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"Information Content of Asset Growth for Future Firm Performance"

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ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ
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Δηλώνω επίσης υπεύθυνα ότι οι πηγές στις οποίες ανέτρεξα για την εκπόνηση της συγκεκριμένης εργασίας, αναφέρονται στο σύνολό τους, κάνοντας πλήρη αναφορά στους συγγραφείς, τον εκδοτικό οίκο ή το περιοδικό, συμπεριλαμβανομένων και των πηγών που ενδεχομένως χρησιμοποιήθηκαν από το διαδίκτυο. Παράβαση της ανωτέρω ακαδημαϊκής μου ευθύνης αποτελεί ουσιώδη λόγο για την ανάκληση του διπλώματός μου.

Υπογραφή Διδάκτορα .....

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Abstract

The asset growth anomaly and the associated asset growth factor has emerged as a key feature of modern empirical asset pricing models. Although, extensive evidence exists on the robustness of the asset growth anomaly globally, consensus has not yet reached on what causes the irregularity. Existing literature describes two major channels that can drive this negative relation between asset growth and future stock returns: one suggests some form of mispricing and the other is more consistent with rationality.

To investigate whether the asset growth anomaly is due to mispricing, we extrapolate the methodological frameworks of Bali et al. (2010) and Piotroski and So (2012) on the value-growth puzzle. Then, to explicitly test whether asset growth is a priced risk factor, we employ the common two-stage cross-sectional regression methodology (Gray and Johnson, 2011). Overall, our findings seem to be consistent with a rational based explanation about the asset growth anomaly in Europe.

Because asset growth is the sum of the subcomponents of growth from the left- or right-hand side of the balance sheet, one could argue that some components of total asset growth are subject to managerial accounting discretion. Barton and Simko (2002) argue that the balance sheet records all past accounting choices, so the level of assets can then reflect past earnings management. Thus, the natural question that rises is: Are there any driving forces that can contribute to balance sheet growth other than real investment growth? Indeed, growth in balance sheet accounts may be driven by accounting distortions and/or reduced efficiency (Richardson et al. 2006; Doukakis and Papanastasopoulos, 2014; Watanabe et al. 2013). To that end, we employ and adjust Richardson et al.’s (2006) accrual decomposition, to account for the asset growth anomaly. Finally, in line with Doukakis and Papanastasopoulos (2014), we investigate how the growth and efficiency components of total assets growth could be related to future stock returns.

Using regression- and portfolio-based analysis, we show that both asset growth components contribute to the negative relationship between asset growth and stock returns. Hedge portfolios formed on the magnitude of either the growth component or accounting distortions and/or the efficiency component generate large positive and highly significant monthly size adjusted stock returns. We also show that neither component subsumes nor dominates the other in predicting future returns. Notably, accounting- and growth-based factors appear to complement each other in driving the asset growth effect.

From our cross-sectional regression analysis based on country-level characteristics, we show that the predictive ability of the growth component for future returns is stronger in countries with higher degree of market efficiency, weaker barriers to arbitrage and less managerial discretion over earnings. Market development, trading volume, analyst activity, transaction costs and earnings management demonstrate the most reliable impact on the predictability of stock returns attributable to the growth component. These findings suggest that the effect of the component that captures investment growth on stock returns is more likely to be due to rationality.

The predictive ability of the efficiency component for future returns is found stronger in countries with lower degree of market efficiency, stronger barriers to arbitrage, weaker corporate governance and more managerial discretion over earnings. The evidence from cross-sectional regression tests reveals that almost all country-level proxies under consideration (market development is the only exception), exhibit a reliable impact on the predictability of stock returns attributable to the efficiency component. These findings suggest that the effect of the component that captures accounting distortions and/or reduced efficiency on stock returns is more likely to be due to mispricing. Overall, our country-level-characteristics analysis suggests that the asset growth anomaly can be probably attributable to a mixture of both rational and mispricing explanations, validating the ongoing debate in the existing literature behind its drivers.

