoother or less smooth one must take

[1] The idea that managers that smooth earnings take into account the future outcomes was developed in Fudenberg and Tyrole (1995) and tested in DeFond and Park (1997).

into account several reporting periods. This particular nature makes the assumed behavior of managed numbers around the smoothing line quite different from what was described above. The management will no longer try to exactly meet or slightly beat the target but rather to get closer to it, given the cost-benefit trade-off. The reason is that although the target is the point on the straight line in a given year, no one expects a firm to achieve performance series that would be described by a precisely straight line. On the contrary, if any firm succeeds to report such a stream this would undoubtedly undermine the confidence of users in its value relevance. So, the firms are expected to try to reduce the volatility around this line but not to eliminate it completely. This also implies that reporting numbers slightly below and slightly above the point on the line should have a similar effect for the successful realization of the strategy. In such a case the assumption of a quadratic cost function is quite realistic.

Integrating the four targets discussed above in the expression (17) and supposing there are no other tactical objectives give

$$\begin{aligned} TA_t = {} & \gamma_1\left(CFO_t + \boldsymbol{B}'_m\boldsymbol{X}_m - AF_t\right) + \gamma_2\left(CFO_t + \boldsymbol{B}'_m\boldsymbol{X}_m - RE_{t-1}\right) + \\ & \gamma_3\left(CFO_t + \boldsymbol{B}'_m\boldsymbol{X}_m - ZE_t\right) + \gamma_4\left(CFO_t + \boldsymbol{B}'_m\boldsymbol{X}_m - SM_t\right) + \boldsymbol{B}'_m\boldsymbol{X}_m + \varepsilon_t \end{aligned} \quad (21)$$

where AF_t is the analysts' consensus forecast of earnings in period t, E_{t-1} stands for the earnings reported in the preceding period, ZE_t is always equal to zero as it models avoiding losses and SM_t refers to the smoothing target computed as $\left(RE_{t-1} + AF_{t+1}\right)/2$. The exact definitions of these variables as well as data sources are provided in the next section. Here, I return to other EM targets identified in the literature and explain why they are not included in the empirical model. The list of such targets includes those related to tax minimization, debt covenants, management forecasts, bonus plans and relative performance. Let us consider them in turn.

Consolidated accounts can be filed for tax purposes neither in Switzerland not in Germany. All companies in my sample prepare consolidated financial

statements according to IFRS. These statements are normally used for valuation purposes. At the same time, the parent company accounts are usually prepared according to the country law and firms are free to adjust the individual figures to achieve tax driven targets without any influence on the consolidated accounts. Therefore, EM as a tax minimization strategy can be excluded from my research design.

Cormier et al. (2000) report that specific debt covenants are not widely used in Switzerland. A similar role for debt covenants can be supposed for German companies. Traditionally, banks held important stakes in listed companies being the creditors and shareholders at the same time. Close control over executive management should largely diminish the importance of formal covenants. A close examination of the footnotes to FS of the sample companies suggests that only a few of them have covenants embedded in debt agreements.[1] Even though the debt covenant hypothesis cannot be completely ruled out, the measurement problems also contribute to the decision to disregard such a target. Thus, the debt-to-equity ratio, a standard proxy for a debt-related EM targets has been shown as a weak substitute for all different terms appearing in covenants (see Chapter 1, section 1.2).

Some papers investigated the existence of EM when pre-managed numbers fall short of some quantitative forecast made by management. The underlying incentives stem from the possible loss of reputation if the forecasts turn out to be inaccurate and the legal cost that may arise from suits by disappointed investors. I do not control for this target for the following reasons. Only a small percentage of firms issue quantitative forecasts (see Kasznik (1999), Kasznik and Lev (1995)). This proportion is expected to be even lower in Switzerland and Germany because of the traditionally lower disclosure culture. The threat of litigation is also insignificant because of a lower expected

[1] IAS 32, par. 49(j) requires disclosure of covenants that, if contravened, create a potentially significant exposure to risks. In practice, companies rarely disclose the exact terms of such covenants limiting footnotes to general statements.

reward for potential suitors under the code law as opposed to common law in the US.

The issue of compensation plans, and particularly of variable bonuses is more complicated. The executive compensation plans may include some accounting targets that are based either on GAAP or, more often, on some pro forma earnings that do not coincide with the four targets described above. If so, there is a risk that the actual EM behavior would not be captured by the TDM model unless the bonus bounds (see Healy (1985)) are not separately included as an alternative target. The problem is that precise compensation schemes of top executives are disclosed neither by Swiss nor by German companies, making this contractual target unobservable.[1] The recent literature presents evidence that the importance of equity compensation in the US has constantly increased relative to other compensation forms including bonus plans during the past ten years (see Gao and Strives (2002)). Accordingly, the EM behavior becomes more focused on stock market related targets as opposed to contractual bonus targets. The focus of the EM literature also followed the same direction.

IAS 19 requires the disclosure of equity compensation plans on aggregated level. From these disclosures, it can be noticed that the importance of options and stocks in executive compensation has significantly increased in recent years also for the companies in my sample. Thus, Novartis reports

> *"Globalization of labor market for specialists and executives has led to a rapid convergence between US and European principles of compensation and a stronger focus on long-term, equity based forms of programs… Long-term incentive compensation, in the form of share options, performance contingent shares, and restricted shares, comprises a major portion of the total compensation package for executives."*[2]

[1] Although in compliance with the Corporate Governance Directives applicable since 2002, Swiss companies disclose the amounts of variable compensation, the exact conditions that should be met in order to reap the bonus are rarely provided.
[2] Novartis, Annual Report 2002.

Hence, the importance of this unobservable target can be supposed to decrease in recent years. Nevertheless, to the extent that it influences EM decisions, the Target-Deviation Model will not capture this portion of DA.

Several papers suggested that earnings could be managed to achieve some industry average performance target (Kallunki and Martikainen (1999)). Some explain such a strategy by compensation plans that are based on comparison with competitors. Others refer to investors comparing performance across similar firms. Therefore, such a target can be seen as both contractual and market-driven. The relative comparison hypothesis is quite plausible, however, again the exact benchmark number is not observable and there may be several approaches to estimate the presumed target. It is not possible to know precisely for each firm in the sample who are its close competitors or peer firms that analysts select to compare the performance and how they adjust the numbers for comparability. Researchers usually use industry averages or medians as a proxy for the peer group benchmark. The problem with this approach is that industries must be taken at a quite narrow classification level to reflect the economic sense of the peer group comparison. As previously mentioned, selecting only IFRS-reporting firms results in a relatively low number of firms per industry. The competitors of the most of the sample firms are either using different reporting standards or traded on different exchanges or not traded at all. All these factors make the construction of a relative performance target extremely difficult. The presence of conglomerates operating in rather different segments further complicates the problem. To conclude, there are good reasons to believe that the relative performance target should not be important for the EM strategy. One reason is the absence of consensus on its definition and measurement. Otherwise, it may be a contractual unobservable target but the scarce disclosures of compensation plans that could be obtained from annual reports mention relative accounting performance in extremely rare cases. McNichols (2000) also suggests that relative performance evaluation is perhaps not very common.

After having selected the potential EM targets we now turn to the selection of variables potentially explaining the variation in normal accruals. Based on the discussion in section 2.1, I follow the recent trend in the literature by focusing exclusively on current accruals. Therefore, the discussion below is entirely dedicated to the variables presumably related to current normal accruals.

A natural starting point is the changes in revenues. The fact that the growth in working capital is closely related to the growth of a firm's turnover is known from basic courses of financial management or financial statement analysis. The more a firm sells, the higher credit sales are expected. Also, usually the growth is accompanied by increase in the material and/or other variable expenses. Hence, a growth in accounts payable, and in inventories for manufacturing companies, is expected. It is common to read comments like the following one in annual reports:

> *"Due to increased sales working capital was built up." Wella AG, Annual Report 2000, Notes to the cash flow statement.*

Dechow et al. (1998) formally derive the form of this relationship under a set of assumptions. In section 2.1 I mentioned the problems related to the time-series and cross-sectional estimation of this relationship. As time-series formulation virtually came out of use and would be, by no means, possible within this study (see the next section), I focus on the second approach. A potential alternative to the industry-based cross-sections may be seen in using the cross-sectional or the pooled formulation and controlling somehow for the possible differences in slope coefficients. Equation (8) in Dechow et al. (1998) explicitly shows that the slope coefficient in the linear relationship between WC accruals and changes in sales is closely related and, under some assumptions, is equal to the trade cycle of the firm. This measure equally called *operating cash cycle* is a function of the cost structure, technology and product nature. Thus, it can be expected to vary from firm to firm unless they produce exactly the same range of goods and

services with exactly the same technology and have similar markets and relationships with suppliers and distributors. This is unlikely to be true even within the same industry. There is some evidence that the cash cycle vary substantially within 2-digit SIC industries usually employed in EM studies. A number of papers (Dechow (1994), Barth et al. (2001)) recognize that the trade cycle length is a major factor in accrual generating process. However, no EM study, to my knowledge, explicitly incorporates this measure into DA models. If the firm-specific slope parameters are equal to the firm specific trade cycles, the cross-sectional restriction of common parameters can be relaxed by multiplying ΔREV_t by the firm-specific length of the trade cycle measured as a fraction of the period. In such a case the deviation from the industry or sample average is conditioned on the individual length of the cycle and the theoretical parameter is unconstrained and equals to one. This might seem a tautology as we do not observe the true cycle length, and the observable measure is itself affected my EM. This problem, however, can be substantially mitigated by using a firm-average length computed over several periods for each firm. For example, the trade cycle as a fraction of the year for firm *i* in period *t* is[1]

$$TCYC_{it} = \left[\frac{(AR_{it} + AR_{it-1})/2}{Sales_{it}}\right] + \left[\frac{(INV_{it} + INV_{it-1})/2}{COGS_{it}}\right] - \left[\frac{(AP_{it} + AP_{it-1})/2}{COGS_{it}}\right], \quad (22)$$

where $TCYC_{it}$ is the length of the trade cycle, AR_t and AR_{t-1} accounts receivable respectively at the end and at the beginning of the period. Similarly INV_t (INV_{t-1}) denotes the inventory balances at the end (beginning) of the period, AP_t (AP_{t-1}) refers to accounts payable, $Sales_t$ refers to revenues recognized during the period and $COGS_t$ to the cost of goods sold. It can be seen from (22) that if a firm manages its earnings, for example, through overstating year-end inventory,

[1] See Dechow (1994) or White et al. (2003).

$TCYC_{it}$ will be also overstated. However, the average $TCYC_i$ over several periods is

$$\left(\sum_{t=T-j+1}^{T} TCYC_{it}\right) \Big/ j = ATCYC_i \qquad (23)$$

where j is the number of periods over which the average is computed. Given that short-term accruals should reverse in the adjacent periods, EM effects are expected to cancel out. Other things being equal, the longer the period over which the average is taken the less likely is the contamination by EM.[1] The downside is that in longer periods the firm fundamentals and thus, the true cycle length are more likely to change. If a change is significant, $ATCYC_i$ would be a flawed measure of $TCYC_{it}$. I believe that a period of 3-5 years employed in this study provides an optimal trade-off between the two problems.

Since the current accrual measure used in this study includes other accounts (see section 2.4) in addition to those in (22), the cycle length should be adjusted accordingly. Also, since many firms in the sample present income statements classifying costs by nature[2], it is not possible to compute a comparable measure of COGS. Hence, the full *working capital cycle* for firm i in period t is computed as

$$WCCY_{it} = \left[\frac{\left(AR_{it} + AR_{it-1}\right) + \left(INV_{it} + INV_{it-1}\right) - \left(AP_{it} + AP_{it-1}\right) + \left(ONA_{it} + ONA_{it-1}\right)}{2 \times Sales_{it}}\right],$$

and

$$\left(\sum_{t=T-j+1}^{T} WCCY_{it}\right) \Big/ j = AWCCY_i \qquad (24)$$

where ONA_t denotes other current assets net of other current liabilities and the other variables are defined as previously. The use of sales instead of COGS in

[1] Over long periods earnings should be equal to cash flows. Also, note that discrepancies between balances and flows caused by changes in consolidation scope and currency translations also cancel out in multiperiod averages.

[2] IAS 1 allows presentation of costs by nature as well as by function. When the second approach is used the nature of significant items should be disclosed separately. The inverse, however, is not required.

the denominator is consistent with Dechow et al. (1998), assuming that, absent EM, shock to sales is the only factor of accrual variation. Since any of the corresponding assumptions made in this paper can be expected to be violated, additional control variables are necessary.

Another measure often suggested to be related to normal accruals is the changes in CFO (ΔCFO_t). Recall that since the TDM directly controls for DA in the estimation period, the possible correlation of CFO with the latter is no more an issue. The necessity of including this variable in the control vector can be demonstrated with a simple example. Suppose a firm in period t anticipates a future increase in material prices and builds up unusually high inventory stocks by buying at the cheaper prices in advance. This causes higher than usual cash outflows in period t, unless suppliers agree to extend credit terms. In period $t+1$ the firm uses the accumulated inventory, returning to the normal balances at the end of the period. The decrease in accruals is accompanied by a decrease in cash outflows as fewer inventories are purchased in $t+1$. Thus, the decrease in inventories is mirrored by an increase in operating cash flows, while the sales growth could be even zero. Based on the above observation, ΔCFO_t is included in the control vector.

As it was previously mentioned, not only the changes but also the levels of CFO_t were shown to be negatively correlated with accruals. Some portion of the correlation is expected to be captured by ΔCFO_t and ΔREV_t. The non-captured portion should be controlled for and the inclusion of the levels is warranted.

Dechow and Dichev (2001) show that besides current CFO_t levels, CFO_{t-1} and CFO_{t+1} are significant in explaining WC accruals. I do not include CFO_{t-1}

because it is captured by CFO_t and $\Delta CFO_t = CFO_t - CFO_{t-1}$. Obviously, the inclusion would cause a perfect collinearity in the model. CFO_{t+1} is not included for two reasons. First, this requires an additional year of data (see the next section), leading to a significant reduction in the number of observations.

Second, the purpose of the developed model is to examine the implications of EM for the valuation including the future performance. As Healy (1996) notes, the integration of any information that becomes known only in future periods would make the model useless for ex ante analysis and so, for timely valuation.

Dechow et al. (1995) document that the Jones model estimates of DA are correlated with earnings performance. Kasznik (1999) and Kothari et al. (2004) suggest to improve the specification through an adjustment of estimates by subtracting DA of a firm matched on performance and industry. Although such an approach may be effective if one seeks an evidence of EM in a small non-random sample, it is clearly inappropriate for our purposes. An alternative is to include a profitability measure as an explanatory variable in the regression. Doing so with the Jones-type models would be at least dubious. Even if we accept the hypothesis of no EM in the estimation period, then in the event period, earnings, unlike sales, would include by definition the whole amount of DA. This problem does not arise with the Target-Deviation Model, since DA is not estimated as a residual.

There might be a number of reasons for the performance to be related to normal current accruals. A quite tenable one is that when earnings are scaled by total assets, as it is usually done in EM studies, it becomes a potential determinant of the firms' growth. In particular, under assumptions of persisting profitability, constant leverage and constant payout ratio the sustainable growth rate (*SGR*) can be expressed as

$$SGR = ROE \times (1 - POR) = ROA \times \frac{TASS}{EQU} \times (1 - POR) \qquad (25)$$

where *ROE* is the return on owner's equity (*EQU*), *POR* is the dividend payout ratio, *TASS* is the firm's total assets and *ROA* stands for the profitability. The expression shows that in the presence of available investment projects, firms' growth rate is positively correlated with ROA. In turn, in order to support the

anticipated growth a firm is expected to invest in working capital. If the anticipated expansion is not reflected in the change in sales, the latter will not capture the positive correlation between ROA and WC accruals. Given the above I integrate earnings scaled by total assets in the control vector.

Dechow et al. (2003) add future sales growth to the Jones model in order to control for variation in normal accruals. The rationale is that firms anticipating sales growth will rationally increase inventory balances.[1] I see at least two problems with using the actual sales changes in period *t+1* as a proxy for the expected growth. First, as mentioned previously, the use of variables with values that become known only in the future undermines the practical utility of the model. Second, the actual growth in sales can turn out to be a very bad proxy for anticipated sales growth. A vivid example is Gretag Imaging, a Swiss technology company included in my sample. Encouraged by an impressive double-digit sales growth of the preceding periods, the firm built up high inventory levels in the second half of 2000. Prompted by the economic downturn, the company revenues slumped by more than 50% in 2001. Clearly, the sharp decrease in sales in 2001 is a poor proxy for the expected change and the model would fail to capture the high non-discretionary accruals of 2000.

The problem can be mitigated if, instead of using actual changes in revenues in period *t+1*, we approximate the anticipated growth by the difference between analysts' sales forecast and current period sales. Although the analysts' consensus may differ from the managers' opinion, the divergence is unlikely to be as large as in the example above. Also, since analysts' forecasts are made available before the release of actual numbers, the ex ante utility of the model is not undermined. Similar to the current ΔREV_t the anticipated revenue growth denoted $E\Delta REV_t$ should be multiplied by the firm-average WC cycle in order to allow for parameter variation.

[1] Note that the idea is similar to that of anticipated growth not reflected in current sales growth given in the context of ROA.

Having determined the list of earnings targets and the vector of control variables we can write the target deviation model as

$$\begin{aligned}\Delta WC_t = {} & \gamma_1\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - AF_t\right) + \gamma_2\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - ZE_t\right) + \\ & \gamma_3\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - RE_{t-1}\right) + \gamma_4\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - SM_t\right) + \boldsymbol{B}_5'\boldsymbol{X}_5 + \varepsilon_t\end{aligned} \tag{26}$$

with $\boldsymbol{B}_5'\boldsymbol{X}_5 = \beta_1\Delta REVCY_t + \beta_2\Delta CFO_t + \beta_3 CFO_t + \beta_4 ROA_t + \beta_5 E\Delta REV_t$.

ΔWC_t represents the total working capital accruals in period *t*. $\Delta REVCY_t$ is equal to the change in revenues in period *t*, multiplied by firm-average WC cycle computed as in (24). ΔCFO_t is the change in cash flows from operations from the previous period. CFO_t is the cash flows from operations in period *t*. ROA_t is the earnings in period *t* divided by total assets. $E\Delta REV_t$ is computed as the difference between analysts' consensus forecast of sales in period *t+1* and sales reported in period *t*, multiplied by firm-average WC cycle computed as in (24). Note that since we replaced total accruals with total WC accruals, cash from operations in the target-deviation terms should be also adjusted to include depreciation and other accruals assumed to be entirely non-discretionary. Although we will continue to refer to this measure as *cash flow* (CF), this is not entirely precise in the strict sense of the term. Thus, CF_t is simply the earnings' portion assumed to be unmanaged. The remaining variables are defined previously.

At this moment some further adjustments to (26) are necessary to make the theoretical grounds of the model more tenable. Remember that we recognized the asymmetry of the cost function around the first three targets to be inconsistent with the quadratic cost function. Using quadratic function is equivalent to imposing an equal coefficient on the target-deviation term for firms that exceed the threshold and those that fall short of it. Therefore, we can relax the restriction of symmetric cost by allowing the coefficient of firms with reported earnings above the target to differ from that of firms that miss the target

in a given period. This can be easily done by introducing dummy variables into the model.

Another assumption made for the derivation regards the relative importance assigned to each of the targets. Recall that the cost function in (7) describes the behavior of the management of one hypothetical firm. So, the weights α_1, α_2 and α_3 may be firm specific and differ from one firm to another and even from year to year for the same firm. Since the model must be estimated in a pooled sample the assumption of equal parameter values might seem quite unreasonable. However, to the extent that sample firms are drawn from the same institutional environment, two firms, having similar deviations of pre-managed earnings from two alternative targets, are likely to assign similar weights to each of them. This is expected because FS users in the same environment have similar conventions and rules. Nevertheless, managers of the firms, which are significantly far, above or below, from a particular target would rather give it little or no importance. For example, it seems unlikely that a highly profitable and stable firm gives any consideration to avoiding losses. The failure to relax this constraint can lead to serious misspecifications.

A convenient way of mitigating this problem is to assign a weight of zero to the deviation terms for the firm-periods in which the reported earnings are far above or far below a given target. In fact, the logic is similar to that used in some single-target studies, where EM is suspected in close intervals around the target (see e.g., Peasnell et al. 2000 and Dechow et al. 2003). The problem is how to define that "far" above or below. The mentioned studies usually focus on very small intervals of 1-2 percentiles of the earnings distribution below and above the target. When the purpose is to find an evidence of EM, focusing on small intervals increases the test power. In our case this is not appropriate as choosing a too small interval leads to assigning zero DA to firms that actually managed their earnings relative to that target. Yet another problem with focusing on very small intervals is related to the sample size. When the latter is relatively small, few observations are left in the 1-2 percentiles around some targets. This

may undermine the efficiency of the coefficient estimates of the corresponding deviation terms.