ΠΕΡΙΛΗΨΗ

Η ανωμαλία ανάπτυξης περιουσιακών στοιχείων και ο σχετικός παράγοντας αύξησης του ενεργητικού αποτελεί βασικό χαρακτηριστικό των σύγχρονων εμπειρικών μοντέλων αποτίμησης περιουσιακών στοιχείων. Παρόλο που υπάρχουν εκτεταμένες μελέτες σχετικά με την ευρεία ύπαρξη της ανωμαλίας ανάπτυξης περιουσιακών στοιχείων παγκοσμίως, συναίνεση δεν έχει ακόμη επιτευχθεί για το τι προκαλεί την εν λόγω ανωμαλία. Η υπάρχουσα βιβλιογραφία την αποδίδει σε δύο σημαντικά κανάλια που μπορούν να οδηγήσουν αυτή την αρνητική σχέση μεταξύ της ανάπτυξης περιουσιακών στοιχείων και των μελλοντικών αποδόσεων των μετοχών: το πρώτο προτείνει κάποιος μορφής λανθασμένης αποτίμησης και το δεύτερο είναι πιο συμβατό με ορθολογικές εξηγήσεις.

Για να ερευνήσουμε το κατά πόσο η ανωμαλία αποδίδεται σε κάποιας μορφής λανθασμένη αποτίμηση αναπροσαρμόζουμε την μεθοδολογία των Bali et al. (2010) και των Piotroski και So (2012). Στην συνέχεια για να εξετάσουμε σε βάθος το κατά πόσο ο παράγοντας αύξησης του ενεργητικού αποτελεί παράγοντα κινδύνου, ενσωματώνουμε την μεθοδολογία two-stage cross-sectional regression (Gray και Johnson, 2011). Εν συνόλω τα αποτελέσματά μας συνάδουν περισσότερο με μιας μορφής ορθολογική εξήγηση για την ανωμαλία ανάπτυξης περιουσιακών στοιχείων στην Ευρώπη.

Επειδή η αύξηση των περιουσιακών στοιχείων είναι το άθροισμα των «υποσυνόλων» ανάπτυξης από την αριστερή ή δεξιά πλευρά του ισολογισμού, θα μπορούσε κανείς να υποστηρίξει ότι ορισμένα συστατικά της συνολικής ανάπτυξης περιουσιακών στοιχείων υπόκεινται στην ελευθεριότητα απεικόνισης λογιστικών μεγεθών από την διοίκηση της εκάστοτε εταιρείας. Οι Barton και Simko (2002) υποστηρίζουν ότι ο ισολογισμός ενσωματώνει όλες τις προηγούμενες λογιστικές επιλογές, οπότε το επίπεδο των περιουσιακών στοιχείων μπορεί στη συνέχεια να αντικατοπτρίζει τη όποια προηγούμενη λογιστική ελευθεριότητα στη διαχείριση των κερδών. Έτσι, η φυσική ερώτηση που ανυψώνεται είναι: υπάρχουν ορισμένες δυνάμεις οδήγησης που μπορούν να συμβάλουν στην ανάπτυξη του ισολογισμού εκτός από την πραγματική αύξηση των επενδύσεων; Πράγματι, η αύξηση των λογαριασμών του ισολογισμού μπορεί να οδηγείται από λογιστικές στρεβλώσεις και / ή μειωμένη απόδοση (Richardson et al., 2006, Doukakis και Παπαναστασόπουλος, 2014, Watanabe et al 2013). Για το σκοπό αυτό, χρησιμοποιούμε και αναπροσαρμόζουμε την αλγεβρική «διάσπαση» των Richarkson et al. (2006), ώστε να είναι εφαρμόσιμη στην ανωμαλία ανάπτυξης περιουσιακών στοιχείων. Τέλος, σύμφωνα με τον Δουκάκη και Παπαναστασόπουλο (2014), διερευνούμε πώς θα μπορούσαν να σχετίζονται με τα «υποστοιχεία» πραγματικής ανάπτυξης και αποτελεσματικότητας της συνολικής αύξησης των περιουσιακών στοιχείων στις

αποδόσεις των μετοχών.