The trade-off between too large and too small intervals appears to be quite arbitrary. A logical reference point would be the maximal DA amount that could be recognized in a given reporting environment. A reasonable ceiling is the average earnings scaled by total assets in a large random sample. Thus, it seems unlikely that auditors could leave unnoticed an amount of manipulation higher than the average earnings in the economy. I adopt this approach to the choice of the interval, while additional estimation is carried out to check the sensitivity of results to wider and narrower intervals. With the introduced modifications the empirical Target-Deviation Model becomes

$$\begin{aligned}\Delta WC_t &= \gamma_1 DBEAT_t\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - AF_t\right) + \gamma_2 DMISS_t\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - AF_t\right)\\ &+ \gamma_3 DPROF\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - ZE\right) + \gamma_4 DLOSS_t\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - ZE\right)\\ &+ \gamma_5 DINC_t\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - RE_{t-1}\right) + \gamma_6 DDEC_t\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - RE_{t-1}\right)\\ &+ \gamma_7 DSMOO_t\left(CF_t + \boldsymbol{B}_5'\boldsymbol{X}_5 - SM_t\right) + \boldsymbol{B}_5'\boldsymbol{X}_5 + \varepsilon_t\end{aligned} \tag{27}$$

with $\boldsymbol{B}_5'\boldsymbol{X}_5 = \beta_1 \Delta REVCY_t + \beta_2 \Delta CFO_t + \beta_3 CFO_t + \beta_4 ROA_t + \beta_5 E\Delta REV_t$

$DBEAT_t$ = 1 if the reported earnings are equal to or greater than the consensus forecast by no more than the sample average *ROA*; otherwise $DBEAT_t = 0$.

$DMISS_t$ = 1 if the reported earnings are lower than the consensus forecast by no more than the sample average *ROA*; otherwise $DMISS_t = 0$.

$DINC_t$ = 1 if the reported earnings are greater than the earnings of the previous period by no more than the sample average *ROA*; otherwise $DINC_t = 0$.

$DDEC_t$ = 1 if the reported earnings are smaller than the earnings of the previous period by no more than the sample average *ROA*; otherwise $DDEC_t = 0$.

$DPROF_t$ = 1 if a firm reports profits lower than the sample average *ROA*; otherwise $DPROF_t = 0$.

$DLOSS_t$ = 1 if a firm reports losses lower in absolute value than the sample average *ROA*; otherwise $DLOSS_t = 0$.

$DSMOO_t$ = 1 when the earnings are within the sample average *ROA* from the smoothing target defined previously, no matter above or below; in the opposite case $DSMOO_t = 0$.

The other variables in (27) are defined previously.

Note that in the case of smoothing, as opposed to the other targets, there are no separate terms for earnings above and below the target. As we discussed previously, this follows from the consideration that cost increases symmetrically with the distance from the target regardless whether it is negative or positive. Generalizing the argument, we can broadly split earnings targets into absolute targets or thresholds and relative or smoothing targets. In the first case the cost function is nonsymmetric around the target and exceeding it is clearly preferred to falling short of. In the second case, the cost function is symmetric and only the absolute value of the distance matters.

The equation (27) is the final specification and the results on its estimation are reported in section 2.5. Here, as an upshot, I summarize the theoretically expected signs of the model parameters. β_1, β_4 and β_5 are expected to be positive because of the positive association between current and future sales growth and normal accruals. β_2 and β_3 are expected to be negative because the smoothing function of normal accruals causes negative correlation between them and operating cash flows. γ_1, γ_3 and γ_5 are expected to be negative because firms with reported earnings above the targets are expected to recognize positive DA when pre-managed numbers are below the targets and negative DA when they are above. γ_7 is also expected to be negative as firms manage the income upward when pre-managed earnings are below the smooth line and downward

when it is above. Finally, I make no special prediction about the signs of γ_2, γ_4 and γ_6. It is rather unlikely that any of the firms with negative reported deviation has a positive pre-managed deviation. Given a negative pre-managed deviation and the apparently high cost of exceeding the threshold, some firms may decide to recognize income-decreasing accruals, and hence, create reserves for tomorrow. Others might still recognize income-increasing accruals trying to reduce the negative gap. Finally, the trade-off between the two options may result in no EM for the third group of firms. Which of the effects prevails in a particular sample is an empirical question.[1]

2.4 Sample Selection and Data Collection

I begin the construction of the sample by identifying all Swiss and German firms, which are listed on Swiss (SWX) and German (Frankfurt Stock Exchange) stock exchanges, and which have presented their financial statements under the IAS framework since 1998 or later[2]. Financial firms and utilities are excluded, consistent with prior literature, since they are subject to special regulation. Further I exclude the firms, which changed the fiscal year-end during the sample period, the firms that went public after 1999 and those that switched to IFRS (IAS) after 2000. These filters are necessary in order to have at least 3 yearly observations for each firm. As the SWX does not require to present quarterly financial statements, I am constrained to using annual data. For most firms in the sample, 4 or 5 observations are available up to 2002. The selection results in a total of 115 firms and 500 firm-year observations almost equally

[1] The studies focusing on small intervals below targets expect to find here lower DA amounts than in the small interval above the target. Even if this is the case it does not mean the DA cannot be positive in this region. Moreover, as the focus is on a wider interval in this study, the possibility of income-increasing accruals when pre-managed earnings are below the target cannot be ruled out.

[2] The choice of the 1998 was motivated by a trade-off between a sufficient number of observations and consistency of accounting standards that have undergone significant evolution during the 90s.

distributed between Swiss and German firms. From 115 selected companies 29 were listed on the Neuer Markt (New Market) segment of the Frankfurt Stock Exchange. The segment was launched during the times of the technology boom in the 1990s in order to facilitate the access to stock markets. These firms have a number of particular characteristics.[1] While the other firms in the sample voluntarily switched to IFRS, it was required to choose between IFRS and US GAAP for the listing on Neuer Markt. The majority of the Neuer Markt companies in the sample are technology hardware and software firms that went public during the sample period. Many of them were strongly affected by the slump of the technology market in 2000-2002 and lost a substantial portion (up to 90%) of their IPO value.

It was suggested in the EM literature that IPO firms might have particularly strong incentives to engage in EM (Chaney and Lewis (1998), Theo et al. (1998)). The overrepresentation (29 of 115) of technology IPO firms in the sample may put into question its randomness in terms of EM incentives. This would undermine the generalizability of conclusions based on empirical results. Given the above, the analysis in the next section is carried out separately for the full sample and for the sample excluding Neuer Markt firms. The remaining sample consists of 86 firms with 385 firm-year observations.

Despite the disadvantages of this relatively small sample related to statistical inference, it permits a data collecting approach unique for EM studies. Thus, the observations on all accounting variables, except for those related to analysts' forecasts are obtained directly from the consolidated financial statements of the sample companies. This approach permits to overcome a number of problems related to using commercial databases. [2] Here I mention only a few for the sake of parsimony.

[1] As a result of a new segmentation, the Neuer Markt segment was closed in June 2003 (www.deutsche-boerse.com).

[2] The major sources of financial data on European companies are Blumberg, Reuters and Datastream. The researchers usually use the latter. All the following comments apply to all of them to a smaller or larger extent.

First of all, the databases lack observations for some sample firms on many accounting variables used in the study. Researchers employing US samples usually eliminate the firm-years with missing observations. This approach is not acceptable in the present case as the already relatively small number of observations will be further substantially reduced undermining the quality of the model estimates.

As discussed previously, the working capital changes obtained from the balance sheet as opposed to the cash flow statement may introduce substantial error due to acquisitions and divestitures as well as currency translation effects. Neither of the available databases provides data on the working capital accruals as reported in the cash flow statement.

McNichols (2000) notes that transactions like factoring, having rather financial than operating nature, distort the theoretical relationship between the sales changes and WC accruals. IAS 39 requires disclosure of terms and amounts of such operations. Several firms in the sample sell significant amounts of accounts receivable in such transaction classifying their effect in operating cash flows. Using the information in the notes, I undo the impact of receivables factoring on WC accruals reclassifying it in financing cash flows. A number of other adjustments made in order to mitigate the problems related to data were possible only through the careful analysis of financial statements. These are explained below.

ΔWC_t is obtained from cash flow statements as the change in net current assets reported in the section of operating cash flows. As all firms in the sample present cash flows using the indirect method, the observations are available for all the firms either in detailed or in aggregated form.[1] I exclude from this measure income tax accruals and other nonoperating elements if they are reported as a part of the working capital.[2] This is consistent with the prior

[1] Although the use of direct method is encouraged by IASB, none of the firms applied it during the sample period.

[2] In contradiction with IAS 7 some firms include in CFO clearly irrelevant items, such as interesting bearing liabilities or marketable securities. However, such violations are rather exceptions than a rule.

literature and some theoretical considerations. Where income tax accrual is not disclosed separately I compute it as the difference between current tax expense from the income statement and cash income taxes paid.[1]

To summarizes, ΔWC_t is computed as

$$\Delta WC_t = \Delta AR_t + \Delta INV_t - \Delta AP_t + \Delta OCA_t - \Delta OCL_t$$

where ΔAR_t is the change in trade receivables during the period, ΔINV_t refers to the change in inventories, ΔAP_t to the change in accounts payable, ΔOCA_t to the change in other current assets (OCA) and ΔOCL_t to the change in other current non-financial liabilities (OCL). The items most often included in OCA are prepaid expenses, recoverable VAT and usually insignificant miscellaneous items. Major items in OCL are accruals related to personnel, other accrued expenses, customer prepayments and miscellaneous operating liabilities. The sign of these items in the cash flow statement corresponds to their impact on CFO and not on earnings, and I multiply ΔWC_t by (–1) to preserve comparability with the existing studies.

ΔREV_t is computed as the change in net sales relative to the previous year from the income statement of year *t*. Computing changes using comparable information from statements of the same year, provides an advantage over the commercial databases. The latter usually contain levels of variables obtained from reports in the corresponding years. If a firm reclassifies some items, typically the values of the previous year are not adjusted in the database. Therefore, the first differences would be measured with error.

CFO_t is taken as the operating cash flow reported by firms. In contrast to US GAAP, IFRS do not specify whether the interest paid and received as well as the dividends received should be classified in the operating, investing or financing section of the statement. As a result, some firms classify all these

[1] Taxes paid should be disclosed separately in accordance with IAS 7.

items as operating cash flows, while others include the interests and dividends received in the investing section of the cash flow statement and interests paid in the financing section. To enhance the consistency in the definition of CFO across the sample firms, I reclassify these items in the operating cash flows for all the firms which do not apply this method.[1] ΔCFO_t is the difference between CFO_t and CFO_{t-1} from the year t annual report.

All the data related to analysts' forecasts are taken from the Thomson Financial - I/B/E/S Summary Tapes. Analysts usually release their forecasts after discontinuing operations, extraordinary items, and other items considered non-recurring are backed out. In order to see whether a firm actually met the expectations the reported numbers should be also adjusted for those items. I/B/E/S Data Research adjusts reported earnings to match analysts' forecasts and provides them in the Actual Data File.

When choosing the earnings targets I heavily relied on the financial market perspective of earnings management. If this perspective is correct, the primary opponents of the firm's management in the EM game are analysts' and investors. Since the adjusted numbers are the focus of the financial community, they should be considered as the object of EM and not the bottom line net income reported by companies.[2] Therefore, I take the values from I/B/E/S Summary Actual File for all reported earnings variables in (27). This also determines the computation of CF_t explained below. For 29 firm-years with missing I/B/E/S data, reported earnings are taken as earnings before extraordinary items as defined by IFRS.

AF_t is measured as the median analysts' forecast from I/B/E/S Summary Statistics 2003 File in the last statistical period before the earnings announcement. Usually this period corresponds to the first months of the following year for the firms with the fiscal period ending in December. Taking

[1] Such classification corresponds to the requirement of US GAAP.
[2] Bradshaw and Sloan (2002) show empirically that the Street earnings have displaced the GAAP earnings as the main determinant of stock prices in recent times.

the last statistical period permits to separate the potential effects of earnings management and expectations management (Bartov et al. (2000)). Also, by that time the management is likely to know, with quite a high precision, the pre-managed numbers and hence the magnitudes and signs of deviations from the targets. RE_{t-1} is measured as the actual earnings reported in previous year from I/B/E/S Actual Files. SM_t is computed as the average of RE_{t-1} and AF_{t+1}, which is the median analysts forecast for the following year from the first statistical period after the actual earnings in year t are released. Taking the closest statistical period helps to better approximate the management's expectations at the moment the decision on DA_t is made.

Observations on all the earnings variables collected from I/B/E/S database are collected from the Earnings per Share (EPS) Summary files. Since all the other variables in the model are scaled by total assets and not by the number of shares outstanding, I rescale all the per share measures. The observations in per share terms are multiplied by the average number of shares outstanding at the end of the corresponding period and then divided by total assets.[1]

Inasmuch as reported earnings are measured net of various non-recurring items, CF_t should also reflect these adjustments. Since the selection procedure assures that ΔWC_t does not contain items usually excluded by analysts, it is straightforward to compute CF_t as the difference between I/B/E/S actuals and ΔWC_t from the same accounting period. In this way CF_t includes depreciation and other long-term accruals assumed to be non-discretionary, but it does not include the items backed out by analysts.[2] However, there is yet another adjustment to be done. As the earnings targets are usually based on after-tax earnings numbers, the components of pre-managed earnings should be also expressed in after-tax terms. Consequently, CF_t is computed

[1] An alternative is to use the net income forecasts provided by I/B/E/S. However, significantly fewer analysts provide net income forecasts making the median a poorer proxy of market expectations. The anecdotal evidence also suggests that EPS is the focus of the financial community.
[2] Although analysts can exclude cash items deemed non-recurring, most often they undo the effects of large one-time write-offs, goodwill impairments, gains on asset sales and similar accruals.

as $CF_t = RE_t - (1-\tau)\Delta WC_t$, where τ is the corporate income tax rate. All the elements of the control vector $\boldsymbol{X}_5$ appearing in the target-deviation terms are also multiplied by (*1-τ*). So, NDA is also expressed after-tax in all the terms in parentheses in (27). τ is the statutory tax rate during the sample period equal to 38.36% for German companies and to 24.5% for Swiss companies.[1] Although the effective rates may differ from these statutory ones, the approximation is yet much better than if no adjustment at all is made.

Returning to the control vector $\boldsymbol{X}_5$, the two remaining variables, ROA_t and $E\Delta REV_t$ are computed using I/B/E/S data. In particular, ROA_t is computed by multiplying earnings from the EPS Actual File 2003 by the number of shares outstanding and dividing by average total assets.[2] As opposed to the bottom line net income, I/B/E/S numbers exclude if not all but many transitory items. If so, the measure should be more persistent and matches more closely the assumptions of the sustainable growth rate formula (25). Hence, it should be a better indicator of growth. $E\Delta REV_t$ is measured as the difference between the median sales forecast from I/B/E/S non-EPS Summary File and the net sales in year *t* reported by the firm. The sales forecasts are taken from the earliest statistical period after the end of the fiscal year *t*. Unfortunately, for many companies the earliest summary estimates are available only several months after the year-end. This makes the forecasts a poorer proxy for the managers' expectations of sales in *t+1* at the end of year *t*. For firm-years with no forecast available the anticipated change in revenues is set equal to zero, which is consistent with the often suggested random walk hypothesis (see Dechow et al. 1998). Finally, all accounting variables in (27) except for ROA_t are scaled by

[1] I/B/E/S reports that these rates were used by analysts contributing to the database and by I/B/E/S research when adjusting actuals (see "Accounting for Estimates: How Thomson Financial Handles Global Accounting Diversity" *Thomson financial, 2003 Edition, Europe*).

[2] Average total assets variable is computed as the average of total assets at the beginning and at the end of the year *t*.

average total assets in year *t*. Consistent with prior research, this is done in order to mitigate the heteroscedasticity problem.[1]

Table 1 shows the descriptive statistics of several variables included in the accrual model. In order to exclude the influence of extreme observations on the empirical results both samples are winsorized by deleting the top and the bottom one percent of observations on the main accounting variables. These are ΔWC_t, ΔREV_t, CFO_t, ΔCFO_t *and* ROA_t. After winsorizing there are 466 observations left in the full sample and 354 observations in the sample excluding Neuer Markt firms (the core sample hereafter).

In addition to the variables defined above, Table 1 reports statistics on net income before extraordinary items as reported by the firms ($NIROA_t$) and market values of equity at the end of the period (MV_t). The latter is computed by multiplying the year-end price by the number of shares outstanding. Share prices are obtained from *Thomson Datastream.*

Table 1. Descriptive statistics*

	Full Sample (N=466)					*Core Sample (N=354)*				
Variable	*Mean*	*Median*	*St.Dev*	*Min*	*Max*	*Mean*	*Median*	*St.Dev*	*Min*	*Max*
ΔWC_t	.014	.010	.058	-.159	.264	.009	.007	.037	-.144	.134
ΔREV_t	.065	.039	.177	-.587	.866	.040	.031	.116	-.346	.607
$AWCCY_t$	.199	.213	.116	-.112	.506	.210	.221	.104	-.112	.451
ΔCFO_t	.006	.005	.075	-.327	.295	.005	.005	.054	-.284	.236
ROA_t	.031	.040	.077	-.402	.204	.043	.046	.053	-.133	.196
CFO_t	.071	.081	.073	-.220	.297	.080	.086	.050	-.081	.213
$NIROA_t$	.027	.039	.091	-.531	.596	.040	.045	.072	-.442	.596
MV_t	4'344	346	15'688	3	119'234	5'676	672	17'799	6	119'234

* All variables except for MV_t are scaled by year-average total assets. MV_t is in EUR millions. The variables are defined in the text of the chapter.

[1] Most papers use scaling by lagged total assets. I believe that the use of year-average assets mitigates the discrepancies between stocks and flows that can be introduced by large acquisitions and divestitures. For example, if an important subsidiary is acquired in the first quarter of the year t most of its earnings in the year will be consolidated. Since the beginning period assets do not include the assets of the subsidiary, ROA is overstated introducing measurement error in the analysis.

The comparison of samples confirms that Neuer Markt firms are on average smaller and less profitable. They have both lower cash flow and earnings. The higher revenue growth of these firms during the sample period is explained by a triple-digit sales increase achieved by some of them immediately after the IPOs. Henceforth, I will focus on the core sample while interpreting the data and the empirical results, unless those differ significantly for the full sample. Table 1 shows that the mean and median WC accruals are positive and slightly below 1% of total assets. This could be expected given that the sample covers both years of market growth and decline. The mean $AWCCY_i$ is 20% of the year which roughly corresponds to the ratio of ΔWC_t to ΔREV_t. This corroborates the argument, that on average the regression coefficient on ΔREV_t should not deviate much from the length of the cash cycle. Also, the mean CFO_t is higher than the mean earnings, which is the consequence of always negative depreciation accruals. Earnings adjusted by analysts are slightly higher and less volatile than earnings reported by the firms. The lower volatility is consistent with the claim that analysts remove transitory items making earnings more relevant for valuation. Higher magnitudes indicate that analysts treat as non-recurring more negative than positive items. Such treatment can be explained by accounting conservatism documented in Basu (1997) together with reversal pattern demonstrated in Fama and French (2000). The alternative explanation is the expectation management by the firms that makes analysts exclude unfavorable information from their forecasts as suggested by Bradshaw and Sloan (2002).

The average ROA reported by the firms in the core sample is 4%. In order to facilitate the presentation, this same value is used to compute the dummy variables in (27) for both the core and the full sample. For example, *DBEAT* is set equal to one if $ROA_t \geq AF_t$ and $ROA_t < AF_t + 0.04$. Similarly, *DMEAT* is set equal to one if $ROA_t < AF_t$ and $ROA_t > AF_t - 0.04$.

Overall descriptive statistics suggest that the selected sample characteristics are comparable to those of the wide COMPUSTAT samples used in EM studies.

2.6 Empirical Results

In this section I report the results of estimating DA and NDA by the Target-Deviation Model (TDM). Given that the model is designed as an alternative to existing approaches, DA and NDA are evaluated by several alternative models. The first is the current version of the Jones Model that has gained substantial popularity in recent times (CJM). The regression is

$$\Delta WC_t = \beta_0 + \beta_1 \Delta REV_t + \varepsilon_t \tag{28}$$

Since the model is estimated using the entire pooled sample and not separately for each industry and year combination, it is theoretically inferior to the specification commonly used in the literature. To relax this coefficient constraint and enhance the comparability to the TDM, I estimate the model after adjusting the regressor by multiplying ΔREV_t by the $AWCCY_i$. Thus, the economy-wide formulation of the CJM (EWJM) becomes

$$\begin{aligned} \Delta WC_t &= \beta_0 + \beta_1 \Delta REVCY_t + \varepsilon_t \\ \Delta REVCY_t &= \Delta REV_t \times AWCCY \end{aligned} \tag{29}$$

Finally, in order to compare the results of the TDM with a simpler accrual model that only includes the variables supposed to explain the variation in normal accruals I estimate the regression

$$\Delta WC_t = \beta_0 + \beta_1 \Delta REVCY_t + \beta_2 \Delta CFO_t + \beta_3 CFO_t + \beta_4 ROA_t + \beta_5 E\Delta REV_t + \varepsilon_t \tag{30}$$

Since the fitted values of the regression correspond to the portion of total accruals that can be expected given the regressor values, the residuals can be regarded as unexpected accruals. Therefore, below I refer to this regression as the unexpected accruals model (UAM).

Table 2. Pairwise correlation coefficients

Panel A. Pearson and Spearman correlation coefficients for the (core sample)

	ΔWC_t	ΔREV_t	$AWCCY_i$	$\Delta REVCY_i$	CFO_t	ΔCFO_t	ROA_t	$E\Delta REV_t$	CF_t	AF_t
ΔWC_t	1	.346**	.109**	.379**	-.191**	-.360**	.383**	.195**	.142**	.338**
ΔREV_t	.276**	1	-.024	.886**	.273**	.131*	.440**	.215**	.287**	.411**
$AWCCY_i$	.107*	-.093	1	.191**	-.025*	-.009	.166**	.223**	.092	.163**
$\Delta REVCY_t$	.353**	.831**	.123*	1	.242**	.131*	.449**	.294**	.276**	.425**
CFO_t	-.185**	.278**	-.015	.256**	1	-.546**	.584**	.269**	.771**	.531**
ΔCFO_t	-.348**	.112*	.032	.117*	.570**	1	.146**	.123*	.369**	.123*
ROA_t	.437**	.395**	.150**	.416**	.577**	.174**	1	.334**	.810**	.860*
$E\Delta REV_t$	.169**	.118*	.229**	.174**	.199**	.086	.210**	1	.249**	.362**
CF_t	-.077	.286**	.107*	.266**	.744**	.388**	.862**	.138**	1	.701**
AF_t	.396**	.359**	.148**	.394**	.562**	.183**	.884**	.217**	.755**	1

Panel B. Pearson and Spearman correlation coefficients (full sample)

	ΔWCt	ΔREV_t	$AWCCY$	$\Delta REVCY_t$	CFO_t	ΔCFO_t	ROA_t	$E\Delta REV_t$	CF_t	AF_t
ΔWC_t	1	.424**	.166**	.413**	-.304**	-.358**	.316**	.202**	.243**	.265**
ΔREV_t	.420**	1	-.037	.856**	.118*	.104*	.355**	.284**	.109*	.311**
$AWCCY_i$	.209**	-.075	1	.227**	-.057	-.021	.176**	.290**	.059	.176**
$\Delta REVCY_t$	.473**	.718**	.244**	1	.101*	.087	.391**	.400**	.137**	.348**
CFO_t	-.385**	.039	.083	.010	1	-.513**	.519**	.149**	.766**	.493**
ΔCFO_t	-.426**	.053*	-.001	.042	.518**	1	.077	.092*	.317**	.084
ROA_t	.282**	.251**	.173**	.301**	.538**	.093*	1	.290**	.769**	.862*
$E\Delta REV_t$	.330**	.221	.324**	.454**	-.074	-.006	.160**	1	.149**	.299**
CF_t	-.220**	.049	.072	.069	.741**	.313**	.873**	.004	1	.681**
AF_t	.227**	.213**	.163**	.291**	.540**	.143**	.876**	.151**	.772**	1

* Correlation is significant at the .05 level (2-tailed)
**Correlation is significant at the .01 level (2-tailed)
***Pearson coefficients are below diagonal and Spearman coefficients above diagonal

The first two models are expected to be misspecified in terms of EM detection because a number of relevant variables are omitted. The third is either

misspecified because of the exogeneity problem or because the explanatory variables include DA in the event period.

NDA (DA) estimated by the three models exposed above are computed as fitted values (residuals) of the OLS estimation. So, all of them are Jones-type models in the sense provided earlier (see section 2.1).

Note that all the above accrual models include an intercept term in the regression. Although the original Jones Model does not include a constant term, the recent applications do. There are no particular theoretical grounds for including an intercept. When using the OLS procedure the intercept forces DA to be zero in the estimation sample. There is no much comment in the literature on empirical properties of the constant term. The specification issue seems to be the primary concern. In order to enhance the comparability of the TDM with the Jones-type models, it is also estimated with an intercept in (27).

Table 2 reports the simple pairwise correlation coefficients between the regressors and regressands in the estimated accrual models. Panel A presents the correlations for the core sample and Panel B for the full sample. Pearson correlation coefficients are below the diagonal and Spearman coefficients above the diagonal. Since Spearman coefficients do not tell us a much different story, the discussion focuses on Pearson correlation unless mentioned otherwise. Beginning with the core sample, we can see that all the variables supposed to control for NDA (control variables henceforth) in (27), are individually significantly correlated with ΔWC_t. Moreover, the signs of all coefficients correspond to the theoretical predictions. ΔREV_t does not have the highest individual correlation with ΔWC_t. When adjusted for the operating cycle length the correlation increases from .276 to .353. Also, the coefficients of ΔCFO_t and ROA_t have higher absolute magnitudes.

The high correlation with ROA_t can be attributed to the fact that ΔWC_t is virtually a component of earnings or to ROA_t being an indicator of growth. The significantly positive correlation of ROA_t with anticipated revenue changes

(Pearson .21 and Spearman .33) speaks in favor of the growth hypothesis. The correlation between ROA_t and current revenue changes is also positive and quite high (about 40%). Most regressors are significantly correlated between each other, but the correlation magnitudes are sufficiently low not to raise collinearity problems. Among other relationships it is worthy to note the low correlation between ΔWC_t and CF_t, which is actually a measure of earnings before WC accruals. The highest correlation coefficient in the table is between forecasted (AF_t) and actual (ROA_t) earnings. The Pearson coefficient of .884 witnesses that the earnings surprises, the difference between these two numbers, are quite small. The estimation of the TDM should show whether EM contributes to reducing the magnitude or/and the frequency of these surprises.

Panel B of the table suggests that most of the correlations are quite similar in the full sample. Nevertheless there are some interesting differences. For example, in the second column the correlations of all the control variables with ΔWC_t have higher magnitudes compared with those in Panel A with the exception of ROA_t. For example the coefficient corresponding to changes in revenues is the highest (.473) after adjusting for cycle length.

On the other hand, the coefficient of ROA_t is somewhat lower that in Panel A. A possible explanation for these differences might be the extreme changes in revenues of small software and media firms of the Neuer Markt. At the same time, the highly unstable profitability of these firms could hardly make it a good indicator of growth. Note that the correlations of ROA_t with both current and future revenue changes are also somewhat lower than in Panel A. Another remarkable difference of the full sample is the close to zero and insignificant correlation of revenue growth with levels and changes of cash flows from operations. One potential reason for the difference is that revenue changes are mostly non-cash, which is a symptom of premature or fictitious revenue recognition. Another possible explanation can be seen in changes in cash expenses disproportionate to changes in revenues. This may be caused

either by poor cost management or by industry-specific problems of matching revenues with expenses.

Whether the differences between the Neuer Markt firms and the core sample are due to EM activity or to industry-specific operating features, estimating the accrual models separately within each sample seems to be warranted. The main conclusions are inferred from the results based on the core sample, in order enhance their generalizability. Table 3 provides the results of estimating the 4 accrual regressions in order of complexity, beginning from the simplest CJM in Panel A. The main regression statistics are reported in the left part for the core sample and in the right part for the full sample. Since scaling by total assets does not completely eliminate the heteroscedasticity problem, White's standard errors of the coefficients are reported instead of the classical OLS estimates (column 3 and 6). In the 4^{th} and 7^{th} columns of Table 3, I report the p-values, the smallest probabilities at which the hypothesis that a coefficient estimate is zero, can be rejected.

As it could be expected based on pairwise correlations, the slope coefficient in CJM model is positive and significantly different from zero (.01 level). The intercept is also significant but quite close to zero. The adjusted coefficient of determination (R^2) is quite low (.073), suggesting that the model classifies the major portion of accrual variation as discretionary. The statistics are comparable to those reported in prior studies.

Explanatory power increases after the adjustment for the operating cycle length by about 5%. The slope coefficient in the EWJM moves closer to, but remains significantly different from the theoretical value of 1, expected under the assumptions made in Dechow et al. (1998). This suggests that factors other than sales shocks systematically affect current accruals.

Panel C provides the regression output of the UAM model. When all the identified regressors are included the explanatory power soars to 55 %. This is rather high compared to the cross-sectional specifications estimated in previous studies. All the explanatory variables are significant at .01 level.

Table 3. Regression of current accruals: estimation results*

	Core Sample (N=354)			Full sample (N = 466)		
Panel A. CJM (equation 28)						
Coef.	*Value*	*Std. Error*	*Prob.*	*Value*	*Std. Error*	*Prob.*
β_0	.005	.002	.010	.005	.002	.016
β_1	.088	.029	.003	.137	.022	.000
R^2 *(adj)*	.073			.175		
Panel B. EWJM (equation 29)						
Coef.	*Value*	*Std. Error*	*Prob.*	*Value*	*Std. Error*	*Prob.*
β_0	.005	.002	.011	.005	.002	.038
β_1	.519	.107	.000	.815	.120	.000
R^2 *(adj)*	.122			.222		
Panel C. UAM (equation 30)						
Coef.	*Value*	*Std. Error*	*Prob.*	*Value*	*Std. Error*	*Prob.*
β_0	.017	.003	.000	.026	.003	.000
β_1	.317	.068	.000	.530	.081	.000
β_2	-.131	.041	.001	-.157	.041	.000
β_3	-.397	.056	.000	-.423	.053	.000
β_4	.467	.061	.000	.363	.057	.000
β_5	.110	.035	.002	.068	.041	.092
R^2 *(adj)*	.547			.596		
Panel D. TDM (equation 27)						
Coef.	*Value*	*Std. Error*	*Prob.*	*Value*	*Std. Error*	*Prob.*
β_0	.007	.001	.000	.005	.002	.002
β_1	.464	.127	.000	.830	.159	.000
β_2	-.113	.063	.071	-.211	.094	.025
β_3	-.276	.062	.000	-.296	.071	.000
β_4	.293	.085	.001	.194	.069	.005
β_5	.152	.053	.004	.035	.043	.412
γ_1	-.722	.106	.000	-.926	.095	.000
γ_2	-.502	.078	.000	-.628	.077	.000
γ_3	-.334	.069	.000	-.381	.085	.000
γ_4	-.182	.169	.282	-.307	.111	.006
γ_5	-.546	.143	.000	-.464	.126	.003
γ_6	-.111	.068	.103	-.027	.062	.659
γ_7	-.184	.066	.006	-.262	.063	.000
R^2 *(adj)*	.852			.865		

* The regressions (28), (29) and (30) are estimated by OLS. (27) is estimated by NLLS using the Gauss-Newton optimization algorithm. Standard errors are heteroscedasticity consistent.

The signs of the coefficients correspond to those of univariate correlation coefficients in Table 2 and hence, to theoretical predictions. These signs, however, can be driven both by the correlation with NDA and by a possible association with DA. Also, the intercept estimate is more than three times higher than in panels A and B. Such a high value (1.7% of total assets) can be hardly justified theoretically and might be a symptom of misspecification.

The coefficient on $\Delta REVCY_t$ (β_1) gets smaller after the inclusion of other variables. This is explicable by ROA_t and $E\Delta REV_t$ accounting for a portion of the growth factor. The coefficient on the ROA_t is the highest and most significant.

Panel D reports the coefficients and related statistics from the estimation of the TDM model.[1] The explanatory power climbs further by about 30% relative to UAM. This is consistent with the target-deviations capturing a portion of variation in WC accruals. However, some caution is necessary in interpreting such an increase in the determination coefficient. As explained later in this section, if some of the assumptions inherent to the model are violated we can observe an increase in R^2 even in the absence of EM.

The coefficients on control variables are somewhat different from those in Panel C. For example, the coefficient on ΔCFO_t is no more significant at .05 level. Also, the coefficient on adjusted revenue changes is larger that in the UAM model, while those on ROA_t and CFO_t are lower. The decrease can be explained by the fact that the correlation of ΔCFO_t and ROA_t with DA_t is now captured by the variables that determine EM amounts. When CFO_t is excluded from the model the coefficient on ΔCFO_t becomes highly significant. It seems that the two cash flow variables capture the same variation in normal accruals but they are related in a different way to DA.[2] The intercept is closer to the values in the CJM and the EWJM but it is still highly significant.

[1] Convergence is achieved after 15 iterations, when all starting values are set to zero. The results are insensitive to the choice of starting values, so there is substantial evidence that the global minimum is attained.

[2] Of course, the loss in significance can come from a loss in efficiency caused by nonlinear approximation or/and the loss of degrees of freedom due to inclusion of additional regressors. Given the size of the sample this possibility seems rather unlikely.

The estimates and the related statistics of the target-deviation coefficients, strongly confirm the hypothesis of the EM existence around these targets. Thus, γ_1, γ_3 and γ_5 are negative and highly significant. This is consistent both with firms managing earnings up to exceed the thresholds and firms with pre-managed earnings far above a target recognizing income-decreasing accruals to create reserves. The coefficient on the deviation from the smoothing target is also negative and significant at .01 level.

The coefficient estimates on "negative target-deviations", γ_2, γ_4, and γ_6, also confirm that the discontinuity around these absolute targets is, at least in part, attributable to EM. The target-deviation coefficients for the loss firms and firms with decreased earnings, γ_4 and γ_6, are not different from zero at conventional significance levels. As it was predicted, when reported numbers are below these targets, it is most likely that so were the pre-managed ones. In this situation no clear EM objective can be discerned. The insignificant coefficients are consistent with no EM on average in these regions. In contrast to avoiding decreases and losses, firms that miss analysts' expectations still appear to recognize income-increasing DA. γ_2 is -.5 and significantly different from zero.

Notice, however, that the observed discontinuity just below the thresholds and the following assumption of asymmetric cost function do not imply that there is no upward EM in these regions. In order to explain the discontinuity by recognition of DA, we need that the magnitudes of DA will be higher for firm-years above the threshold than for those below, for a given magnitude of pre-managed deviation from the target. Thus, the coefficient of the target-deviation term for the firms that meet and beat the consensus should be higher than that for firms, which miss the forecast. The null hypothesis $\gamma_1 = \gamma_2$ is rejected by the Wald χ^2 test at .01 level in favor of $\gamma_1 > \gamma_2$. The null of $\gamma_5 = \gamma_6$ is also easily rejected in favor of $\gamma_5 > \gamma_6$. The test, however, fails to reject $\gamma_3 = \gamma_4$. The failure can be attributed to the high standard deviation of γ_4 that results from the small

number of observations for which *DLOSS*=1. We return to this problem in the sensitivity analysis in the next section.

To summarize, the estimation of the TDM model shows en evidence of EM around the four earnings targets. The results are consistent with DA explaining the previously observed discontinuities around analysts' consensus forecast and previous period earnings. The evidence is somewhat mixed in case of the zero threshold.

The highest coefficient in Panel D is on the deviation from the analysts' consensus for the firms that meet or beat the forecast. Since the magnitudes of the coefficients were derived as a function of importance assigned by management to the corresponding target, analysts' expectations seem to be a priority. The evidence is consistent with the results in Brown and Caylor (2003), showing that managers reorder their threshold priorities in recent years and give more importance to avoiding negative earnings surprises.

The results of estimating the accrual models using the full sample are mostly consistent with those for the core sample. The explanatory power is about 10% higher in panels A and B but it is almost the same in the UAM and the TDM models. The coefficient on $\Delta REVCY_t$ is higher (.83 in TDM) and it is not significantly different from unity in the EWJM and the TDM models. At the same time the coefficient on ROA_t is much lower and that on $E\Delta REV_t$ is not significant at all. This suggests that for some firms contemporary sales shock is a better proxy for growth than for others. As opposed to the core sample results ΔCFO_t remains significant when target-deviation terms are included, though only at .05 level.

The inference from the coefficients on the target-deviations is similar to conclusions based on the core sample, except for the term corresponding to *DLOSS*. γ_4 are significantly different from zero and not significantly different from γ_3. Again there is no sufficient evidence that the cost function is asymmetric around zero earnings, in spite of the evidence that the target affects

EM decisions. Hence, the zero target seems to behave like a relative rather than an absolute target.

It is worth mentioning several factors that can explain the evidence of income-increasing EM by firms that reported earnings below the thresholds.[1] First of all, if the cost of falling short of the target significantly decreases with the magnitude of the deviation, it may be optimal to pump the earning up, without being able to cross the threshold. This would explain the significance of coefficients on the terms multiplied by *DMISS* and *DLOSS* in the TDM, but not the equality of γ_3 and γ_4.

Degeorge et al. (1999) analyze two cases, depending on whether a manager knows the latent, that is, the pre-managed earnings precisely or imprecisely when she selects DA magnitudes. In the second case, when pre-managed earnings end up much below the management's expectations, reported earnings may fall short of crossing the threshold even in the presence of upward EM. Nevertheless, I believe that such cases must be rather exceptional than widespread.

A more plausible explanation can be seen in the existence of overlapping targets. Until now we assumed that the only object of EM is the net income number after adjustments made by analysts. However, firms may choose to manipulate some other earnings measures, such as, for example, the operating income. This might be particularly tenable in the case of the zero target. If it is too costly to manage the net income up to positive numbers, operating income, which usually excludes mostly negative elements such as interests and taxes, might be much closer to zero. Since the two concurrent earnings measures are expected to be highly correlated, so should be their corresponding pre-managed deviations. As a result the firm-years with *DLOSS* = 1 would recognize income-increasing DA proportional to the magnitudes of the respective deviation. The TDM is quite flexible to allow testing for the existence of such concurrent

[1] We assume as previously that it makes no sense for a firm having pre-managed earning above a target to recognize income-decreasing DA so as to fall below that target.

targets or, in other terms, for alternative objects of EM. In the above case only CF_t should be adjusted in the additional target-deviation term. Searching alternative EM objects is, however, beyond the scope of this thesis and is left for the future research. Below we go on to the main purpose of this study, the estimation of DA magnitudes.

In Panel A of Table 4 I report descriptive statistics of the DA and NDA measures estimated by the accrual models using the core sample. Panel B reports pairwise correlation coefficients between the accrual variables.[1] The analog of Table 4 for the full sample is provided in Annex B.

Since the estimates of the CJM and the EWJM are quite similar (correlation between DA estimates equals 97%), only the statistics from the EWJM are reported to facilitate the presentation. DA (NDA) values are taken as the regression residuals (fitted values) from the EWJM and the UAM. (18) and (19) are used to computed the TDM estimates. The residuals from the TDM are defined as unexpected accruals (UEA). ΔWC_t is included in the table for the purpose of comparison.

Not surprisingly, since the regressions include an intercept, the mean DA estimated by the EWJM and the UAM is equal to zero. The corresponding medians are also close to zero. The mean DA estimated by the TDM is, however, statistically different from zero, even though it amounts to only 0.6% of total assets. In the presence of a significant intercept it is quite difficult to interpret the mean values of DA and NDA in the sample. Consistent with prior research this "average" amount is attributed to NDA. Nevertheless, there are no clear theoretical reasons for attributing such a constant either to NDA or to DA.

Another possible reason for a positive mean is the asymmetry of the cost function around some of the targets. Such an asymmetry suggests that the magnitudes of upward EM may be higher on average. This does not mean that earnings are constantly overstated during a period of several years in a relatively

[1] Index *t* is suppressed to simplify the presentation.

wide sample of firms. Simply, the income-decreasing reversals of positive DA would not be captured by the model if they were not related to any of the target-deviation terms. The mean values can be also influenced by the bounds of the EM range around the targets. The issue is examined in the next section. In any case, even if the small deviation from zero is caused by some measurement bias, is should be largely compensated by smaller estimation errors for each firm-year value.

The standard deviations of the estimated accrual components clearly show that EWJM attributes most of the variation in ΔWC_t to DA, while the other two models produce a roughly similar variation for DA and NDA. DA estimated by the TDM has the lowest standard deviation. The range of individual DA estimates is also smaller for the TDM than for the EWJM and it is substantially smaller than the range usually produced by the Jones Model in large COMPUSTAT samples. The last row of Panel A shows the median ratio of the estimated accrual component to ΔWC_t.

Xie (2001) argues that in spite of the high correlation of total accruals and abnormal accruals, the latter is not the major component of accruals in his sample. The argument is based on the mean (median) ratio of abnormal accruals to total accruals equal to 0.37 (0.46). The results in Panel A suggest that the documented feature may be entirely attributed to depreciation accruals.[1] When this much more stable and at the same time the biggest in magnitudes (on average) component is excluded from the model, the median ratio is 0.75.[2] Such a high proportion is, of course, unrealistic and casts doubt on the very usefulness of accrual accounting. The median proportion of DA is much smaller (about 39%) for the UAE model. It is about 46% for the TDM, which is consistent with the UAM attributing some portion of DA to the non-discretionary component. Finally, the unexpected accruals represent the smallest portion of the total (7%).

[1] The unreported results taking depreciation accruals into account confirm this argument.
[2] It is even higher for the CJM model (not reported). I do not compute mean ratios as they are strongly influenced by outliers resulting from division on close to zero values of ΔWC.

Although the magnitudes assigned to abnormal accruals relative to ΔWC might still appear excessively high, they are much more realistic than those estimated by the EWJM.

Table 4. Descriptive statistics of estimated accrual measures for the core sample

Panel A. Descriptive statistics

	DA_{EWJM}	DA_{UAM}	DA_{TDM}	NDA_{EWJM}	NDA_{UAM}	NDA_{TDM}	UEA_{TDM}	ΔWC_t
Mean	.000	.000	.006	.009	.009	.002	.000	.009
Median	-.001	.001	.007	.007	.009	.002	.000	.007
Max	.109	.079	.069	.063	.100	.076	.082	.134
Min	-.159	-.093	-.114	-.038	-.093	-.086	-.048	-.144
St. Dev.	.035	.025	.022	.013	.027	.023	.014	.037
Med. Ratio	.750	.389	.460	.250	.611	.425	.069	1

Panel B. Correlation coefficients***

	DA_{EWJM}	DA_{UAM}	DA_{TDM}	NDA_{EWJM}	NDA_{UAM}	NDA_{TDM}	UEA_{TDM}	ΔWC_t
DA_{EWJM}	1	.734**	.749**	.071	.570**	.490**	.341**	.921**
DA_{UAM}	.714**	1	.804**	.047	.041	.040	.443**	.695**
DA_{TDM}	.759**	.787**	1	-.048	.159	.111*	-.002	.657**
NDA_{EWJM}	.000	.000	-.109*	1	.494**	.628**	.055	.379**
NDA_{UAM}	.617**	.000	.197**	.474**	1	.973**	.037	.699**
NDA_{TDM}	.526**	.000	.131*	.645**	.967**	1	.011	.674**
UEA_{TDM}	.423**	.538**	.000	.040	.068	.052	1	.341**
ΔWC_i	.936**	.668**	.672**	.353**	.744**	.720**	.410**	1

* Correlation is significant at the .05 level (2-tailed)
**Correlation is significant at the .01 level (2-tailed)
***Pearson coefficients are below diagonal and Spearman coefficients above diagonal

Looking at the correlations in Panel B, we further notice that the TDM model provides quite a different measure of reporting discretion. Even though the correlation coefficient between DA estimated by the EWJM and the TDM is quite high and significant (.76), such a value is hardly surprising given that both measures are highly correlated with ΔWC. Nevertheless, most of the alternatives to the Jones Model suggested previously, produce, as a rule, DA values, which

have a correlation above 95% with the estimates produced by the basic model.[1] This suggests that the TDM estimates can potentially produce a materially different inference from EM tests. NDA estimated by the EWJM is relatively weakly correlated with that produced by the other two models (.47 for UAM and .65 for TDM). The estimates from the UAM and the TDM are very close with Pearson coefficient of .97. The high correlation between ΔWC and DA_{EWJM} is the result of the low explanatory power in Panel A of Table 3. It suggests that the model does not provide much improvement over a simple approximation of DA by TA.