Από την ανάλυση παλινδρομήσεων και χαρτοφυλακίων, καταλήγουμε στο ότι και οι δύο παράγοντες της ανάπτυξης του Ενεργητικού συνεισφέρουν στην αρνητική σχέση του ρυθμού ανάπτυξης του Ενεργητικού και των αποδόσεων. Τα σύνθετα χαρτοφυλάκια των ακραίων πεμπτημορίων με βάση τις τιμές τόσος του παράγοντα πραγματικής ανάπτυξης όσο και του παράγοντα των λογιστικών στρεβλώσεων ή/και αποτελεσματικότητας παράγουν υψηλές μηνιαίες θετικές αποδόσεις στατιστικά σημαντικές. Επίσης καταλήγουμε στο ότι κανένας από τους δύο παράγοντες δεν ενσωματώνει ή υπερκαλύπτει τον άλλο σε επίπεδο προβλεπτικής ικανότητας επί των μελλοντικών αποδόσεων. Συγκεκριμένα, και οι δύο παράγοντες φαίνεται να συμπληρώνουν ο ένας τον άλλο και να εξηγούν από κοινού το παζλ του ρυθμού ανάπτυξης του Ενεργητιού επί των μελλοντικών αποδόσεων.

Χρησιμοποιώντας ανάλυση παλινδρομήσεων και χαρτοφυλακίων, τα αποτελέσματά μας δείχνουν ότι ο παράγοντας πραγματικής ανάπτυξης έχει ισχυρότερη επίδραση επί των αποδόσεων των μετοχών σε χώρες με ισχυρότερη αποτελεσματικότητα αγορών, λιγότερες δυσκολίες για εξισορροπητική κερδοσκοπία και χαμηλότερο βαθμό ελευθεριότητας επί λογιστικών πρακτικών από την πλευρά της διοίκησης των εταιρειών. Ο βαθμός ανάπτυξης των αγορών, ο όγκος συναλλαγών, η δραστηριότητα των αναλυτών, τα κόστη συναλλαγών και η λογιστική διαχείριση των κερδών έχουν τον πιο σημαντικό αντίκτυπο στον παράγοντα πραγματικής ανάπτυξης. Τα αποτελέσματα αυτά υποστηρίζουν ότι η επίδραση του εν λόγω παράγοντα, που αντιπροσωπεύει την επίδραση της ανάπτυξης επενδύσεων στις μελλοντικές αποδόσεις, είναι πιο συμβατική με μία ορθολογική εξήγηση του φαινομένου.

Η προγνωστική ικανότητα του παράγοντα αποδοτικότητας επί των μελλοντικών αποδόσεων είναι ισχυρότερη σε χώρες με χαμηλότερο βαθμό αποτελεσματικότητας της αγοράς, ισχυρότερα εμπόδια στην εξισορροπητική κερδοσκοπία, ασθενέστερη εταιρική διακυβέρνηση και μεγαλύτερο βαθμό ελευθεριότητας απεικόνισης των οικονομικών μεγεθών από την διοίκηση των εταιρειών. Τα αποτελέσματα των παλινδρομήσεων οδηγούν στο ότι σχεδόν όλες οι μεταβλητές που αντιπροσωπεύουν διάφορα χαρακτηριστικά των αγορών της Ευρώπης (ο βαθμός της αποτελεσματικότητας των αγορών αποτελεί την μόνη εξαίρεση), παρουσιάζουν ισχυρό αντίκτυπο στην προβλεψιμότητα του παράγοντα της αποδοτικότητας επί των αποδόσεων των μετοχών. Αυτά τα ευρήματα υποδεικνύουν ότι η επίδραση του παράγοντα που αντιπροσωπεύει τις λογιστικές στρεβλώσεις και / ή την μειωμένη απόδοση διαχείρισης των στοιχείων του Ενεργητικού είναι πιθανότερο να οφείλεται σε λανθασμένη αποτίμηση από πλευρά των επενδυτών. Συνολικά, η ανάλυση σε επίπεδο χαρακτηριστικών μιας χώρας μας υποδεικνύει ότι η ανωμαλία ανάπτυξης περιουσιακών στοιχείων μπορεί να οφείλεται

πιθανότατα σε ένα μείγμα ορθολογικών και μη εξηγήσεων, επιβεβαιώνοντας την διττή φύση της και τη συνεχιζόμενη έρευνα για το τι εν τέλει «δημιουργεί» την εν λόγω ανωμαλία.