The correlation between DA and NDA estimated by residual-based models are constrained to zero by orthogonality conditions. In contrast, the TDM procedure provides a unique opportunity to measure the correlation between the two components, without cautioning against the possibility of spurious correlations (see Subramanyam (1996), p. 268). A number of papers discussed the theoretical relationship between DA and NDA. Under the smoothing hypothesis negative correlation is usually predicted. Guay et al. (1996) provide settings in which DA and NDA may be positively correlated. In any case, predictions are usually based on the hypothesis about the association of DA to pre-managed earnings. However, if the variation of pre-managed earnings is dominated by variation in the cash flow component, then the two correlations may have different signs.[2] This happens because both DA and NDA are supposed to be negatively correlated with cash flows.

The correlation coefficient between DA and NDA estimated by the TDM is positive and significant at .05 level. The magnitude of the coefficients is quite low, however. The positive sign is consistent with the smoothing hypothesis. The natural smoothing provided by GAAP makes NDA high when CFO is low.

[1] A lower correlation is obtained only between estimates of the cross-sectional and the time-series specifications.
[2] More precisely, the correlation between pre-managed earnings and DA will be negative, but the correlation of NDA and DA will be positive.

If the natural smoothing is not sufficient additional positive DA are recognized. Similarly, when CFO is high, both NDA and DA are low.

The only negative coefficient in Panel 2 is the one between DA_{TDM} and NDA_{EWJM}. A possible inference here is that accruals, which vary with revenue growth, have somewhat different properties from those captured by other regressors.

The results for the full sample are in their majority similar to those discussed above. The correlation of DA_{TDM} and DA_{EWJM} is even lower than in the core sample (.68). The correlation of NDA_{TDM} and DA_{TDM} is not significantly different from zero. Also DA_{TDM} has the lowest correlation with ΔWC among the estimates of the three accrual models.

To get further insights into the properties of the estimated accrual components Table 5 reports the pairwise correlations of DA and NDA with several performance measures. Only parametric Pearson coefficients are provided.

Table 5. Correlation between estimated accruals and performance measures

	DA_{TDM}	DA_{UAM}	DA_{EWJM}	NDA_{TDM}	NDA_{UAM}	NDA_{EWJM}	PME_{TDM}	PME_{UAM}	PME_{EWJM}
ROA	.074	.000	.310**	.544**	.587**	.416**	.917**	.887**	.626**
CFO	-.176**	.000	-.294**	-.184**	-.248**	.256**	.662**	.852**	.973**
PME_{TDM}	-.237**	-.333**	-.060	.352**	.384**	.339**	1	.860**	.684**
PME_{UAM}	-.067	.000	.043	.340**	.295**	.508**		1	.898**
PME_{EWJM}	-.186**	.000	-.268**	-.016	-.115*	.470**			1

* Correlation is significant at the .05 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)

The new variables in the table are the estimates of pre-managed earnings based on the three accrual models. PME_{TDM} is obtained by adding after-tax NDA estimates to CF_t. PME_{UAM} (PME_{EWJM}) is computed as a sum of CFO_t and NDA_{UAM} (NDA_{EWJM}). All NDA measures are positively and significantly correlated with earnings, which comes at no surprise. Among the measures of pre-managed earnings the highest correlation with ROA corresponds to that

produced by the TDM model. This implies that DA estimated by the latter cause the least distortion in reported earnings. Earnings (ROA_t) are not correlated with DA_{UAM} by construction.

The high positive correlation of ROA_t with DA_{EWJM} is clearly caused by a large portion of NDA erroneously included in this estimate. The correlation with DA_{UAM} is positive but not significant. This is consistent with DA neutralizing the fluctuations in earnings. For the same reasons as above, cash flow from operations is significantly negatively correlated with $DA_{EWJM.}$ Previous research (Dechow et al. (1995)) attributed this negative correlation to a misspecification of the Jones Model. Only in case of the TDM we can argue that the negative correlation of -.176 is caused by DA and not by erroneously included NDA. The same applies to the negative correlation between pre-managed earnings and DA. In the case of the EWJM, it can be produced by the natural smoothing, since a large portion of normal accruals appears in DA_{EWJM} instead of PME_{EWJM}. The UAM model is obviously not an acceptable solution due to the misspecification caused by omitted variables. Imposing orthogonality of performance and DA does not allow for the negative association between EM and the underlying performance. This contradicts to the theoretical relationship suggested by numerous authors.

Summarizing the results of this section, we can conclude that the overall empirical evidence speaks in favor of the Target-Deviation Model. First, it allows to provide evidence of EM around the selected targets and thus, to get an insight into objectives of managers. Second, it produces magnitudes of EM, which are more realistic than those estimated by existing techniques. Third, the properties of the produced estimates, such as the relationship to performance measures, are more plausible and consistent with the theory.

Nevertheless, a word of caution is warranted in interpreting the significance of the coefficients on deviation terms from some of the targets. This issue is of particular relevance in the case of targets which are highly correlated with reported earnings such as the analyst' forecast. The problem is that in

deriving the model we assumed that the vector $\boldsymbol{B}'_m \boldsymbol{X}_m$ effectively controls for normal accruals and the deviation term corresponding to γ_1 (γ_2) is a good approximation of the deviation of pre-managed earnings from the target. If the assumption fails, a significantly negative coefficient can appear even in the absence of EM. The reason is that the term ($CF_t - AF_t$) is highly negatively correlated with ΔWC_t by construction.[1] In case the vector $\boldsymbol{B}'_m \boldsymbol{X}_m$ perfectly performs its function, the mentioned negative correlation is offset by the positive correlation between ΔWC_t and $\boldsymbol{B}'_m \boldsymbol{X}_{m,}$ leaving us the correlation of "pre-managed earnings surprise" with DA if any. In the opposite case the negative correlation might dominate leading to an erroneous evidence of EM. Given that it is virtually impossible to model all the factors that explain the variation of normal accruals in a cross-section, the evidence of EM around such targets can be claimed only with reservation. A similar argument applies to the explanatory power of the model. Thus, in the extreme case, where $\boldsymbol{B}'_m \boldsymbol{X}_m$ is set equal to zero in the deviation term, the increase in explanatory power (say relative to the UAM model) would come at no surprise.

The implication is that additional robustness checks are necessary in order to speak rigorously of an evidence of EM in this case. Possible tests may be aimed at looking at the incremental magnitudes of the coefficients ($\gamma_{1,}$ γ_2) and R^2 from adding the term $\boldsymbol{B}'_m \boldsymbol{X}_m$ to the deviation ($CF_t - AF_t$). Another approach would consist in simulating an accrual process absent earnings management and test whether the coefficients are still significantly negative and how large are their magnitudes. This analysis is left for future research.

Another major assumption of the model is the cash earnings are not managed. Inherited from prior research the assumption hinges on the fact that such manipulations usually imply real operating decisions which are more costly that simply changing assumptions on companies' books. Nevertheless, the

[1] Recall that CF_t is obtained as the difference between reported earnings and after tax changed in WC accruals.

possibility of EM through the cash portion cannot be completely ruled out. A simple example of such manipulations is the timing of inventory purchases by firms using LIFO costing method.[1] Te analysis of notes to financial statements uncovers that only a few of the sample firms applied this costing formula. However, it also turns out that many sample firms (about 23%) did not disclose the costing method they apply raising doubts about their intentions with respect to influencing the reported numbers. If such inventory manipulations are used to manage earnings towards the selected targets the effectiveness of the TDM in measuring EM magnitudes can be undermined.

The next section examines whether these advantages of the model are sensitive to a number of alternative specifications.

2.6 Sensitivity Analysis

All the empirical results reported in the previous section are based on the pooled samples of firms observed in several time periods. Hence, specification issues related to panel data and, particularly, the presence of firm specific unobservable effects should be considered. The F-ratio is used to test whether firm-specific fixed effects are significant in any of the estimated accrual models.[2] The hypothesis of no fixed effects is not rejected at any conventional significance level for all of the current accrual models. Therefore, applying the least squares procedure to the pooled sample is warranted.

Swiss and German companies are pooled in one common sample for the estimation purposes. The differences in the institutional backgrounds are not expected to affect systematically the normal accrual process since only firms applying IFRS are selected. The analysis of notes to financial statements permits

[1] Although the literature usually refers to LIFO as the method allowing much discretion, some manipulations are possible also when the weighted average method is used. This is possible because substantial discretion can be exercised in assigning weights.

[2] See Greene (2002) or Baltagi (2002) for the details of the F test.

to see that no important systematic difference exists in the choices of accounting methods within the IFRS framework. Nevertheless, institutional differences might still influence EM behavior.

A robust comparison between the country subsamples is difficult given the small sample sizes. Also, when Neuer Markt firms are excluded, the sample becomes rather unbalanced with only 98 firm-year observations on German firms. I test the sensitivity of the model by including a country dummy, both separately and as an interaction with the target deviation terms. I also estimate the EWJM, UAM and TDM models separately for each subsample. The overall output (not reported) shows that the tenor of the results does not differ between the countries. The average DA and NDA of the Swiss firms estimated by either of the models do not significantly differ from the respective statistics for the German companies, whether the Neuer Markt firms are included or not. When the latter are compared to the core sample, only NDA estimated by the TDM model is on average significantly higher for the Neuer Markt firms. This is consistent with the fact that some of these firms experience double- and even triple-digit growth in the years just after IPO.

Nevertheless, some of the coefficient estimates are still different for German and Swiss companies. In particular, the coefficients corresponding to the deviations from analysts' forecast are lower for the German companies, while the coefficient on smoothing term is considerably higher. However, the difference if any is only marginally significant. The estimates of standard errors of the parameters usually increase as additional terms are added or if the sample is split up. My conjecture is that, given the relatively small sample size, the benefits of relaxing the common coefficient restrictions are inferior to the cost of lower statistical efficiency. If this is the case, then pooling of firms domiciled in different countries and traded on different exchanges but using the same reporting standards is justified as a means of alleviating the problem of small samples.

Previous literature suggested that the Jones and similar models are misspecified for firms with extreme performance. This suggests that the relationship between earnings and accruals might be nonlinear. I test for this possibility by allowing the coefficient on earnings (ROA_t) to be different for the firms in the lowest and highest performance quintile. In both the UAM and TDM the null hypothesis of a common coefficient cannot be rejected at any conventional significance level. Similar conclusions come out when performance deciles are used instead of quintiles. All the results are almost identical when earnings, measured as I/B/E/S actuals, are replaced by earnings before extraordinary items as reported in financial statements.

A similar analysis is carried out with respect to operating cash flows taken as variable explaining normal accruals. Again no sign of nonlinearity is detected.

Having tested the sensitivity of the accrual models to rather general specification problems, we can proceed to analyzing the constraints imposed on the Target-Deviation Model. In section 2.3 we assumed that firms in the same institutional environment are likely to give the same relative importance to earnings targets, given the relative distance of true pre-managed earnings from the latter. It is, however, very implausible to assume that a firm, far away from a particular benchmark on the real line of earnings numbers, gives that benchmark any importance, especially if the other targets are much closer. In simpler terms, a highly profitable growth firm (e. g., ROA of 15-20%) is unlikely to consider the zero earning target in the cost minimization function.[1] Since such firms are expected to have a zero coefficient on the target-deviation term, 4% bounds around each target were used in previous section to cut off these heterogeneous observations. The intuitive reason for choosing such a cut-off rule is that EM magnitudes higher than the sample average normalized earnings are unlikely to go unnoticed. Although intuitively appealing, the rule is still somewhat arbitrary

[1] The exceptional case is when the good results are entirely attributable to some extraordinary and non-recurring events.

and it seems necessary to check the sensitivity of results to widening and narrowing the cut-off bounds.

Since the firm-years with earnings beyond the chosen bounds are automatically attributed zero EM amounts relative to the corresponding target, it is useful to observe how the allowed scope of manipulators changes when all bounds are increased or decreased by one percentage point. Table 6 shows the number of firm-year observations included in the target bounds when these are set at 4% as well as at 3% and 5% of total assets.

The frequency of firm-years is reported separately for the core and the full samples. The values in the first column range from 0 to 4 showing the number of targets a firm is "allowed" to consider simultaneously in a given year. Notice that only a small number of firm-years is facing no target at all and so automatically receives zero EM estimates. Naturally, as the cut-off bounds are widened the number of interacting targets increases for some firms, remaining the same for the others. For example, when the bounds are widened from 3% to 5%, the number of firms having to weigh all the four targets more than doubles. This happens mostly at the expense of the singe-target and double-target firm-years.

Table 6. The frequency of firm-years within allowed target bounds

Number of targets*	*Core sample*			*Full sample*		
	3%	4%	5%	3%	4%	5%
0	15	11	9	32	25	20
1	41	28	16	68	47	31
2	60	52	29	87	83	48
3	184	181	170	209	204	204
4	54	82	130	70	107	163
Total	354	354	354	466	466	466

* Number of targets is the total number of targets not excluded from the cost function of a firm in a given year

Changing the target bounds essentially comes down to modifying the assumptions about the cost function of some of the sample firms. Therefore, the

practical interest of the TDM model depends on the sensitivity of accrual estimates to reasonable variation in these assumptions. To examine this problem I estimate the Target-Deviation Model after redefining the dummy variables in equation (27) in order to set deviation bounds to 3% and 5% of total assets.

Table 7. Estimation output of the TDM with 3% and 5% target bounds

	Core sample				*Full sample*			
	3% bounds		*5% bounds*		*3% bounds*		*5% bounds*	
Coef.	*Value*	*Pr.*	*Value*	*Pr.*	*Value*	*Pr.*	*Value*	*Pr.*
β_0	.005	.000	.010	.000	.007	.000	.008	.000
β_1	.388	.002	.548	.000	.892	.000	.801	.000
β_2	-.159	.011	-.097	.150	-.222	.016	-.200	.037
β_3	-.209	.000	-.300	.001	-.262	.000	-.317	.000
β_4	.283	.001	.312	.003	.181	.004	.209	.004
β_5	-.162	.002	-.007	.801	.032	.438	.078	.244
γ_1	-.775	.000	-.787	.000	-.997	.000	-.822	.000
γ_2	-.686	.000	-.508	.000	-.773	.000	-.602	.000
γ_3	-.403	.000	-.320	.000	-.467	.000	-.331	.000
γ_4	.026	.872	-.134	.438	-.338	.000	-.274	.004
γ_5	-.518	.000	-.348	.004	-.505	.000	-.345	.001
γ_6	-.078	.314	-.002	.966	.034	.655	.005	.932
γ_7	-.120	.118	-.127	.102	-.220	.008	-.218	.001
R^2 *(adj)*	.850		.827		.860		.863	

Table 7 reports the coefficients, associated probabilities as well as the explanatory power. Comparing the output to statistics reported in Panel D of Table 3, one can notice that in spite of some differences in coefficient magnitudes and significance level, the tenor of the results does not change. All the tests applied to the model coefficients in the preceding section point to the similar conclusions. Only the coefficient on the smoothing term (γ_7) becomes insignificantly different from zero in the core sample, while staying almost intact in the full sample. Also, in the case of the 3% bounds in the core sample, the hypothesis $\gamma_3 = \gamma_4$ is rejected at .05 level, further contributing to the mixed

evidence on discontinuity around the zero target.[1] The explanatory power also remains almost unaffected by the modification in restrictions. Since we are principally interested in the estimated magnitudes of EM, the comparison should be focused on the descriptive statistics and correlations between the alternative estimates. Table 8 provides these estimates for the core sample. The TDM output using 4% bounds as well as the EWJM statistics are reported to facilitate the comparison.

Table 8. Descriptive statistics of accrual estimates under alternative restrictions[2]

Panel A. Descriptive statistics

	DA_{TDM}			DA_{EWJM}	NDA_{TDM}			NDA_{EWJM}
	3%	*4%*	*5%*		*3%*	*4%*	*5%*	
Mean	.003	.006	.006	.000	.006	.002	.003	.009
Median	.003	.007	.008	-.001	.006	.002	.001	.007
Max	.061	.069	0.069	.109	.077	.076	.076	.063
Min	-.124	-.114	-.101	-.159	-.079	-.086	-.096	-.038
St. Dev.	.022	.022	.021	.035	.022	.023	.024	.013
Med. Rat.	.397	.460	.399	.750	.470	.459	.437	.250

Panel B. Correlation coefficients***

		DA_{TDM}			DA_{EWJM}	NDA_{TDM}			NDA_{EWJM}
		3%	*4%*	*5%*		*3%*	*4%*	*5%*	
	3%	1	.951**	.868**	.745**	.154**	.167**	.191**	-.037
DA_{TDM}	*4%*	.962**	1	.932**	.749**	.114*	.111*	.124*	-.048
	5%	.883**	.938**	1	.728**	.117*	.105*	.077	-.097
DA_{EWJM}		.752**	.759**	.722**	1	.499**	.490**	.480**	.071
	3%	.168**	.134*	.095	.541**	1	.990**	.944**	.595**
NDA_{TDM}	*4%*	.177**	.131*	.045	.526**	.992**	1	.967**	.628**
	5%	.198**	.139**	.042	.499**	.944**	.967**	1	.655**
NDA_{EWJM}		-.033	-.109*	-.194**	.000	.602**	.645**	.685**	1

* Correlation is significant at the .05 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)
*** Pearson coefficients are below diagonal and Spearman coefficients above diagonal.

[1] One might think of several reasons for such results. First, the smoothing target-deviation may be stronger correlated with the deviation from previous numbers when they get smaller. Second, when bounds are widened some firms with big losses that are unlikely to manage their earning up also fall within the range. Thus, when I reestimate the model after including a separate smoothing term for firms below the 4% bound, γ_7 becomes again significant, while the coefficient of the new term is not significantly different from zero at .05 level.

[2] Only for the core sample. The equivalent table for the full sample in provided in Annex B.

Descriptive statistics remain almost the same for the alternative cut-off points. Only the mean and the median of the DA (NDA) estimates using 3% bounds are slightly smaller (higher). This is not surprising since zero EM is imposed on some more observations. More interestingly, the median ratio of the estimated DA to the total WC accruals is .40 for both 3% and 5% specification as opposed to .46 for the benchmark TDM estimates. Thus, not only the 3% but also the 5% bounds provide a more conservative measurement. Although difficult to explain, the difference is relatively small, especially compared to that with the Jones Model estimates. The correlation coefficients also point out to the similarity of alternative specifications. The correlation between the DA values estimated by the 3%-TDM and the 4%-TDM is .96. The correlation between the DA values estimated by the 5%-TDM and the 4%-TDM is .94. The correlation with the DA values from the Jones Model is very similar for the three TDM specifications, the 5%-TDM having the lowest coefficient (.72). The similarity of NDA estimates is even stronger with all the correlations above .94. The correlation of NDA_{TDM} with NDA_{EWJM} tends to increase with the bounds.

Another notable observation is the more salient positive correlation between DA and NDA for the specifications with narrower bounds. Since most authors suggested a negative relation between the two measures, the TDM may help in shedding a new light on the hypothesis. Given the scant nature of the observation I do not explore the possible reasons further in this work. This is left to future research.

Summarizing the results of this section, we can conclude that the TDM is quite robust to alternative specifications. In particular, slightly changing the somewhat arbitrarily chosen maximum EM range does not dramatically change the model's estimates. This means that the practical efficiency and usefulness of the model should not crucially depend on the imposed bounds.

It is relevant to emphasize that care must be exercised in order not to choose a too wide or too narrow EM range. A too narrow range would result in

few observations around some targets. At the same time, zero EM amounts might be automatically assigned to too many firms, reducing the power of the analysis. The overly large bounds do not seem to be a panacea either. The risk is that the model is badly specified and the coefficients on deviation terms are biased. For example, the deviation from zero in the TDM is simply a measure of pre-managed earnings. When too wide bounds are imposed, the term is highly correlated with ROA_t raising the collinearity problem. In the extreme case of no bounds the optimization procedure fails to converge to a global minimum, and the coefficient estimates have rather implausible values.

Closing the examination of measurement issues I proceed to the third chapter, where the obtained accruals decomposition is analyzed in the context of performance prediction and market valuation.

CHAPTER THREE

Implications for Valuation: Discretionary versus Unexpected Accruals

3.1 Earnings Components and Performance Forecasting

Texts on equity valuation and financial statement analysis often recommend examining separately the accrual and cash components of current earnings for the purpose of predicting future performance. The underlying reasoning is that the accrual system relies on accruals, deferrals, estimates and allocations, which involve some degree of subjectivity. Some authors explicitly argue that it is the manipulation of accruals that makes them less useful for forecasting.

Sloan (1996) conjectures that current earnings performance is less likely to persist if it is attributable primarily to the accrual component as opposed to the cash flow component. Using a large sample of NYSE and AMEX firms, he shows that the coefficient on the cash component is significantly higher than the coefficient on the accrual component of earnings. The results confirm that the cash portion of current earnings has a higher value for forecasting than the accrual portion. Xie (2001) extends the analysis by decomposing total accruals using the Jones Model and some of its modifications. The results suggest that the lack of persistence of total accruals documented in Sloan (1996) is due primarily to the lack of persistence of abnormal accruals.

Among the purposes of this section is to test whether the documented differences in persistence are still present in a much smaller sample of non-US firms. Furthermore, the abnormal accruals measured by the residual-based models were shown in the previous chapter to contain a significant portion that cannot be attributed to any discretionary behavior. Therefore, I investigate whether the persistence of the accrual components depends on the model used to

decompose total accruals. Also, I examine whether implications for earnings persistence are different for the accruals explained by discretionary behavior around the earnings targets, and the residual accruals, deemed as unexpected given the information at date *t*. The theory suggests that transitory accrual components having one time effect on current earnings are expected to have no implication for future earnings.[1] On the other hand, discretionary accruals have no corresponding cash flows by definition, and represent borrowing or reversal of earnings from the adjacent periods. Therefore, the forecasting coefficient is expected to be smaller than in the case of unexpected accruals.

To examine whether the persistence properties of accruals and cash flows for the firms in this study are consistent with those documented previously I estimate the following models:

Model 1: $$EARN_{t+1} = \alpha_0 + \alpha_1 EARN_t + v_{t+1}$$

Model 2: $$EARN_{t+1} = \alpha_0 + \alpha_1 CFO_t + \alpha_2 ACCR_t + v_{t+1}$$

$EARN_t$ is defined as earning after adjustments made by analysts from the I/B/E/S Actual Summary file. CFO_t refers to operating cash flow defined as in the previous chapter. $ACCR_t$ stands for total accruals computed as the difference between $EARN_t$ and CFO_t. Note that $ACCR_t$ defined in this section includes also long-term accruals such as depreciation but does not include special accrual items backed out by analysts. All variables are scaled by the year-average total assets.

Accruals are taken at the highest aggregate level in order to drive parallels with the results in Sloan (1996).[2] This simple model provides a good starting point for more detailed analysis. Next, accruals are disaggregated into current

[1] To the extent that unexpected accruals result from non-discretionary estimation errors they are not expected to be closed by a corresponding cash flow. Hence, the persistence property would more resemble that of the discretionary accruals.

[2] The results are not directly comparable since Sloan uses operating income, which excludes interest and taxes. Also, accruals are computed from the balance sheet and CFO is obtained as the difference between earnings and accruals.

and long-term components and finally, current accruals are decomposed into various components using the estimates obtained in the previous chapter.

Since we assumed that only WC accruals are subject to accounting manipulations, it seems natural to question whether these short-term accruals have different implications for future earnings compared to depreciation and other long-term accruals. In order to make inference on this question, the following model is estimated:

Model 3: $$EARN_{t+1} = \alpha_0 + \alpha_1 CFO_t + \alpha_2 DEPR_t + \alpha_3 OACCR_t + \alpha_4 \Delta WC_t + v_{t+1}$$

$EARN_t$, CFO_t and ΔWC_t have been defined previously. $DEPR_t$ includes the depreciation of property plant and equipment as well as the amortization of identifiable tangible assets. $OACC_t$ stands for other long-term accruals measured by subtracting ΔWC_t from $ACCR_t$ and adding back depreciation and amortization expense ($DEPR_t$). Hence, the measure includes among others long-term provisions, deferred taxes, goodwill amortization, impairments and write-downs of fixed assets not adjusted by analysts.[1]

Finally, ΔWC_t is partitioned into components estimated by the two competing accrual models, the EWJM and TDM, in the preceding chapter.

Model 4:

$$EARN_{t+1} = \alpha_0 + \alpha_1 CFO_t + \alpha_2 DEPR_t + \alpha_3 OACCR_t + \alpha_4 NDA_{t,EWJM} + \alpha_5 DA_{t,EWJM} + v_{t+1}$$

Model 5:

$$EARN_{t+1} = \alpha_0 + \alpha_1 CFO_t + \alpha_2 DEPR_t + \alpha_3 OACCR_t + \alpha_4 NDA_{t,TDM} + \alpha_5 DA_{t,TDM} + \alpha_6 UEA_{t,TDM} + v_{t+1}$$

All the variables in the forecasting models above are scaled by year-average total assets. v_{t+1} represents a zero-mean error term. Panel B of Table 9 reports descriptive statistics on the variables used in the models 1-5. For the sake of

[1] The data collection procedure ensures that DEPR does not include asset impairments and extraordinary write-downs.

parsimony some of the variables already described in Chapter 2 are not included. Since the data on one-year-ahead earnings results in a loss of a roughly one fifth of the observations, the size of the core sample reduces to 277.[1]

The loss of observations does not materially affect the respective statistics. The sample averages and the variability of the accrual components are consistent with those reported in prior studies. The mean total accruals are negative (-.031), which is due to the constantly negative depreciation and amortization (-.041). The latter has the lowest variation (.014) compared to $OACCR_t$ and ΔWC_t. Other long-term accruals have a mean close to zero but vary substantially within the sample.

Table 9. Descriptive statistics on variables in included in Models 1-5.[***]

Panel A. Descriptive statistics

	$EARN_{t+1}$	CFO	$ACCR$	$DEPR$	$OACCR$	ΔWC	NDA_{TDM}	DA_{TDM}	UEA_{TDM}
Mean	.048	.078	-.031	-.042	-.002	.014	.006	.007	.001
Median	.047	.084	-.033	-.041	-.005	.012	.004	.008	.000
Max	.271	.213	.152	-.015	.177	.134	.076	.069	.084
Min	-.138	-.081	-.212	-.090	-.147	-.144	-.067	-.114	-.045
Std.Dev.	.061	.051	.047	.015	.032	.036	.023	.022	.014

Panel B. Correlation coefficients (Pearson)

	$EARN_{t+1}$	CFO	$ACCR$	$DEPR$	$OACCR$	ΔWC	NDA_{TDM}	DA_{TDM}	UEA_{TDM}
$EARN_{t+1}$	1								
CFO	.494**	1							
$ACCR$	.181**	-.439**	1						
$DEPR$	.116	-.124*	.295**	1					
$OACCR$	-.162**	-.345**	.579**	.026	1				
ΔWC	.328**	-.209**	.654**	-.060	-.150*	1			
NDA_{TDM}	.327**	-.183**	.782**	.190**	.271**	.689**	1		
DA_{TDM}	.090	-.181**	.252**	-.227**	-.286**	.672**	.103	1	
UEA_{TDM}	.131*	-.029	.063	-.093	-.309**	.394**	.010	-.009	1

* Correlation is significant at the .05 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)
*** The subscript t is omitted for the sake of simplicity number of observations = 277

[1] Because of the previously brought arguments, the analysis in this and the following sections focuses uniquely on the core sample. The extremely unusual performance of many of the Neuer Markt firms might put into question the comparability with previous findings. Nevertheless, the unreported results show that all the conclusions in Chapter 3 do not differ materially when the full sample is used instead.

Panel A reports the pairwise correlation coefficients between the dependent and the independent variables.[1] The correlations of the current period cash flow and accruals with the earnings of the next period appear in the second column. The values seem to be largely consistent with the conjectures made above. The correlation with the current operating cash flow is the highest approaching .50. The coefficient on total accruals is almost three times lower although it is still positive and significant at .01 level. When total accruals are disaggregated, one uncovers that the correlation between future and current earnings is much higher. On the other hand, depreciation expense has a coefficient insignificantly different from zero. The correlation of $OACCR_t$ with $EARN_{t+1}$ is negative, suggesting that this component includes the fastest mean-reverting portion of earnings. Recalling the nature of items summarized in $OACCR_t$, we can infer that the latter is dominated by non-recurring elements not backed out by analysts.

Finally, the hypothesis of the pecking order in terms of persistence seems to be confirmed by the coefficients corresponding to the current accrual components estimated by the TDM. Thus, the correlation with NDA is the highest (.33) and significant at .01 level. The coefficient on unexpected accruals is more that twice lower and significantly different from zero only at .05 level. At last, the correlation between current DA and future earnings is not significantly different from zero.

A few correlation coefficients between the other pairs in Panel B also reveal some interesting facts. For example, whereas the negative correlation between CFO and total accruals is widely documented in the literature, the values in the second column show that only less than half of the correlation magnitude pertains to current accruals. At the same time, it is the other long-term accruals that seem to be accountable for the highly negative correlation.

[1] Since they provide no additional information, non-parametric Spearman correlations are not reported in this table as well as in other correlation tables reported in this chapter.

Another interesting observation is the negative (positive) correlation of $DEPR_t$ and $OACCR_t$ with DA_t (NDA_t). One possible explanation is that DA are accrued to smooth the transitory impact of $OACCR_t$ and, in the case of depreciation, to offset the investment expenses leading the revenue growth.

Table 10. Persistence of earnings and earnings components

Panel A. Model 1***

Parameter	α_0	α_1	R^2 (adj)
Value	.013	.759	.417
Std. Err.	.005	.080	
Prob.	.008	.000	

Panel B. Model 2***

Parameter	α_0	α_1	α_2	R^2 (adj)
Value	.002	.851	.638	.436
Std. Err.	.308	.076	.096	
Prob.	.759	.000	.000	
Wald-test	$\alpha_1 = \alpha_2$: $\chi^2 = 7.317^{**}$			

Panel C. Model 3***

Parameter	α_0	α_1	α_2	α_3	α_4	R^2 (adj)
Value	.013	.809	.907	.265	.840	.495
Std. Err.	.009	.071	.176	.122	.088	
Prob.	.137	.000	.000	.031	.000	
Wald-tests	$\alpha_1 = \alpha_3$: $\chi^2 = 27.038^{**}$			$\alpha_1 = \alpha_4$: $\chi^2 = 0.109$		

Panel D. Model 4***

Parameter	α_0	α_1	α_2	α_3	α_4	α_5	R^2 (adj)
Value	.015	.853	.960	.262	.451	.897	.500
Std. Error	.009	.078	.180	.116	.343	.090	
Prob.	.073	.000	.000	.023	.190	.000	
Wald-tests	$\alpha_1 = \alpha_4$: $\chi^2 = 2.953$				$\alpha_4 = \alpha_5$: $\chi^2 = 3.883^{*}$		

Panel E. Model 5***

Parameter	α_0	α_1	α_2	α_3	α_4	α_5	α_6	R^2 (adj)
Value	.010	.803	.822	.192	.953	.688	.840	.492
Std. Error	.008	.077	.209	.162	.199	.171	.212	
Prob.	.244	.000	.000	.239	.000	.000	.000	
Wald-tests	$\alpha_2 = \alpha_5$: $\chi^2 = .600$				$\alpha_4 = \alpha_5$: $\chi^2 = .636$			

* Significant at the .05 level
** Significant at the .01 level
*** The dependent variable is $EARN_{t+1}$; number of observations = 277

The significant correlation between the independent variables in Models 1-5 suggests that the bivariate relationships between these variables and future earnings may lead to conclusions different from those following from the richer multivariate models. Table 10 shows the main regression statistics resulting from the estimation of the models. Panel A provides the output from the estimation of Model 1. The estimate of α_1 is .759, confirming prior findings that earnings are slowly mean reverting. Although comparable, the coefficient is slightly lower than the estimate reported in Sloan (1996). This might be expected as Sloan used operating income, which does not contain some relatively volatile items. Although highly significant (t-statistics of 9.53), the estimate still have a standard error much bigger than usually reported in related US studies.[1] I believe that the difference should be mostly attributed to the much larger sample sizes typically employed in those investigations. The adjusted R^2 amounts to about 42%, suggesting that quite an important portion of earnings in the next period can be forecasted based only on the knowledge of current earnings.

Panel B provides the estimates for Model 2. Again the outcome is consistent with previous findings. The estimate of the coefficient on CFO_t is higher and that on total accruals is lower than the coefficient on earnings in Model 2. The null hypothesis $\alpha_1 = \alpha_2$ is rejected at .01 level.[2] Therefore, the persistence of earnings performance attributable to the accrual component is lower relative to the earnings persistence attributable to the cash flow component. The adjusted R^2 increases slightly as a result of relaxing the coefficient constraint.

Model 3 allows further investigation into the sources of the documented lower persistence of the accrual component. Unlike the bivariate Pearson correlation, the coefficient on $OACCR_t$ is positive and significant at .05.

[1] All the standard errors of the coefficient in Table 10 are computed using the White's heteroscedasticity consistent covariance matrix.

[2] Under the null hypothesis the Wald statistics is distributed as χ-squared with the degrees of freedom equal to the number of restrictions tested.

Nevertheless, it is obviously smaller that the other regression coefficients. The Wald-test rejects the hypothesis $\alpha_1 = \alpha_3$ at .01 significance level. At the same time the hypotheses $\alpha_1 = \alpha_2$ (statistics not reported) and $\alpha_1 = \alpha_4$ cannot be rejected at any conventional significance level. Moreover, the coefficient on depreciation is higher, albeit not significantly, than the coefficient on CFO_t and it is not significantly different from 1. The results are consistent with depreciation being the most stable component of earnings. This corroborates the argument that changing depreciation methods and estimates is associated with high cost and that assets structure remains quite stable on average. Hence, the best forecast analysts can do on average for the next year's depreciation, is the current depreciation adjusted for anticipated growth in assets.[1] Another conclusion we can draw from Panel C is that other long-term accruals seem to be the only element accountable for the lower persistence of accruals relative to cash flow. The determination coefficient increases to about 50% indicating that decomposing earnings as in Model 3 further enhances the forecasting power.

Although the results in Panel C show that the persistence of current accruals does not differ significantly from the persistence of operating cash flow, it might still be the case that some components of WC accruals have different persistence properties. Panel D investigates the issue by allowing the coefficients to be different for DA and NDA separated by the short-term version of the Jones Model. The statistics show that, contrary to the predictions, the coefficient on NDA_{EWJM} is lower than the coefficient on DA_{EWJM} and the difference is statistically significant at .05 level. Moreover, the former coefficient is not even statistically different from zero. At first sight, the results might seem contradictory to the findings in prior research and notably in Xie (2001). However, when one recalls that the Jones Model version used in that study also includes depreciation accrual, a fuller picture is beginning to emerge. Numerous papers employing the long-term version of Jones-type models report

[1] It should be pointed out that the coefficient on $DEPR_t$ is roughly twice more variable than those on CFO_t and WC accruals.

accrual estimates, which suggest that the major portion of depreciation expense is, on average, assigned to NDA. Given the high coefficient on $DEPR_t$ in Models 3 to 5, it is not surprising that NDA might appear more persistent, when it includes depreciation and amortization. As far as WC accruals are concerned, the Jones Model does not seem to provide decomposition with forecasting implications predicted by theory. It is still unclear, why the coefficient on DA could be about two times lower than the coefficient on NDA in Model 4. The bivariate coefficients of correlation with earnings of the next period (not reported) are almost identical for the two components of current accruals. However, the correlations with CFO_t are radically different, amounting to -.32 for DA and .30 for NDA. Thus, it is likely that the positive correlation of NDA with $EARN_{t+1}$ is almost entirely captured by CFO_t, when the latter is included as a regressor.

Finally, Panel E provides the estimates of Model 5. Focusing on the coefficient values corresponding to the WC accrual components one might think that the "pecking order" conjecture made above seems to be verified. Thus, the estimated value of α_4 is the highest (.953), followed by α_6 (.84) and α_5 (.688). Unfortunately, the null hypothesis of equality cannot be rejected for any pair of the three coefficients. Again the relatively small sample size seems to cause a shrink in the test power relative to analogous procedures applied to US firm samples.[1]

The almost identical R^2 values of Models 3-5 suggest that not much improvement in forecasting future earnings can be achieved by decomposing current accruals. The evidence that the estimation of the TDM provides information relevant to forecasting future performance remains rather mixed at this stage. Additional analysis in the rest of this section, as well as the sensitivity analysis conducted in section 3.4 examines this question further.

[1] Conducting an F-test, Xie (2001, p. 365) is able to reject the equality hypothesis, when the difference between coefficients is only 0.03. Here, the difference of 0.265 cannot be rejected using a similar test.

Table 11. Forecasting cash flows using earnings and earnings components

Panel A. Model 1***

Parameter	α_0	α_1	R^2 (adj)
Value	.066	.309	.080
Std. Err.	.005	.077	
Prob.	.000	.000	

Panel B. Model 2***

Parameter	α_0	α_1	α_2	R^2 (adj)
Value	.047	.457	.095	.150
Std. Err.	.005	.067	.073	
Prob.	.000	.000	.197	
Wald-test	$\alpha_1 = \alpha_2$: χ^2=11.432**			

Panel C. Model 3***

Parameter	α_0	α_1	α_2	α_3	α_4	R^2 (adj)
Value	.043	.419	.012	-.210	.285	.197
Std. Err.	.011	.085	.191	.123	.117	
Prob.	.000	.000	.948	.091	.015	
Wald-tests	$\alpha_1 = \alpha_3$: χ^2=26.25**		$\alpha_1 = \alpha_4$: χ^2=.908		$\alpha_3 = \alpha_4$: χ^2=17.708**	

Panel D. Model 4***

Parameter	α_0	α_1	α_2	α_3	α_4	α_5	R^2 (adj)
Value	.046	.459	.059	-.214	-.083	.338	.202
Std. Error	.010	.059	.186	.116	.350	.140	
Prob.	.000	.000	.753	.065	.811	.016	
Wald-tests	$\alpha_1 = \alpha_4$: χ^2=1.876				$\alpha_1 = \alpha_5$: χ^2=.135		

Panel E. Model 5***

Parameter	α_0	α_1	α_2	α_3	α_4	α_5	α_6	R^2 (adj)
Value	.040	.398	-.099	-.307	.446	.115	.159	.197
Std. Error	.011	.090	.209	.181	.208	.218	.317	
Prob.	.000	.000	.637	.091	.033	.598	.617	
Wald-tests	$\alpha_2 = \alpha_5$: χ^2=2.469				$\alpha_5 = \alpha_6$: χ^2=.938			

* Significant at the .05 level
** Significant at the .01 level
*** The dependent variable is CFO_{t+1}; number of observations = 277

A number of studies (see e.g., Dechow (1994)) showed that earnings is superior to cash flow measures in terms of forecasting the future performance. At the same time, it is the future cash flows of a firm that many important stakeholders are interested in. For example, financial analysts need to forecast

future cash flows as an input to discounted cash flow models. Investors want to evaluate the ability of the firm to pay dividends on a continuous basis, which requires regular free cash inflow. Also, creditors want to know the future cash flow in order to assess the firm's ability to service its debt. On the other hand, future earnings may also contain DA. Hence, the persistence of this component of earnings might be caused by serial correlation in DA as opposed to its relevance for the true future performance.

Given the above, I examine the implication of earnings and earnings components for the operating cash flow of the following year by replacing $EARN_{t+1}$ by CFO_{t+1} in Models 1-5. Barth et al. (2001) examine the role of accruals in predicting future cash flows. They show that disaggregating current earnings into cash flow and accrual components significantly increases the predictive power of the model. Moreover, disaggregating total accruals into major components such as depreciation, inventory, accounts payable and receivable further enhances the adjusted R^2.[1] For the purpose of the present investigation, I do not decompose current accruals into individual WC elements but rather into estimated discretionary, normal and unexpected portions. Table 11 provides the estimation results. The overall picture resembles the one illustrated by Table 10, even though there are some differences. The coefficient on aggregate earnings is only .3 and the explanatory power is much lower (Panel A). Panel B reveals that the coefficient on aggregate accruals is very low and not significantly different from zero. The hypothesis $\alpha_1 = \alpha_2$ is rejected at .01 level. Relaxing the restriction almost doubles the explanatory power relative to Model 1. One can infer from Panel C that long-term accruals are responsible for such a low predicting performance of aggregate accruals. The coefficient on depreciation and amortization is very close to zero and it is statistically insignificant. The difference from Table 10 comes at no surprise since current

[1] However, it is not clear from the reported results whether this improvement comes from disaggregating total accruals into long-term and short-term components or also from disaggregating current accruals into WC components.

depreciation is expected to predict only future depreciation. The coefficient on $OACCR_t$ is negative (-.21), even though it is significant only at .10 level. The estimate is also significantly lower that the coefficients on cash flow and on WC accruals. While α_4 is somewhat lower than α_1, the equality hypothesis cannot be rejected. Again the evidence suggest that forecasting implications of operating cash flow and current accruals do not differ systematically.

When current accruals are disaggregated further, the standard errors of the coefficients strongly increase affecting the test power. Again the output of Model 4 contradicts to the theoretical conjectures made previously and to the opportunistic EM scenario. The coefficient on NDA_{EWJM} is negative though not significantly different from zero. On the other hand the coefficient on DA_{EWJM} is positive and significant at .05 level. Still the equality hypothesis, $\alpha_4 = \alpha_5$, cannot be rejected. When WC accruals are disaggregated by the TDM model the picture is more consistent with the discretionary EM hypothesis. The coefficient on NDA_{TDM} is significant at .05 level, while those on DA_{TDM} and UEA_{TDM} are not significantly different from zero. Again, however, the inflated standard errors do not allow to reject the equality hypotheses of any of the coefficient pairs including that with the coefficient on CFO_t. As in case of future earnings, most of the improvement in forecasting power is achieved by disaggregation at the level of Model 3. Note that in all cases earnings components in current period predict a smaller portion of next period's cash flow than of next period's earnings. This is not surprising given that firm-specific cash flow series is more volatile than earnings series, partly smoothed by accrual accounting.