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CHAPTER 1

INTRODUCTION

1.1 Motivation

Real investment should be efficiently priced in capital markets since, economic efficiency requires that the market appropriately evaluates transactions such as the acquisition and disposal of assets. However, a growing body of literature identifies a bias in the reflection of corporate asset investment and disinvestment in average stock returns. Mainly, the findings suggest that corporate events associated with asset expansion (i.e., acquisitions, public equity offerings, public debt offerings, and bank loan initiations) tend to be followed by periods of abnormally low returns, whereas events associated with asset contraction (i.e., spinoffs, share repurchases, debt prepayments, and dividend initiations) tend to be followed by periods of abnormally high returns (Chan et al. 2008; Fama and French, 2008; Lam and Wei, 2011, Lipson et al. 2011; Gray and Johnson, 2011; Titman et al. 2013; Watanabe et al. 2013; Papanastasopoulos, 2017; Cooper and Maio, Forthcoming, among others).

Two prominent explanations can be put forward to interpret the asset growth anomaly: one suggests some form of mispricing and the other is more consistent with rationality. Based on the mispricing explanation, the asset growth anomaly is driven by naïve investors that do not fully incorporate the information from the growth rate in a firm's total assets into stock prices. In a frictionless rational asset pricing framework, the higher average returns for firms with low asset growth would need to reflect compensation for higher systematic risk. We need to stress here, that what really causes the effects of asset changes on stock prices is still under debate in the literature.

Titman et al. (2013) and Watanabe et al. (2013) document that the asset growth effect on stock returns generalizes outside the U.S., and notably is stronger in countries with more efficient stock markets. Although their results favor a risk-based explanation, one should consider that their empirical research design does not focus on discriminating between behavioral and rational driving forces of the asset growth anomaly, but rather on identifying

certain country-level factors that are linked with the possible occurrence of the anomaly in an international setting.

This issue motivates the first part of this Ph.D thesis. Using an integrated European stock market sample from 21 countries during the period 1988-2016, we directly assess whether the asset growth anomaly can be attributed to risk or mispricing. We believe that by investigating the underlying origin of the asset growth anomaly, outside the U.S., in countries with differing capital markets and financial reporting regimes, could provide additional insights into whether this prominent asset pricing regularity represents an important challenge to market efficiency. Furthermore, instead of using certain country-level factors that proxy possible drivers behind the asset growth effect, we employ a direct and less sensitive empirical research design to disentangle between a risk-based and a mispricing-based explanation of the phenomenon.

Asset expansions and contractions are incorporated during the preparation of a firm's financial statements. According to accounting principles, financial statements should provide information about the true financial position, performance and changes in financial position of an enterprise and thus, become useful to a wide range of users, who have a "reasonable knowledge" of business and accounting, in making economic decisions. The reported assets, liabilities, equity, income and expenses are directly related to the corporation's financial position. One of the most important issues in financial reporting is the extent to which managers manipulate reported earnings (Peasnell et al., 1999). Earnings management is taking advantage of the flexibility in the choice of accounting methods to indicate the management decision-making on future cash flows (Beneish, 2001; Sankar and Subramanyam, 2001). Hall et al. (2013, p. 106) defined earnings management as "the use of accounting discretion, intentional accounting misstatement, or use of real transactions to alter the numbers reported in the financial statements to influence outcomes that depend on reported accounting numbers". The market equilibrium theory, under conditions of uncertainty, agrees that smoothing represents an overt attempt to counter the cyclical nature of reported earnings, thereby tends to reduce the covariance of a firm's expected returns with returns on the market portfolio (Sharpe 1970).

In addition, existing literature on earnings management provides evidence that overinvesting firms tend to engage in earnings management techniques. Notably, Jensen (2005) argues that managers engaging in earnings managements through real activities

and within GAAP exercise discretion over accounting estimates, invest and issue stock excessively and acquire other firms before ultimately turning to accounting fraud to sustain their firm's overvaluation. Wei and Hei (2008) report that the investment-based anomaly comes from the abnormal component of capital expenditures and furthermore their results suggest that firms ranked the highest in both discretionary current accruals and abnormal capital expenditures earn substantially lower abnormal returns than do firms ranked lowest by these two measures. Kedia and Philippon (2009) argue that firms that are subsequently required to restate their financial statements overinvest and overhire as a means of providing the appearance of financial soundness. Cohen and Zarowin (2010) find an overinvestment in firms engaging in either real or accrual-based earnings management, but firms engaging in real earnings management overinvest more than firms that engage in accrual earnings management.