Summarizing the empirical results, the following points can be suggested. Despite some evidence, no strong conclusions can be made about the usefulness of accrual models in forecasting future performance. When depreciation and amortization accruals are not included in the Jones model, the produced results seem to contradict the EM hypothesis. Consistent with prior research significant improvement in forecasting power is achieved by separating the cash flow and the accrual components of earnings. Additional progress can be made by

decomposing aggregate accruals into WC, depreciation and other long-term components. In section 3.4 I return to the forecasting issues with some additional empirical tests.

3.2 Pricing of Earnings Components

Yet another question of interest related to the information comprised in the accrual components of earnings is how the market prices these components. Subramanyam (1996) employs a cross-sectional variation of the Jones Model to examine the issue. The evidence in this paper reveals that, on average, the market attaches value to DA. The author argues that this evidence is consistent with managerial discretion improving the ability of earnings to reflect economic value. Nevertheless, he admits that measurement error in the DA proxy is an alternative explanation for the results.

The main purpose of this section is to examine how the market prices the three accrual components estimated by the TDM. The simplest way to do this consists in regressing contemporaneous stock returns on the earnings components. Thus, the necessary regression is obtained by replacing the dependent variable in Model 5 by stock returns. In order to draw parallels with prior research I also estimate the Models 1 to 4 after replacing the regressand.

The data necessary to compute the stock returns are collected from the Thomson Datastream historical database. The holding period returns are computed for periods of 12 months ending 3 months after the end of the corresponding fiscal year.[1] To isolate the effects of the general market performance, individual annual returns are adjusted for returns of broad stock indices, MSCI Switzerland and MSCI Germany respectively for Swiss and

[1] This is a common practice in the literature. Although Swiss firms were allowed to publish the annual report in six months after the fiscal year end, I maintain the 3 month period to avoid an overlap with the information on the first quarter results of the following year.

German firms. Some authors (see e.g., Sloan (1996) and Xie (2001)) employ size-adjusted abnormal returns in similar research contexts. Since the sample used in my study is relatively small, returns on the market-capitalization-based portfolio deciles would not be representative. Therefore, in order to control for a potential size effect, I include the log market value of the firm's equity at the end of the year as a regressor in each of the estimated models.

The histogram plot of the market-adjusted returns reveals that the sample distribution is strongly skewed to the right due to a few extremely positive observations. To improve the statistical properties of the model I normalize the return variable by taking its logarithm.[1] Table 12 reports the estimation results. The coefficient on size proxy is significantly different from zero at .05 level in the first two models and only at .10 level in the others. Its value is approximately .02. Being irrelevant for the following analysis, this coefficient and the related statistics are omitted from the table for space considerations.

Panel A shows that the coefficient on aggregate earnings equals 2.335 and it is highly significant. The value of the coefficient and R^2 is higher than in comparable previous findings[2] (see Subramanyam (1996)). Panel B shows the results of disaggregating earnings into the cash flow and accrual components. The findings are again generally consistent with the prior evidence. The coefficient on CFO_t is higher and the coefficient on accruals is lower that that on aggregate earnings. In spite of the substantial difference the hypothesis $\alpha_1 = \alpha_2$ is rejected only at .05 level. The increase of R^2 resulting from release of the constraint is quite small.

Panel C confirms that not all accrual components are priced in the same way. Not surprisingly, the coefficient on depreciation expense is not significantly different from zero. As a matter of fact, the forecasting regressions

[1] Alternative normalization methods such as deleting the extreme observations or setting them equal to 1 (100% return) do not materially change the reported results.
[2] Yet, due to much smaller sample size, the standard error estimates are several times bigger.

in the previous section suggest that, on average, all the information in current depreciation expense is already comprised in the previous year's depreciation.

Table 12. The market pricing of earnings components

Panel A. Model 1[***]

Parameter	α_0	α_1	R^2 (adj)
Value	-.308	2.335	.116
Std. Err.	.077	.465	
Prob.	.000	.000	

Panel B. Model 2[***]

Parameter	α_0	α_1	α_2	R^2 (adj)
Value	-.377	2.917	1.644	.128
Std. Err.	.082	.522	.544	
Prob.	.000	.000	.003	
Wald-test	$\alpha_1 = \alpha_2$: χ^2=5.757[*]			

Panel C. Model 3[***]

Parameter	α_0	α_1	α_2	α_3	α_4	R^2 (adj)
Value	-.346	2.657	1.752	-.750	3.203	.173
Std. Err.	.102	.512	1.490	.750	.635	
Prob.	.001	.000	.240	.312	.000	
Wald-tests	$\alpha_1 = \alpha_3$: χ^2=22.927[**]		$\alpha_1 = \alpha_4$: χ^2=.682		$\alpha_3 = \alpha_4$: χ^2=21.172[**]	

Panel D. Model 4[***]

Parameter	α_0	α_1	α_2	α_3	α_4	α_5	R^2 (adj)
Value	-.355	2.526	1.587	-.764	4.351	2.992	.172
Std. Error	.103	.543	1.508	.754	1.709	.699	
Prob.	.001	.000	.293	.312	.011	.000	
Wald-tests	$\alpha_1 = \alpha_4$: χ^2=.950		$\alpha_4 = \alpha_5$: χ^2 = .523		$\alpha_1 = \alpha_5$: χ^2 = .484		

Panel E. Model 5[***]

Parameter	α_0	α_1	α_2	α_3	α_4	α_5	α_6	R^2 (adj)
Value	-.377	2.395	.540	-1.610	4.501	.748	3.948	.178
Std. Error	.103	.531	.333	.909	1.055	1.191	1.709	
Prob.	.000	.000	.738	.077	.000	.531	.022	
Wald-tests	$\alpha_4 = \alpha_6$: χ^2 = .065		$\alpha_5 = \alpha_6$: χ^2 = 3.226		$\alpha_4 = \alpha_5$: χ^2 = 4.415[*]			

* Significant at the .05 level
** Significant at the .01 level
*** The dependent variable is market adjusted stock return ($MAJR_t$); number of observations = 354

The coefficient on other long-term accruals is negative, which corresponds to the negative implications for future cash flow documented earlier. Nevertheless, the estimate is not significant, suggesting that market participants ignore this component on average. Finally, the coefficient on WC accruals is not only statistically different from zero, but its value (3.2) is even higher than the value of the cash flow coefficient. Yet the difference is not statistically significant and we can conclude that the market considers current accruals at least as important for stock valuation as cash flows. The disaggregation at Model 3 level results in a substantial increase in the explanatory power.

Decomposing current accruals into portions estimated by the EWJM allows to see that the valuation coefficients on both NDA and DA components are significantly different from zero (Panel D). The NDA_{EWJM} coefficient appears higher than the DA_{EWJM} coefficient, which is consistent with evidence in Subramanyam (1996). Nevertheless, the hypothesis of equality of the two coefficients cannot be rejected. Also, the coefficient on NDA_{EWJM} has a higher standard deviation and it is significant only at .05 level.

Panel E of Table 12 provides quite a different picture, suggesting that the choice of a model of discretionary accruals matters. The coefficient on NDA estimated by the Target-Deviation Model is about six times bigger than the coefficient on the DA proxy. The hypothesis $\alpha_4 = \alpha_5$ is rejected at .05 level. Furthermore, the latter coefficient is not statistically distinguishable from zero, indicating that the market distinguishes and ignores the discretionary portion of earnings when assessing the stock prices. In addition, the results show that the market distinguishes between discretionary and unexpected accruals. The coefficient on the latter is equal to 3.948 and it is significant at .05 level. Because of the large standard errors the hypothesis $\alpha_5 = \alpha_6$ can be rejected only at .10 level. At the same time we cannot reject $\alpha_4 = \alpha_6$. The overall evidence indicates that the true pricing coefficient on unexpected accruals should be

somewhere between the coefficients on DA_{TDM} and NDA_{TDM}. This evidence speaks in favor of the EM hypothesis underlying the Target-Deviation Model.

Subramanyam (1996) notes that "the pricing of discretionary accruals is a joint test of (1) the market pricing mechanism and (2) the nature of the discretionary accruals". However, since the DA measure used in the test is only a proxy, there is a third component to the joint hypothesis, notably the specification test of the accrual decomposition model. The results of this section indicate that the findings in Subramanyam (1996) are affected by the fact that DA proxy includes a substantial portion of normal accruals.

The irrelevance of DA documented in Panel E is consistent with two scenarios. According to the first scenario the efficient market detects the opportunistic discretionary portion of earnings and ignores it in the valuation process. By the second scenario, DA are informative and managers use this device to improve the value relevance of earnings. However, the inefficient market fails to properly understand the signal and treats DA as misleading. The evidence in section 3.1 indirectly favors the first scenario. The issue is further explored in the next section.

3.3 Mispricing of Earnings Components

The purpose of this section is to test whether stock prices rationally reflect the one-year-ahead earnings implications of current earnings components. Sloan (1996) applies the procedure developed in Mishkin (1982)[1] in order to test whether the stock market differentiates between cash and accrual components of current earnings in terms of their association with future earnings. He finds that investors tend to "fixate" on reported earnings, and consequently, firms with relatively high (low) levels of accruals experience negative (positive) future

[1] Mishkin (1982) procedure was originally designed to test for the rational expectations in the context of monetary policy.

abnormal stock returns. The results also indicate that investors treat the cash flow component as if it is less persistent. Subsequently Xie (2001) employs the same methodology and finds that the market overestimates the persistence of abnormal accruals, and consequently, overprices these accruals. The author reports that the overpricing of total accruals documented in Sloan (1996) is due largely to abnormal accruals.

In this section I apply the same Mishkin procedure. One purpose is to test whether the market rationally prices cash flow, long-term and short-term components of earnings with respect to their association with future profitability. More importantly, I examine whether the alternative decomposition of accruals provided by the TDM leads to conclusions different from those in Xie (2001). In order to explore the first question I estimate the following regression system:

System 1:

$$\begin{cases} EARN_{t+1} = \alpha_0 + \alpha_1 CFO_t + \alpha_2 DEPR_t + \alpha_3 OACCR_t + \alpha_4 \Delta WC_t + v_{t+1} \\ MAJR_{t+1} = \beta\left(EARN_{t+1} - \alpha_0 - \tilde{\alpha}_1 CFO_t - \tilde{\alpha}_2 DEPR_t - \tilde{\alpha}_3 OACCR_t - \tilde{\alpha}_4 \Delta WC_t\right) + \varepsilon_{t+1} \end{cases}$$

$MADJ_{t+1}$ refers to market adjusted stock returns as specified previously. All other variables are defined as before. The first equation in the system is the forecasting equation of Model 3 from section 3.1. The second one is a *valuation* equation that estimates the valuation coefficients, $\tilde{\alpha}_1, \tilde{\alpha}_2, \ldots$, that the market assigns to the different earnings components. If the market is efficient the coefficients in the valuation equation should be equal to the corresponding coefficients in the forecasting equation.[1] The equations in the system are estimated jointly using an iterative generalized nonlinear least squares procedure. For testing purposes the estimation proceeds in two stages. In the

[1] See Mishkin (1982) and Sloan (1996) for the theoretical and technical details of the procedure.

first, the equations are jointly estimated without imposing any constraint on the coefficients. In the second stage, the estimation is carried out after imposing the rational pricing constraints, $\tilde{\alpha}_k = \alpha_k$ (k = 1, 2, 3, 4). Mishkin (1982) shows that the following likelihood ratio statistics is asymptotically distributed as $\chi^2(q)$, where q is the number of nonlinear constraints:

$$2n\left[log(\,SSR^{c}\,) - log(\,SSR^{u}\,)\right],$$

SSR^c = sum of squared residuals from the constrained system, SSR^u = sum of squared residuals from the unconstrained system, n = the number of the sample observations and log = the natural logarithm operator. The rational pricing of one or more earnings components is rejected if the above statistics is sufficiently large.

Similarly, in order to assess whether the market rationally prices the normal, discretionary and unexpected portion of current accruals I estimate the following system:

System 2:

$$\begin{cases} EARN_{t+1} = \alpha_0 + \alpha_1 CFO_t + \alpha_2 DEPR_t + \alpha_3 OACCR_t \\ \quad + \alpha_4 NDA_{t,TDM} + \alpha_5 DA_{t,TDM} + \alpha_6 UEA_{t,TDM} + v_{t+1} \\ \\ MAJR_{t+1} = \beta(\,EARN_{t+1} - \alpha_0 - \tilde{\alpha}_1 CFO_t - \tilde{\alpha}_2 DEPR_t - \alpha_3 OACCR_t \\ \quad - \alpha_4 NDA_{t,TDM} - \alpha_5 DA_{t,TDM} - \alpha_6 UEA_{t,TDM}\,) + \varepsilon_{t+1} \end{cases}$$

where all variables are defined as before.

Table 13 reports the unconstrained coefficient estimates for System 1, as well as the corresponding asymptotic standard errors.[1] The values of the likelihood ratio statistics (LR) corresponding to the pairwise single constraints are reported in the corresponding row of the last column. The statistics

[1] The estimate of β is 3.275 and it is significant at 0.01 level. The estimates are not included in the table because they are irrelevant for the analysis undertaken.

corresponding to joint hypotheses of more than one constraint are provided in the bottom of Table 13.

The first salient result of the system estimation is that only the coefficient on current accruals is significant (at .01 level) in the pricing equation. The coefficient on CFO_t is much lower than its forecasting counterpart and its marginal significance level is .053. The likelihood ratio statistics of 15.1 indicates that the underpricing of cash from operations ($\alpha_1 > \tilde{\alpha}_1$) is statistically significant at .01 level. This is consistent with the previous findings, although the difference between coefficients is much larger here.

Table 13. Rationality of the market pricing: (Mishkin test, System 1)

Forecasting coefficients			*Valuation coefficients*			
Parameter	*Estimate*	*Std. Error*	*Parameter*	*Estimate*	*Std. Error*	LR^{***}
α_1 *(CFO)*	.803**	.056	$\tilde{\alpha}_1$ *(CFO)*	.335	.173	15.099**
α_2 *(DEPR)*	.941**	.167	$\tilde{\alpha}_2$ *(DEPR)*	.152	.368	9.688**
α_3 *(OACCR)*	.261**	.088	$\tilde{\alpha}_3$ *(OACCR)*	.289	.252	0.000
α_4 *(ΔWC)*	.834**	.075	$\tilde{\alpha}_4$ *(ΔWC)*	.660**	.217	1.070

H_0: $\alpha_1 = \tilde{\alpha}_1$ and $\alpha_2 = \tilde{\alpha}_2$ and $\alpha_3 = \tilde{\alpha}_3$ and $\alpha_4 = \tilde{\alpha}_4$	LR = 17.939**
H_0: $\alpha_2 = \tilde{\alpha}_2$ and $\alpha_3 = \tilde{\alpha}_3$ and $\alpha_4 = \tilde{\alpha}_4$	LR = 10.804*

* Significant at the .05 level
** Significant at the .01 level

*** Likelihood ratio $2n\left[log(\,SSR^{c}\,) - log(\,SSR^{u}\,)\right]$ is asymptotically distributed as $\chi^2(1)$ under the null of $\alpha_k = \tilde{\alpha}_k$: subscripts *t* and *TDM* are omitted for the sake of simplicity.

As far as accruals are concerned, the results appear in contrast to those reported in the received literature. Only the coefficient on $OACCR_t$ is larger in the forecasting equation but it is also statistically insignificant. The joint hypothesis of rational pricing of the accruals components is rejected at .05 level (LR=10.8) in favor of underpricing. The pairwise tests of coefficients equality uncover that the major reason for the underpricing of the accrual component is mainly due to irrational pricing of the depreciation and amortization component. This is somewhat surprising, since the accounting theory and the received empirical evidence suggest that this is the most predictable component of

earnings.[1] One possible reason is that financial analysts extensively use pro forma performance measures such as EBITDA, which ignore this accrual.

The forecasting coefficient on current accruals appears higher than its valuation counterpart, suggesting potential underpricing. However, the LR is relatively low and the difference between coefficients is not statistically significant. The LR corresponding to the hypothesis of rational pricing of $OACCR_t$ is virtually zero, showing that the market correctly incorporates the persistence of this component into prices. Finally, the LR statistic of 17.9 rejects the null hypotheses that the market rationally prices all the four components of earnings. The finding that the market underprices accruals is in contrast to the prior results (Sloan 1996).[2] The difference may be explained by sample characteristics but also by differences in computation of some variables. The sensitivity to the latter is explored in the next section.

Table 14. Rationality of the market pricing: (Mishkin test, System 2)

Forecasting coefficients			*Valuation coefficients*			
Parameter	*Estimate*	*Std. Error*	*Parameter*	*Estimate*	*Std. Error*	LR^{***}
α_1 *(CFO)*	.799**	.056	$\tilde{\alpha}_1$ *(CFO)*	.288	.230	22.300**
α_2 *(DEPR)*	.842**	.167	$\tilde{\alpha}_2$ *(DEPR)*	-.034	.504	13.203**
α_3 *(OACCR)*	.175	.158	$\tilde{\alpha}_3$ *(OACCR)*	.076	.229	0.208
α_4 *(NDA)*	.953**	.197	$\tilde{\alpha}_4$ *(NDA)*	1.116**	.367	0.303
α_5 *(DA)*	.680**	.169	$\tilde{\alpha}_5$ *(DA)*	.173	.417	3.374
α_6 *(UEA)*	.823**	.207	$\tilde{\alpha}_6$ *(UEA)*	.773	.594	0.030

H_0: $\alpha_4 = \tilde{\alpha}_4$ and $\alpha_5 = \tilde{\alpha}_5$ and $\alpha_6 = \tilde{\alpha}_6$	LR = 3.380
H_0: $\alpha_4 = \alpha_5$ and $\tilde{\alpha}_4 = \tilde{\alpha}_5$	LR = 7.760*
H_0: $\alpha_4 = \alpha_6$ and $\tilde{\alpha}_4 = \tilde{\alpha}_6$	LR = 7.022*

* Significant at the .05 level
** Significant at the .01 level

*** Likelihood ratio $2n\left[log(SSR^c) - log(SSR^u)\right]$ is asymptotically distributed as $\chi^2(1)$ under the null of $\alpha_k = \tilde{\alpha}_k$;
subscripts *t* and *TDM* are omitted for the sake of simplicity

[1] Recall that the variable $DEPR_t$ do not include extraordinary write-offs and impairments but only scheduled depreciation and amortization expense.
[2] The conclusions are similar when the accruals are aggregated like in Sloan (1996).

While the market appears to rationally price the implications of current accruals for future earnings, it might still be the case that some of the current accruals components are overpriced, while the others are underpriced. Table 14 displays the results of Mishkin tests based of the estimation of System 2.

Again there is only one statistically significant coefficient in the pricing equation, the one on normal accruals. Moreover, it appears to be higher than its forecasting counterpart. Nevertheless, the LR associated with the null hypothesis of coefficient equality is very low (.303). On the other hand, the pricing coefficient on DA is almost four times lower than its forecasting counterpart, even though $\alpha_5 = \tilde{\alpha}_5$ can be rejected only at .10 level. $\tilde{\alpha}_6$ being insignificant, still has a magnitude close to that of α_6 and the associated LR is virtually zero. At the same time, the mispricing of depreciation and operating cash flow is even more pronounced than in Table 13.

The LR statistics, corresponding to the joint hypothesis of rational pricing of all current accrual components, equals 3.38, which is not statistically significant at any conventional level. Nevertheless, a special case of the null hypothesis that the market does not differentiate between the persistence implications of NDA and DA ($\alpha_4 = \alpha_5$ and $\tilde{\alpha}_4 = \tilde{\alpha}_5$) is rejected at .025 level. A similar hypothesis regarding NDA and UEA ($\alpha_4 = \alpha_6$ and $\tilde{\alpha}_4 = \tilde{\alpha}_6$) is rejected at .05 level.

The general conclusion one can make from the analysis above is that on average the market prices current accruals and their components rationally. Also, market participants seem to distinguish between the implications of three current accrual components for future earnings. Nevertheless, there is still some evidence that DA are underpriced, and quite a strong evidence that depreciation accruals and cash from operations are underpriced.

As a matter of fact, when current accruals are decomposed applying the EWJM (not reported), Mishkin test statistics show that NDA is largely overpriced (LR = 8.565) and DA is underpriced (LR = 5.352). This suggests that

previous findings of market irrationality are sensitive to the accrual decomposition model employed. At the same time, it remains hard to reconcile the prior evidence of overpricing of aggregate accruals with the apparent underpricing documented in this study. In the next section I check whether differences in computation of some variable are responsible for this contradiction.

3.4 Sensitivity Analysis

It was argued in the preceding chapter that imposing bounds on maximal EM range is required for a theoretically correct specification of the TDM. In section 2.6 I show that estimates of DA and NDA are not highly sensitive to the choice of the range bounds. However, since the decisions on some of the hypotheses tested in the proceeding three sections are taken on the margin, it seems worthwhile to check whether all the conclusions still hold when those bounds are altered. To do so, all the tests involving TDM-estimated accruals carried out above in this chapter are repeated after replacing the estimates under 4% bounds by those estimated with 3% and 5% bounds. The unreported results show that all the conclusions made so far remain unaltered using these alternative specifications.

The next sensitivity check concerns the definition of variables and particularly that of earnings. As opposed to I/B/E/S-adjusted earnings used in the preceding analysis, prior literature (Xie (2001)) employed earnings before extraordinary items reported by firms (Compustat item # 18). At the same time, CFO measure employed in this study is not adjusted in the same way as earnings. Although most items backed out by analysts are of accrual nature, the dissonance between the two variables cannot be excluded. The consequence is a possible measurement error in the other long-term accruals ($OACCR_t$), since this

variable is computed as the difference of all other items.[1] In order to enhance the comparability with the previous studies, as well as to neutralize the potential impact of the mentioned measurement error, I repeat the analysis after substituting I/B/E/S-adjusted numbers by earnings before extraordinary item reported according to IFRS in the financial statements.[2] Accordingly, $OACCR_t$ is recalculated based on this measure of earnings. Since the definition of the other variables is unchanged, other long-term accruals now include all the special accrual items backed out by analysts. All the regressions and systems produced above in this chapter are reestimated with these newly computed variables. Except for a few results all the conclusions driven previously can be maintained. A noteworthy difference is found in the forecasting regression of earnings on accrual components corresponding to Panel E of Table 10. The coefficient on NDA_{TDM} is now significantly higher that those on DA_{TDM} and UEA_{TDM} (.05 significance level), which is consistent with the opportunistic EM story. Also, quite naturally, all the earnings forecasting equations have lower explanatory power than in Table 10, confirming the claim that analysts remove the most transitory elements from earnings.

Another, albeit slight, difference relates to the Mishkin tests. The $OACCR_t$ variable computed from net income appears to have a significant coefficient in the valuation equation of System1 and System 2, which is also higher than its forecasting counterpart. Although the hypothesis of rational pricing can be rejected only at 0.1 level (LR is 3.4 and 3.8 respectively in the two systems), this still provides some evidence of overpricing. Hence, the finding points to a potential reason for the results reported above contradicting to the prior evidence. Since the measure of aggregate accruals used in Xie (2001) also includes items similar to those in $OACCR_t$, and most of them are sure to appear in the DA estimated by the Jones Model, the reported overpricing can be caused

[1] Recall that $OACCR_t$ is computed as $OACCR_t = EARN_t - CFO_t - DEPR_t - \Delta WC_t$

[2] IAS 8 (revised 1993) provides the definition of extraordinary items, which is quite close to the definition of the US GAAP, although unlike the latter IFRS do not provide a list of items, which cannot be disclosed as extraordinary.

by these items.[1] Nevertheless, the latter conclusion should be interpreted with caution, because of the marginal statistical significance of the relevant test. In all other aspects redefining the earnings variable does not change the tenor of the results received in sections 3.1-3.3.

Dechow et al. (1998) show that the predictive ability of earnings for future cash flows depends on the firm's operating cycle. For similar reasons the implication of earnings components should vary with this fundamental. Since the preceding analysis is entirely carried out in a cross-section of firms having largely different cycle length, the coefficient estimates and the conclusions that follow might not be the same for all of them. Given the relatively small sample size, the cost of splitting it into deciles and even into quartiles, as usually done in the literature appear to be very high in terms of asymptotic efficiency. Hence, I divide the sample into halves, based on the firm-average length of the working capital cycle.[2] The forecasting equations are estimated separately for each subsample, taking first future earnings and then future cash flows for the dependent variable. For the sake of parsimony the estimation results are reported only for the regressions corresponding to Model 5 in section 3.1. No material information relevant for the current analysis is added by the other more concise models. Table 15 provides the output for the earnings forecasting. In Panel A (B) I report the results for the subsample of firms having the shorter (longer) cycle lengths.

The picture is quite different in the two panels. The forecasting coefficients on CFO_t, $DEPR_t$ and $OACCR_t$ are substantially lower for the firms having a shorter cycle.[3] The difference is more evident in the case of depreciation, which has an insignificant coefficient in Panel A. This difference can be related to the positive correlation between the cycle length and fixed asset intensity, measured as the ratio of depreciation expense to sales revenues.

[1] Although the author performs sensitivity analysis removing special items, which are suggested to be unusual but rather not discretionary, from earnings and accruals, the procedure does not exclude the possibility that some of the items removed by analysts still remain in the accrual measure.
[2] The results presented further are essentially the same when operating cash cycle is used to split the sample.
[3] When current accruals are not decomposed the corresponding coefficient is also smaller.

More interestingly, the relationships between the coefficients on current accrual components are rather different. In Panel B these coefficients are quite close to each other and to the coefficient on CFO_t. In fact, the Wald statistics associated with the null of pairwise equality are all very close to zero.

In Panel A, however, the coefficient on NDA_{TDM} is significantly higher than those on DA_{TDM} and UEA_{TDM} and even the one on CFO_t. These results seem rather difficult to interpret at this stage.[1] It can be suggested that discretionary accruals are mostly opportunistic for firms with faster cycling working capital and mostly informative for firms with longer cycles. However, a similar behavior for UEA is not consistent with this story, unless the latter also contains discretionary accruals not captured by the TDM. Under an alternative scenario, the firms with longer cycles can defer the reversal of DA more easily causing a positive first-order autocorrelation.

Table 15. Forecasting earnings: firms with different WC cycle length.

Panel A. Subsample of firms with below-median WC cycle. ***

Parameter	α_1*(CFO)*	α_2*(DEPR)*	α_3*(OACCR)*	α_4*(NDA)*	α_5*(DA)*	α_6*(UEA)*	R^2 (adj)
Value	.665	.300	-.187	1.093	.347	.354	.488
Std. Error	.069	.225	.160	.207	.173	.272	
Prob.	.000	.183	.243	.000	.048	.196	
Wald-tests	$\alpha_4 = \alpha_6$: χ^2 =4.248*		$\alpha_1 = \alpha_4$: χ^2 = 4.229*		$\alpha_4 = \alpha_5$: χ^2 =5.692*		

Panel B. Subsample of firms with above-median WC cycle. ***

Parameter	α_1*(CFO)*	α_2*(DEPR)*	α_3*(OACCR)*	α_4*(NDA)*	α_5*(DA)*	α_6*(UEA)*	R^2 (adj)
Value	.934	1.229	.359	.839	.873	1.063	.486
Std. Error	.111	.288	.204	.259	.285	.280	
Prob.	.000	.000	.081	.002	.003	.000	
Wald-tests	$\alpha_4 = \alpha_6$: χ^2 =.344		$\alpha_1 = \alpha_4$: χ^2 =.188		$\alpha_4 = \alpha_5$: χ^2 =.011		

* Significant at the .05 level
** Significant at the .01 level
*** The dependent variable is $EARN_{t+1}$; number of observations = 138 and 139
subscripts *t* and *TDM* are omitted for the sake of simplicity

Attempting to provide an explanation for the observed differences, it seems useful to have a look at the differences between characteristics of accrual

[1] The unreported statistics show that only NDA is correlated with the firm-average WC cycle (.27).

components for the two subsamples defined above. Tables B2 and B3 (see Annex B) provide descriptive statistics and Pearson correlations for the subsample of firms having respectively below- and above-median firm-average WC cycle length. The bivariate correlation coefficients tell us a slightly different story from the one suggested by regression estimates. Thus, for the subsample of firms with longer cycles the Pearson correlation of NDA_{TDM}, DA_{TDM} and UEA_{TDM} with future earnings is .38, .09 and .18 respectively. On the other hand, in the below-median subsample the corresponding values are .15, .03 and .04 neither of which is statistically different from zero. This suggests that the correlation with some other earnings component is accountable for the results in Table 15. $OACCR_t$ seems to be that variable. One can see from Panel B of Table B2 that NDA_{TDM} is positively correlated with this variable while DA_{TDM} and UEA_{TDM} negatively. These differences are more salient than those in Panel B of Table B3, where the correlation between NDA_{TDM} and $OACCR_t$ is not significant. When $OACCR_t$ is excluded from the forecasting regression the coefficient estimates become quite similar for the two subsamples resembling the pecking order in Panel E of Table 10.[1]

Looking at the descriptive statistics computed from the two subsamples, one can notice several slight differences. The long-cycle firms appear slightly more profitable, although the volatility of earnings is also higher. Mean (median) current accruals are also higher in this sample. Moreover, while the mean (median) NDA_{TDM} of the short-cycle firms is substantially smaller than the mean (median) DA_{TDM}, the mean (median) NDA_{TDM} of the long-cycle firms are larger. Nevertheless, most of the observed differences are not statistically significant (not reported). Only in the below-median subsample mean NDA_{TDM} is significantly smaller than mean DA_{TDM}. The difference between NDA_{TDM} means in two samples is also statistically significant. The latter finding is not

[1] This idea also seems to be supported when the forecasting regressions are estimated using earnings before extraordinary items, and thus, $OACCR_t$ is adjusted accordingly. With this specification the coefficient on NDA is substantially higher, although the difference is only marginally significant.

surprising, since firms having relatively high accrual balances might be expected to have relatively larger changes in case the averages are positive.

In order to shed more light on the importance of the WC cycle length for the role and nature of different accrual component, I report the estimates of the cash flow forecasting regression in Table 16. Panel A (B) provides statistics for the subsample of firms with shorter (longer) operating cycles. The coefficient on CFO_t is almost identical in the two regressions. The depreciation coefficient changes sign but remains insignificant. Hence, it deserves no additional comment. The firms having shorter cycle appear to have a significant and negative coefficient on other long-term accruals. Since this component of earnings includes many items having quite different accounting nature, it is hard to see clear reasons for the difference between the two subsamples.

As in the case with earnings forecasting, the main differences between the two regressions refer to the working capital components. In Panel A the coefficient on NDA_{TDM} equals .817 and it is highly significant. At the same time the coefficients on DA_{TDM} and UEA_{TDM} are negative and close to zero. The null of $\alpha_4 = \alpha_5$ is rejected at .05, while the null of $\alpha_4 = \alpha_6$ can be rejected only at .10 level. Thus, the results for this subsample show that higher than average current normal accruals in current period are associated with higher than average future cash flows. At the same time, discretionary accruals estimated by the TDM appear to be irrelevant for cash flow forecasting.

On the other hand, Panel B highlights that the observed differential implication of accrual components is a characteristic of the firms with shorter cash cycles. The results for the second subsample suggest that current cash flow is the only earnings component that matters for the prediction of the next-year CFO.

The coefficients on all current accrual components are not significantly different from zero. Also, none of these coefficients is significantly different from the others. The fact that the importance of accruals decreases with the length of the operating cycle was already documented in the literature (see e.g.,

Barth et al. (2001), Dechow and Dichev (2001)). Since DA appear to be irrelevant in both subsamples, this study suggests that the decrease in relevance should be primarily attributed to normal accruals.

Table 16. Forecasting cash flow: firms with different WC cycle length.

Panel A. Subsample of firms with below-median WC cycle. ***

Parameter	α_1(CFO)	α_2(DEPR)	α_3(OACCR)	α_4(NDA)	α_5(DA)	α_6(UEA)	R^2 (adj)
Value	.469	-.404	-.530	.817	-.090	-.085	.297
Std. Error	.111	.345	.215	.297	.237	.379	
Prob.	.000	.245	.015	.007	.703	.821	
Wald-tests	$\alpha_4 = \alpha_6$: χ^2 = 2.887		$\alpha_1 = \alpha_4$: χ^2=1.126		$\alpha_4 = \alpha_5$: χ^2 = 3.960*		

Panel B. Subsample of firms with above-median WC cycle. ***

Parameter	α_1(CFO)	α_2(DEPR)	α_3(OACCR)	α_4(NDA)	α_5(DA)	α_6(UEA)	R^2 (adj)
Value	.461	.129	-.200	.245	.210	.274	.185
Std. Error	.101	.248	.243	.252	.333	.423	
Prob.	.000	.604	.413	.332	.530	.517	
Wald-tests	$\alpha_4 = \alpha_6$: χ^2 =.003		$\alpha_1 = \alpha_4$: χ^2 = .610		$\alpha_4 = \alpha_5$: χ^2 = .004		

* Significant at the .05 level
** Significant at the .01 level
*** The dependent variable is CFO_{t+1}; number of observations = 138 and 139; subscripts *t* and *TDM* are omitted for the sake of simplicity

Larger management's estimation errors may be considered as one potential reason for such a shrink. The argument is that it is more difficult to make precise estimates, when the accrual components of revenues and expenses are higher relative to cash components. However, the positive and significant earnings-prediction coefficients in Panel B of Table 15 imply that management's estimation errors cannot be the major reason for the lower predictive power.[1]

Neither of the bivariate correlation coefficients between current accrual components and future cash flows is significant in both subsamples (see Tables B2 and B3). This implies that the differential implications derived from the multiple regressions should be regarded in the light of the contemporaneous relationships with the other earnings components. Maybe the most remarkable difference related to the issue refers to the correlation between ΔWC_t or, in

[1] The estimation errors are expected, by nature, to introduce negative serial correlation in earnings.

particular, its NDA component and current period CFO. While the correlations between DA and UEA with CFO does not differ materially between the subsamples, the correlation of normal accruals with current cash flow is substantially lower (more negative) for the short-cycle firms. Thus, the coefficient on NDA_t amounts to -.43 and differs from zero at .01 significance level. At the same time, the corresponding coefficient in the long-cycle subsample cannot be statistically distinguished from zero.[1] Since aggregate current accruals exhibit similar property, these differences cannot be caused by some estimation error inherent to the TDM.

Next I examine whether the differential pricing of the current accrual components documented in section 3.2 depends on the working capital cycle length. Again pricing regressions are estimated separately for the below-median and the above-median subsamples. The results are provided in Table 17.

Table 17. Pricing of earnings components: firms with different WC cycle length.

Panel A. Subsample of firms with below-median WC cycle. ***

Parameter	α_1(CFO)	α_2(DEPR)	α_3(OACCR)	α_4(NDA)	α_5(DA)	α_6(UEA)	R^2 (adj)
Value	3.841	5.309	.352	6.684	3.926	4.709	.198
Std. Error	.691	2.362	1.707	2.073	1.805	2.866	
Prob.	.000	.026	.837	.001	.031	.102	
Wald-tests	$\alpha_4 = \alpha_6$: χ^2 =.262		$\alpha_1 = \alpha_4$: χ^2=1.769		$\alpha_4 = \alpha_5$: χ^2=.734		

Panel B. Subsample of firms with above-median WC cycle. ***

Parameter	α_1(CFO)	α_2(DEPR)	α_3(OACCR)	α_4(NDA)	α_5(DA)	α_6(UEA)	R^2 (adj)
Value	1.696	-.986	-2.472	4.687	-2.832	5.302	.262
Std. Error	.675	1.556	1.118	1.145	1.495	1.797	
Prob.	.013	.528	.028	.000	.060	.004	
Wald-tests	$\alpha_4 = \alpha_6$: χ^2 =.077		$\alpha_1 = \alpha_4$: χ^2=5.945*		$\alpha_4 = \alpha_5$: χ^2=16.155**		

* Significant at the .05 level
** Significant at the .01 level
*** The dependent variable is $MAJR_t$; number of observations = 177 and 177; subscripts *t* and *TDM* are omitted for the sake of simplicity

[1] Conditional on the variance of cash flow and accruals, the higher is the magnitude of the negative correlation between these two earnings components, the smaller must be the variance of earnings. Thus, the results suggest that accruals play some other role than simply smoothing current cash flows for firms having a longer operating cycle.

One can see from Panel A that the coefficient on NDA_{TDM} is higher than the coefficient on UEA_{TDM}, which is in turn larger than the coefficient on DA_{TDM}. Nevertheless, additional (Wald) tests do not allow to reject the null hypotheses of equality of these parameters at any conventional level. The reported statistics indicate that, despite the relatively high magnitude, α_6 (UEA coefficient) is not statistically different from zero. The coefficient on DA_{TDM} is, however, significant at .05 level. This might seem surprising given that this component was found insignificant in predicting next-year earnings and cash flow for the short-cycle subsample. I return to this question below.

Panel B of the tables provides quite a different picture. The coefficients on NDA_{TDM} and UEA_{TDM} are positive, large in magnitudes and highly significant. The Wald statistics corresponding to the null of their equality is close to zero (.077). On the other hand, the pricing coefficient on discretionary accruals is negative, even though it is only marginally significant. The hypothesis $\alpha_4 = \alpha_5$ is strongly rejected, showing that the market clearly distinguishes between discretionary and normal accruals. The coefficient on CFO_{TDM} is lower that in Panel A, and it is significantly smaller than α_4. This is consistent with findings in Dechow (1994), which show that the superiority of earnings over cash flow as a performance measure increases with the length of the operating cycle. Among other differences from Panel A is the insignificance of depreciation accrual and negative and significant pricing of other long-term accruals. The pricing of depreciation and amortization is consistent with the implications for next-period earnings inferred from Table 15. As far as the current accrual components are concerned, market pricing does not seem to rely uniquely on the one-year-ahead implications. Thus, in the long-cycle subsample the coefficients on DA_{TDM} and NDA_{TDM} are significantly different neither in earnings- nor in cash-flow-forecasting equations. One possible reason is that the market incorporates in prices some other information reflected in the current-period earnings components. This might be, for example, the implication for two- or three-year-ahead cash flows. Unfortunately the limited sample size does not permit to

investigate this possibility in depth. Nevertheless, we cannot rule out mispricing as a potential reason for the differences between the forecasting and pricing equations. In an attempt to check for such a possibility I perform Miskin tests similar to those in section 3.3 separately for each subsample. The results provide not much new information in addition to the findings presented above, and hence, I do not report them for the sake of parsimony.[1] The hypothesis of rational pricing cannot be rejected for any of the current accrual components in either of the samples. The only interesting finding of these additional tests is that the underpricing of operating cash flow discovered in section 3.3 is entirely attributable to firms with shorter than the median working capital cycle. Thus, CFO of the firms with longer than median WC cycle, being a poorer performance measure in the sense mentioned above, appears to be correctly priced by the market. There seems to be no obvious explanation for such a difference. A more in-depth examination of potential reasons is beyond the scope of this work.

I can now summarize the results of this section. Using the TDM estimates with slightly varying constraints does not affect the tenor of the results. The conclusions derived in the preceding sections remain valid under alternative specification of the earnings variable. However, using earnings before extraordinary items permits to reject the hypothesis that discretionary and normal accruals are equally relevant for forecasting future earnings. When the study sample is split into halves based on the length of the operating cycle, the strength of the inference differs, sometimes qualitatively, between the two groups. DA and UEA appear irrelevant for forecasting earnings of the short-cycle firms, while for long-cycle firms these components are as relevant as normal accruals. NDA is the only component to have significance for next-year cash flows. Also this significance holds only in the below-median sample. The examination of several properties of earnings components suggest that the

[1] Since the Mishkin procedure heavily relies on the asymptotic properties of the test statistics, the inferences from the split samples with only about 140 observations per regression should be interpreted with caution.

received differences are not simply caused by bivariate relationships between the estimated current accrual components and future performance. Rather there seems to exist fundamental differences in the accrual process between firms with different operating cycle length, which may also determine the nature of EM. Further investigation of this question is left to future research.

The pricing coefficients estimated using the above-median sample strongly point out to the opportunistic nature of DA, successfully detected by market participants. The respective results from the below-median sample put into question such a conclusion and suggest to look for other explanations such as, for example, some properties attributed by the decomposition procedure. Nevertheless, we cannot exclude that accounting discretion might have a different nature depending on the length of the operating cycle and therefore the properties of normal accruals.

The overall evidence in this chapter balances in favor of the opportunistic or misleading nature of DA. In the results above, the pricing and forecasting coefficients on DA are not significant more often than their NDA counterparts. Also, while in some of the regressions the coefficient on normal accruals is significantly higher than that on DA, the opposite is never the case. It goes without saying that the evidence remains far from overwhelming and exhaustive.

At this point I end the third and the last chapter of this thesis. Next follow the general summary and conclusions including suggestions for future research.

SUMMARY AND CONCLUSIONS

Chapter 1 creates the background for the rest of this thesis. In particular, having reviewed and classified the received theoretical and empirical literature I suggest a generalized framework of the EM process. The framework allows to classify and define a clear role for the main elements of the EM phenomenon including incentives, objectives as well as initiators and addressees of EM actions. Such a generalized scheme provides at least two useful implications. First, it allows to better define the purpose of numerous variables, which until present have been employed by researchers in rather an unsystematic way. For example, relying on the framework one can assess whether a particular observable variable is a proxy for incentives or rather for constraints to managing earnings. Alternatively, the same variable can refer to particular circumstances, where the desired effect of EM might be particularly strong. The interpretation and the implications of empirical results obviously depend on the appropriateness of the chosen proxy. Second, it follows from the created framework that although incentives and particular circumstances condition the desired effects and their intensity, the practical necessity and capacity of engaging in EM is determined by the deviations of pre-managed earnings from some benchmarks or earnings targets.

Chapter 2 builds on the framework summarized above in order to derive a conceptually new model for estimating the managed portion of earnings. The model is intended to overcome some serious drawbacks of the existing residual-based or Jones-type models heavily criticized in the literature. Thus, these models usually assume that the parameters are estimated in a sample where observations are not affected by accounting manipulations and the obtained estimates objectively reflect the accounting process absent EM. This assumption is criticized by many authors for being implausible in many applications. Even if the hypothesis holds, researchers must still require that explanatory variables do not contain discretionary amounts in the test sample. The Target-Deviation

Model derived in section 2.2 does not require such restrictive assumptions. Therefore, the model can be estimated in any sample without imposing orthogonality between discretionary and normal accruals. In order to make the TDM empirically treatable some additional structure is imposed on the model in section 2.3. In addition to decomposing accruals into discretionary and non-discretionary components the model permits to test directly for an evidence of EM around some targets.

In section 2.5 the TDM model is estimated using a sample of Swiss and German firms applying IFRS to present consolidated accounts. The received evidence strongly supports the hypotheses that managers recognize discretionary accruals in order to meet analysts' forecast, to avoid losses and decreases of earnings relative to preceding periods, and to smooth the reported income stream. Nevertheless, caution is necessary in interpreting the results in the context of some targets. For example, the analyst's consensus forecast being highly correlated with reported earnings, the robustness of evidence is questionable and requires additional testing.