One may argue that firms' investment decisions might be connected to accounting distortions. Furthermore, Barton and Simko (2002) argue that the balance sheet records all past accounting choices, so the level of assets can then reflect past earnings management. Our motivation for the second part of this Ph.D thesis draws from the question: "Are there any driving forces that can contribute to balance sheet growth other than real investment growth?". Indeed, growth in balance sheet accounts may be driven by accounting distortions and/or reduced efficiency (see Richardson et al. 2006; Doukakis and Papanastasopoulos, 2014; Watanabe et al. 2013).

Based on Chan et al.'s (2006) work on accruals (i.e., growth in non-cash working capital accounts), we also propose an additional channel that could lead to significant security mispricing. Asset growth may contain adverse information about operating performance, but the market underreacts or reacts to this information slowly and subsequently corrects this underreaction resulting in lower stock returns. In particular, growth in assets may reflect a relative slowdown in business conditions such as difficulties in generating sales, overproduction and less efficient utilization of fixed assets.

Taking all the above into account, the main aim of the present thesis is to provide new insights on the puzzling drivers behind the asset growth anomaly.

1.2 Objectives

The present thesis focuses on the drivers behind the asset growth anomaly using an integrated European stock market sample during the period 1988-2016. The purpose of the thesis is twofold.

First, since the cause of the asset growth anomaly is still an ongoing debate, we pose a straightforward question: “Is the asset growth anomaly, outside the U.S., due to mispricing or it reflects some form of risk compensation?”. By investigating the underlying origin of the asset growth anomaly, outside U.S., in countries with differing capital markets and financial reporting regimes, we provide additional insights into whether this prominent asset pricing regularity represents an important challenge to market efficiency.

Secondly, because asset growth is the sum of the subcomponents of growth from the left- or right-hand side of the balance sheet, it is only natural to ask whether there are driving forces that can contribute to balance sheet growth other than real investment growth? Indeed, growth in balance sheet accounts may be driven by accounting distortions and/or reduced efficiency (see Richardson et al. 2006; Doukakis and Papanastasopoulos, 2014; Watanabe et al. 2013). Recognizing this issue, we are the first to the best of our knowledge, that decompose asset growth into a component that reflects investment growth in output and a component that reflects accounting distortions and/or less efficient use of existing capital.

1.3 Methodology

In order to directly assess whether the asset growth anomaly is due to mispricing or risk, we employ and extrapolate three different methodological frameworks. We already know that investors overreact to changes in firms’ future business prospects as implied by asset expansions or contractions and thus, leading in an investors’ systematic misvaluation. To investigate the mispricing-based explanation, we recognize that using an indicator variable that is perceived to reveal signals of undervaluation and overvaluation, should aid to identify ex ante mispriced stocks with low and high asset growth rates. Following Bali et al. (2010), we employ net equity financing activities as the indicator variable of undervaluation and overvaluation. Analysis of the interactions of asset growth rate and net equity financing activities is motivated by the fact both variables, according to the existing literature, are important predictors of stock returns in the cross-section.

Extrapolating the argumentation in Bali et al. (2010), low asset growth purchasers - high asset growth issuers reveal congruence in the valuation signals. Thus, the conditional probability that each valuation signal is due to mispricing, rather than noise, is high. On the other hand, low asset growth issuers - high asset growth purchasers reveal incongruence in the valuation signals. In this case, the power of each signal to identify mispricing is mitigated, more likely to be due to noise.

At a portfolio level, to support the notion that combining low-high asset growth and issue-repurchase indicators improves our ability to identify mispriced shares, we expect the following return patterns: low asset growth purchasers should significantly outperform high asset growth issuers, but low asset growth issuers should not significantly outperform high asset growth purchasers.

However, the above return patterns could also be generated if low-high asset growth and issue-repurchase indicators reflected relatively independent aspects of equity risk. For example, low-high asset growth indicators may rank firms based on their loadings on total asset growth risk factor, whereas issue/purchase indicators may rank firms on their loadings on a different risk factor.

Further, in favor of mispricing we expect to find at the individual level of our empirical analysis (i.e., cross-sectional regressions) a negative and significant relation between total asset growth rate and subsequent returns only within the subsample where the asset growth and the issue/purchase indicators point in the same direction (concurring signals). In the case of conflicting signals, the subsample where the signals are noisier, we expect the effects of both indicators on stock returns to weaken and possibly become insignificant.

Furthermore, in order to further investigate whether the asset growth anomaly can be attributable to mispricing, we also employ Piotroski and So's (2012) proposed market expectation errors approach that is based on the interactions between the asset growth rate and Piotroski's (2000) FSCORE. This approach provides a more general overview of how investors assess and interpret the information contained in reported accounting figures. Piotroski and So (2012) find that the difference in subsequent returns between

value and growth firms (i.e., the value premium) in the U.S. stock market exists among firms with existent market expectation errors, i.e., among value firms with strong fundamentals and growth firms with weak fundamentals.

A mispricing-based explanation suggests optimistic (pessimistic) expectations about future performance for high (low) asset growth firms. Under this view, the asset growth effect captures price corrections arising from the reversal of these expectation errors. In other words, expectation errors should be concentrated among firms where fundamentals (as implied by FSCORE) differ from the expectations implied by total asset growth rate. Notably, the largest asset growth effect will occur where expectations implied by FSCORE are "incongruent" with expectations implied by the firms' total asset growth rate. On the other hand, under a risk-based explanation, the predictive ability of asset growth for future returns should not depend on the congruence of valuation signals and market expectation errors, since the higher returns of firms with low asset growth rates relative to firms with high asset growth rates simply constitute compensation for higher risk.

Thus, in favor of mispricing we expect to find a negative and statistically significant relation between total asset growth and subsequent stock returns, only when we have congruence in the valuation signals and market expectation errors. In contrary, under a rational framework, the predictive ability of asset growth for future returns should not depend neither on the congruence of valuation signals nor on market expectation errors, since the higher returns of firms with low asset growth rate relative to firms with high asset growth rate simply constitute compensation for higher risk.

Finally, to directly examine whether asset growth is a priced risk factor we employ the common two-stage cross-sectional regression (2SCSR) methodology (Gray and Johnson, 2011). If total asset growth is a priced risk factor, then its factor risk premium should be positive and statistically significant.

Since we are also interested in assessing the importance of accounting- and growth-based factors underlying the possible occurrence of the asset growth anomaly, we employ and adjust Richardson et al.'s (2006) accrual decomposition. We decompose total asset growth into a growth and an efficiency component. The main benefit of such a

decomposition is, as stated in Richardson et al.'s (2006), that it is an algebraic identity and thus does not require estimation of any parameters.

We are motivated by a desire to offer a more eclectic interpretation on what really drives the asset growth anomaly. The growth component captures the part of the anomaly that is attributable to diminishing marginal returns to increased investment and/or extrapolative biases concerning future growth. The efficiency component captures the part of the anomaly that is attributable to accounting distortions and/or reduced efficiency. We investigate whether the asset growth anomaly can be attributed to the growth component or to the efficiency component, or both. If both components drive the anomaly, we then test whether one subsumes or dominates the other.

Our first hypothesis is derived under the optimal investment explanation, which suggests that the asset growth anomaly should be more pronounced among countries where stocks are more efficiently priced. The effects of real investment growth should be captured by the growth component of our decomposition. Thus, under the rational explanation of the asset growth anomaly, the predictive ability of the growth component for future returns should be stronger in countries with a higher degree of market efficiency.

The remaining hypotheses are derived under the mispricing hypothesis. Both components of our decomposition could have an effect on stock returns due to mispricing. Notably, the potential effect of the efficiency component could not be consistent with rationality. Mispricing is expected to be more pronounced in countries where stocks are less efficiently priced and in countries where arbitrage is more costly, risky and limited. Thus, under the mispricing explanation of the asset growth anomaly, the predictive ability of both the growth and the efficiency component for future returns should be stronger in countries with a lower degree of market efficiency and severer barriers to arbitrage.