As far as the estimated magnitudes are concerned, those produced by the TDM are clearly more realistic than those estimated by existing techniques. Using the same sample, a version of the popular Jones Model produces a median ratio of discretionary current accruals to total current accruals that amounts to .75. Such a high proportion clearly cast doubt on the very usefulness of accrual accounting. In contrast, the ratio produced by the TDM ranges between .4 and .46 depending on the assumed bounds. Also, the coefficient of correlation between the DA estimates from two competing models is low relative to those obtained by the alternative models suggested in previous studies. This finding corroborates the idea that the Target-Deviation Model tells us a different story about EM. Furthermore, the properties of the accrual components produced by the TDM, such as the relationship to performance measures, are more plausible and consistent with the theory than those of the components estimated by the residual-based models.

The derivation of the Target-Deviation Model opens vast opportunities for future research. Given that the sample used in the empirical part of this study is considerably smaller than the ones typically exploited by accrual decomposition models, it is of a great interest to investigate whether the reported results are sensitive to sample selection. A use of a larger sample would also allow to test whether the parameters estimated by the model remain more or less stable through time. Most of the data employed in this study are obtained through a time-consuming search in financial statements and a number of adjustments mentioned in section 2.4. It would be interesting to question whether the results will be materially different if the data are collected from widely available commercial databases.

Since the TDM permits to overcome some serious drawbacks of the existing approaches, the model can be used to check the robustness of numerous prior findings put into question by the flawed research design.

The empirical results obtained in this study contribute to the growing debate over the observed kinks in the earnings distribution. In particular, they suggest that at least partially the kink is caused by discretionary accounting. Consistent with the evidence from some recent studies, the TDM estimates suggest that meeting or beating the consensus forecast is a priority for firms' management. Future studies can rely on the TDM to examine the role of other earnings targets that I do not integrate in the model but that might be more important in a different institutional environment. A related possibility consists in testing for alternative definitions of earnings that could be used as the EM object. In fact, the TDM allows for a possibility where one earnings measure might be the object of EM around some targets, while another measure is benchmarked to some other targets. For example one can estimate the model assuming that I/B/E/S-adjusted earnings are manipulated in order to meet expectations, but the bottom line net income is managed in order to avoid reporting losses.

Finally, Chapter 3 is entirely devoted to the role of EM in stock valuation. In particular, I examine whether accrual components estimated by alternative decomposition models have different implications for next-period earnings and cash flows. The market pricing of the earnings components is also tested using alternative accrual decomposition models.

The results obtained employing the Jones Model adapted for pooled samples appear to be inconsistent with the opportunistic EM hypothesis. In most cases DA appear to be more valuable for forecasting future performance than NDA, and the markets do not distinguish between the two components. At the same tame, the evidence based on the TDM estimates is somewhat mixed. For example, although NDA has a significantly higher coefficient in predicting future earnings, this is the case only for firms having a relatively short operating cycle. Similar conclusions can be made from the cash flow forecasting regression, where the coefficient on DA cannot be distinguished from zero in the below-median subsample. While only the coefficient on NDA is positive and highly significant for this subgroup, non of the current accrual components has a significant coefficient in the above-median subsample. There is also strong evidence that the financial markets differentiate between components estimated by the TDM. Again, however, the differentiation appears stronger in one of the subsamples.

The overall evidence inclines towards the pertinence of the TDM model to the analysis of earnings and performance forecasting. In all the estimations, NDA component appears at least as relevant for valuation as the DA component, while the opposite is never the case. It seems worthwhile to mention that although in most of the considered cases the coefficient estimates are comparable to those obtained in prior studies, the standard errors are always much larger. I believe that this difference is largely attributable to the considerably smaller number of observations available for the tests in this study. If this is the case, then using a larger study sample might allow to reject some of

the hypotheses making the above results more complete and convincing. This gives another opportunity for future research.

Mishkin tests inquire into the rationality of pricing of earnings components leading to conclusions only partially consistent with previous findings. In contrast to Sloan (1996), I do not find that market overprices total accruals. The tests also suggest that current accrual components are rationally priced by investors. However, similar to the prior findings, cash from operations appears to be strongly underpriced, and the sensitivity results reveal that the inefficiency is related to the shares of companies having below-median WC cycle. Exploiting this inefficiency must give rise to abnormal returns.

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ANNEX A

Table A1. Firms included in the study sample by industry and economic sector

Company Name	Sector	Industry
SZ TESTSYSTEME	CONSUMER DURABLES	APPLIANCES
SACHSENRING AUTOMOBIL.	CONSUMER DURABLES	AUTOMOBILES
HARPEN	BASIC INDUSTRIES	BAS MULTI-INDUSTRY
EICHHOF	CONSUMER NON-DURABLES	BEVERAGES & TOBACCO
HAWESKO HOLDING	CONSUMER NON-DURABLES	BEVERAGES & TOBACCO
CINEMEDIA FILM	CONSUMER SERVICES	BROADCST & PUB
MEDIA!	CONSUMER SERVICES	BROADCST & PUB
TV LOONLAND	CONSUMER SERVICES	BROADCST & PUB
SENATOR FILM	CONSUMER SERVICES	BROADCST & PUB
ODEON FILM	CONSUMER SERVICES	BROADCST & PUB
DYCKEROFF	CAPITAL GOODS	BUILDING MATERIALS
FORBO	CAPITAL GOODS	BUILDING MATERIALS
HEIDELBERGER ZEMENT	CAPITAL GOODS	BUILDING MATERIALS
SIKA	CAPITAL GOODS	BUILDING MATERIALS
TARKETT SOMMER	CAPITAL GOODS	BUILDING MATERIALS
CENIT	CONSUMER SERVICES	BUS & PUB SVC
BOSSARD	CONSUMER SERVICES	BUS & PUB SVC
CEYONIQ	CONSUMER SERVICES	BUS & PUB SVC
SGS HOLDING	CONSUMER SERVICES	BUS & PUB SVC
DAETWYLER	CAPITAL GOODS	CAP MULTI-INDUSTRY
BAYER	BASIC INDUSTRIES	CHEMICALS
EMS CHEMIE	BASIC INDUSTRIES	CHEMICALS
GURIT	BASIC INDUSTRIES	CHEMICALS
HENKEL VZ	BASIC INDUSTRIES	CHEMICALS
BACHEM	BASIC INDUSTRIES	CHEMICALS
LONZA	BASIC INDUSTRIES	CHEMICALS
CLARIANT	BASIC INDUSTRIES	CHEMICALS
SIEGFRIED	BASIC INDUSTRIES	CHEMICALS
QUADRANT*	BASIC INDUSTRIES	CHEMICALS
GEBERIT	CAPITAL GOODS	CONSTRUCTION
HOLDERBANK CEMENT	CAPITAL GOODS	CONSTRUCTION
HOCHTIEF	CAPITAL GOODS	CONSTRUCTION
ZSCHOKKE	CAPITAL GOODS	CONSTRUCTION
INFOR BUSINESS SOLUTIONS	TECHNOLOGY	DATA PROCESSING
ARTICON-INTEGRALIS	TECHNOLOGY	DATA PROCESSING
ASCOM HOLDING	CAPITAL GOODS	ELECTRICAL & ELECTR
ALSO HOLDING	CAPITAL GOODS	ELECTRICAL & ELECTR
DISETRONIC HOLDING	CAPITAL GOODS	ELECTRICAL & ELECTR
GRETAG IMAGING	CAPITAL GOODS	ELECTRICAL & ELECTR
LOEWE	CAPITAL GOODS	ELECTRICAL & ELECTR
LEM HOLDING	CAPITAL GOODS	ELECTRICAL & ELECTR
LPKF LASER & ELECTRONICS	CAPITAL GOODS	ELECTRICAL & ELECTR

MICRONAS SEMICONDUCTOR	CAPITAL GOODS	ELECTRICAL & ELECTR
PHOENIX MECANO	CAPITAL GOODS	ELECTRICAL & ELECTR
VIVANCO GRUPPE	CAPITAL GOODS	ELECTRICAL & ELECTR
PLAMBECK	CAPITAL GOODS	ELECTRICAL & ELECTR
CICOREL HOLDING	TECHNOLOGY	ELECTRONIC COMP
LINTEC COMPUTER	TECHNOLOGY	ELECTRONIC COMP
ELMA ELECTRONICS	TECHNOLOGY	ELECTRONIC COMP
MENSCH UND MASCHINE SOFT	TECHNOLOGY	ELECTRONIC COMP
MIKRON HOLDING	TECHNOLOGY	ELECTRONIC COMP
UNAXIS HOLDING	TECHNOLOGY	ELECTRONIC COMP
TECAN AG REG	TECHNOLOGY	ELECTRONIC COMP
SAIA-BURGESS	TECHNOLOGY	ELECTRONIC COMP
MAXDATA COMPUTER	TECHNOLOGY	ELECTRONIC COMP
SEZ	TECHNOLOGY	ELECTRONIC COMP
HERO	CONSUMER NON-DURABLES	FOOD & HOUSEHOLD
AS CREATION TAPETEN	CONSUMER NON-DURABLES	FOOD & HOUSEHOLD
NESTLE	CONSUMER NON-DURABLES	FOOD & HOUSEHOLD
SUEDZUCKER	CONSUMER NON-DURABLES	FOOD & HOUSEHOLD
BARRY CALLEBAUT	CONSUMER NON-DURABLES	FOOD & HOUSEHOLD
SIHL ZURCHER PAPIERFABRIK	BASIC INDUSTRIES	FOREST PRODUCTS
PHONAK HOLDING	HEALTH CARE	HEA MULTI-INDUSTRY
CENTERPULSE	HEALTH CARE	HEA MULTI-INDUSTRY
MWG-BIOTECH	HEALTH CARE	HEA MULTI-INDUSTRY
ALTANA	HEALTH CARE	HEALTH CARE
SERONO	HEALTH CARE	HEALTH CARE
BEIERSDORF	HEALTH CARE	HEALTH CARE
ROCHE HOLDING	HEALTH CARE	HEALTH CARE
MERCK KGAA	HEALTH CARE	HEALTH CARE
NOVARTIS	HEALTH CARE	HEALTH CARE
RHOEN-KLINIKUM	HEALTH CARE	HEALTH CARE
SCHERING	HEALTH CARE	HEALTH CARE
UNILABS	HEALTH CARE	HEALTH CARE
WELLA	HEALTH CARE	HEALTH CARE
WALTER MEIER HOLDINGS	CAPITAL GOODS	INDUSTRIAL COMP
TECHNOTRANS	CAPITAL GOODS	INDUSTRIAL COMP
DIS DEUTSCHE IND. SERV.*	INDUSTRIAL	INDUSTRIAL SERVICES
KUONI	CONSUMER SERVICES	LEISURE & TOURISM
MOEVENPICK	CONSUMER SERVICES	LEISURE & TOURISM
AGIE CHARMILLES	CAPITAL GOODS	MACHINERY & ENG
BUCHER HOLDING	CAPITAL GOODS	MACHINERY & ENG
GEORG FISCHER	CAPITAL GOODS	MACHINERY & ENG
HEIDELBERGER DRUCK.	CAPITAL GOODS	MACHINERY & ENG
KOMAX	CAPITAL GOODS	MACHINERY & ENG
NEXTROM HOLDING	CAPITAL GOODS	MACHINERY & ENG
RIETER	CAPITAL GOODS	MACHINERY & ENG
INTERROLL	CAPITAL GOODS	MACHINERY & ENG
SALTUS TECHNOLOGY	CAPITAL GOODS	MACHINERY & ENG
SAURER	CAPITAL GOODS	MACHINERY & ENG

SWISSLOG HOLDING	CAPITAL GOODS	MACHINERY & ENG
SIG	CAPITAL GOODS	MACHINERY & ENG
SULZER	CAPITAL GOODS	MACHINERY & ENG
SCHWEITER TECHNOLOGIES	CAPITAL GOODS	MACHINERY & ENG
ZELLWEGER	CAPITAL GOODS	MACHINERY & ENG
UNITED LABELS	CONSUMER SERVICES	MERCHANDISING
DEUTSCHE ENTERTAINMENT	CONSUMER SERVICES	MERCHANDISING
JELMOLI	CONSUMER SERVICES	MERCHANDISING
SELECTA	CONSUMER SERVICES	MERCHANDISING
METRO	CONSUMER SERVICES	MERCHANDISING
VON ROLL	BASIC INDUSTRIES	METALS – STEEL
SCHMALBACH-LUBECA	BASIC INDUSTRIES	MISC. MATERIALS
ADIDAS-SALOMON	CONSUMER NON-DURABLES	RECREATION
PUMA	CONSUMER NON-DURABLES	RECREATION
BRAIN FORCE SOFTWARE	TECHNOLOGY	TEC MULTI-INDUSTRY
BRAIN INTERNATIONAL	TECHNOLOGY	TEC MULTI-INDUSTRY
TRIA SOFTWARE	TECHNOLOGY	TEC MULTI-INDUSTRY
CDV SOFTWARE ENTERTAINMENT	TECHNOLOGY	TEC MULTI-INDUSTRY
AC SERVICE	TECHNOLOGY	TEC MULTI-INDUSTRY
COMPUTERLINKS	TECHNOLOGY	TEC MULTI-INDUSTRY
TRANSTEC	TECHNOLOGY	TEC MULTI-INDUSTRY
TA TRIUMPH-ADLER	TECHNOLOGY	TEC MULTI-INDUSTRY
SOFTM SOFTWARE	TECHNOLOGY	TEC MULTI-INDUSTRY
BREMER WOLLE-KAMMER	CONSUMER NON-DURABLES	TEXTILES & APPAREL
KUEHNE & NAGEL INTL	TRANSPORTATION	TRA MULTI-INDUSTRY

Data source: Thomson I/B/E/S International Summary History

* These firms are missing from the Thomson I/B/E/S Summary files. Home exchange classifications are used

ANNEX B

Definition of variables described in the following tables:

$EARN_{t(t+1)}$ = annuals earnings in year *t (t+1)* from I/B/E/S Summary files (section 2.4)
$CFO_{t(t+1)}$ = operating cash flow year *t (t+1)* reported in financial statements (section 2.4)
$DEPR_t$ = depreciation of property plant and equipment plus amortization of identifiable intangible assets (section 3.1)
$OACCR_t$ = other long-term accruals (section 3.1)
ΔWC_t = current accruals is the change in noncash working capital accounts (section 2.4)
NDA_{EWJM} = non-discretionary (normal) accruals computed by the EWJM model (section 2.2)
DA_{EWJM} = discretionary (abnormal) accruals computed by the EWJM model (section 2.2)
NDA_{UAM} = non-discretionary (normal) accruals computed by the UAM model (section 2.2)
DA_{UAM} = discretionary (abnormal) accruals computed by the UAM model (section 2.2)
NDA_{TDM} = non-discretionary (normal) accruals computed by the TDM model (section 2.2)
NDA_{TDM} = discretionary (abnormal) accruals computed by the TDM model (section 2.2)
UEA_{TDM} = unexpected accruals computed by the TDM model (section 2.2)

More detailed definitions and data sources are provided in the corresponding sections of the main text.

Table B1. Descriptive statistics of estimated accrual measures for the full sample

Panel A.

	DA_{EWJM}	DA_{UAM}	DA_{TDM}	NDA_{EWJM}	NDA_{UAM}	NDA_{TDM}	UEA_{TDM}	ΔWC
Mean	.000	.000	.015	.014	.014	.000	.000	.014
Median	-.002	.000	.014	.010	.012	-.005	-.001	.010
Max	.188	.206	.173	.159	.253	.218	.132	.264
Min	-.204	-.159	-.139	-.062	-.156	-.152	-.071	-.159
Std. Dev.	.051	.036	.032	.027	.045	.044	.021	.058
Med. Ratio	.698	.397	.426	.295	.603	.397	.051	1

Panel B. Correlation coefficients***

	DA_{EWJM}	DA_{UAM}	DA_{TDM}	NDA_{EWJM}	NDA_{UAM}	NDA_{TDM}	UEA_{TDM}	ΔWC
DA_{EWJM}	1	.711**	.667**	-.002	.482**	.382**	.246*0*	.857**
DA_{UAM}	.717**	1	.796**	.050	.013	-.023	.368**	.655**
DA_{TDM}	.678**	.780**	1	-.105*	.007	-.080	-.066	.528**
NDA_{EWJM}	.000	.000	-.170**	1	.524**	.641**	.065	.413**
NDA_{UAM}	.552**	.000	.032	.610**	1	.955**	.024	.684**
NDA_{TDM}	.458**	.000	-.048	.731**	.967**	1	-.010	.637**
UEA_{TDM}	.425**	.551**	.000	.015	.042	.024	1	.262**
ΔWC	.881**	.632**	.517**	.473**	.775**	.749**	.381**	1

* Correlation is significant at the .05 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)
*** Pearson coefficients are below diagonal and Spearman coefficient above diagonal.
Number of observations = 466

ANNEX B

Table B2. Descriptive statistics (subsample of firms with below-median WC cycle)***

Panel A. Descriptive statistics

	$EARN_{t+1}$	CFO_{t+1}	CFO	$DEPR$	$OACCR$	ΔWC	NDA_{TDM}	DA_{TDM}	UEA_{TDM}
Mean	.041	.081	.076	-.043	-.005	.009	.001	.008	.000
Median	.042	.084	.084	-.043	-.006	.010	-.001	.011	.000
Max	.447	.286	.183	-.015	.111	.096	.057	.069	.046
Min	-.139	-.047	-.081	-.088	-.147	-.122	-.043	-.114	-.034
Std.Dev.	.061	.053	.052	.015	.028	.032	.017	.024	.013

Panel B. Correlation coefficients (Pearson)

	$EARN_{t+1}$	CFO_{t+1}	CFO	$DEPR$	$OACCR$	ΔWC	NDA_{TDM}	DA_{TDM}	UEA_{TDM}
$EARN_{t+1}$	1								
CFO_{t+1}	.446**	1							
CFO	.471**	.368**	1						
$DEPR$	-.013	-.068	-.083	1					
$OACCR$	-.276**	-.292**	-.360**	-.055	1				
ΔWC	.139	.130	-.334**	-.100	-.186	1			
NDA_{TDM}	.149	.061	-.429**	.133	.358**	.628**	1		
DA_{TDM}	.028	.064	-.176*	-.203*	-.309**	.777**	.187*	1	
UEA_{TDM}	.038	.083	.027	-.080	-.348**	.165	-.164	-.188*	1

* Correlation is significant at the .05 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)
*** The subscript *t* is omitted forth sake of simplicity. Number of observations = 138
WC cycle is defined in section 2.3

ANNEX B

Table B3. Descriptive statistics (subsample of firms with above-median WC cycle)***

Panel A. Descriptive statistics

	$EARN_{t+1}$	CFO_{t+1}	CFO	$DEPR$	$OACCR$	ΔWC	NDA_{TDM}	DA_{TDM}	UEA_{TDM}
Mean	.056	.079	.081	-.041	-.002	.018	.010	.007	.001
Median	.052	.085	.086	-.038	-.004	.015	.010	.005	.001
Max	.271	.263	.213	-.016	.177	.134	.076	.059	.084
Min	-.150	-.139	-.047	-.090	-.122	-.144	-.067	-.060	-.045
Std.Dev.	.072	.056	.049	.015	.033	.040	.025	.021	.015

Panel B. Correlation coefficients (Pearson)

	$EARN_{t+1}$	CFO_{t+1}	CFO	$DEPR$	$OACCR$	ΔWC	NDA_{TDM}	DA_{TDM}	UEA_{TDM}
$EARN_{t+1}$	1								
CFO_{t+1}	.490**	1							
CFO	.471**	.414**	1						
$DEPR$	.149**	-.047	-.169*	1					
$OACCR$	-.113	-.279**	-.353**	.068	1				
ΔWC	.357**	.127	-.140	-.049	-.149	1			
NDA_{TDM}	.382**	.094	-.054	.185*	.163	.729**	1		
DA_{TDM}	.063	.045	-.194*	-.220**	-.278**	.621**	.074	1	
UEA_{TDM}	.175*	.085	-.100	-.111	-.216**	.561**	.147	.165	1

* Correlation is significant at the .05 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)
*** The subscript *t* is omitted forth sake of simplicity. Number of observations = 139

ANNEX C

List of Abbreviations

AMEX	American Exchange
AP	Accounts Payable
AR	Accounts Receivable
CEO	Chief Executive Officer
CFO	Cash Flow from Operations
CJM	Current Jones Model
COGS	Cost of Goods Sold
DA	Discretionary Accruals
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EM	Earnings Management
EPS	Earnings Per Share
EU	European Union
EWJM	Economy-wide Jones Model
FAAR	Foundation for Accounting and Reporting Recommendations
FASB	Financial Accounting Standards Board
FIFO	First In First Out
FS	Financial Statements
GAAP	Generally Accepted Accounting Principles
GPPE	Gross Property Plant and Equipment
I/B/E/S	Institutional Brokers Estimate System
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IFRS	International Financial Reporting Standards
IPO	Initial Public Offering
IS	Income Smoothing
IV	Instrumental Variables
KS	Kang and Sivaramakrishnan (1995)
LIFO	Last In First Out
LR	Likelihood Ratio
MSCI	Morgan Stanley Capital International
NDA	Non-discretionary Accruals
NLLS	Nonlinear Least Squares
NYSE	New York Stock Exchange
OCA	Other Current Assets
OCL	Other Current Liabilities

List of Abbreviations (continued)

OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
PPE	Property Plant and Equipment
R&D	Research and Development
ROA	Return on Assets
ROE	Return on Equity
SEC	Securities and Exchange Commission
SEO	Seasoned Equity Offering
SGR	Sustainable Growth Ratio
SIC	Standard Industrial Classification
SWX	Swiss Stock Exchange
TA	Total Accruals
TDM	Target-Deviation Model
UAM	Unexpected Accruals Model
UEA	Unexpected Accruals
UK	United Kingdom
US	United States
VAT	Value Added Tax
WC	Working Capital

ANNEX C

List of Figures and Tables