Further, if overinvestment, earnings management and slowdown in operating performance are underlying driving forces of asset growth mispricing, the effect of both components of our decomposition on stock returns is expected to be more pronounced in countries with stronger corporate governance mechanisms and greater managerial discretion over earnings. Thus, under the mispricing explanation of the asset growth anomaly, the predictive ability of both the growth and the efficiency component for future returns should be stronger in countries with better corporate governance and more room for accounting manipulation.

Countries of the European Union (plus Switzerland) are homogeneous in terms the status of the economy (i.e., classified mainly as advanced economies), legal tradition (i.e., classified mainly as code low countries), and accounting regimes (i.e., adopt IFRS since 2005). However, they share large variation in other characteristics capturing aspects of market efficiency, limits to arbitrage, corporate governance and earnings management, that enables us to develop hypotheses regarding the ability of the components of our asset growth decomposition to predict future returns, conditional on existing explanations of the asset growth anomaly.

As factors linked to the level of market efficiency, we consider financial market development (measured by annual market capitalization of publicly listed companies as a percentage of GDP), individualism and political risk. Market development and individualism have a positive association with market efficiency, while political risk has a negative association. We also consider three factors as barriers to arbitrage at the country level: trading volume, analyst activity and transaction costs. Arbitrage is more costly, risky and limited in countries with lower trading volume and analyst activity, and higher transaction costs.

As corporate governance mechanisms, we use business sophistication and accounting quality. Corporate governance provides the framework for attaining a company's objectives, and thus encompasses practically every sphere of management, from action plans and internal controls to performance measurement and corporate disclosure. Business sophistication proxies the level of firms' quality operations and strategies, while accounting quality proxies corporate disclosure. Finally, we consider the earnings management index at the country-level, developed by Leuz et al. (2003).

1.4 Contribution

In respect to the first part of this thesis, Titman et al. (2013) and Watanabe et al. (2013) document that the asset growth effect generalizes outside the U.S., and notably is stronger in countries with more efficient stock markets. Although their results favor a risk-based explanation, one should consider that their empirical research on what drives the asset growth anomaly is on a cross-country-differences level. They do not directly assess the cause of the asset growth effect (risk or mispricing), but rather they relate the asset growth effect's possible explanations to country characteristics.

More specifically, their research design employs country level characteristics in order to disentangle a mispricing-based from a risk-based explanation. However, one could argue that their empirical tests are sensitive to these country characteristics. Thus, our straightforward approach could provide a more general and less sensitive overview on the mispricing versus rational debate. Furthermore, from an investment perspective, we provide evidence that asset growth strategies can be enhanced by taking into account the firm's equity financing activities.

The objective of this thesis is to provide additional evidence on the role of real investment growth and other possible driving forces that could affect the asset growth anomaly. We are motivated by a desire to offer a more eclectic interpretation on what really drives the asset growth anomaly. As we have already mentioned, growth in balance sheet accounts may be driven by accounting distortions and/or reduced efficiency (see Richardson et al. 2006; Doukakis and Papanastasopoulos, 2014; Watanabe et al. 2013). Recognizing this issue, we are the first to the best of our knowledge, that decompose asset growth into a component that reflects investment growth in output and a component that reflects accounting distortions and/or less efficient use of existing capital.

1.5 Structure of the thesis

The structure of the present research is as follows. Chapter 2, introduces the existing theoretical framework and empirical literature relevant for this study. Chapter 3 presents the empirical research design and data formation. In Chapter 4, we report the empirical findings. In the final Chapter 5, we summarize the conclusions and present potential extensions to the present research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the relevant literature of this thesis. The first section briefly defines the basic theoretical framework of the efficient market hypothesis, describes the most discussed anomalies and the relevant studies conducted in this field. The second section discusses existing literature on the asset growth effect anomaly (or the investment anomaly) over time, addresses the indicators of asset growth used in the existing literature, as well as their benefits and drawbacks. Furthermore, it addresses the explanations of the asset growth effect. The third section presents earnings management early research based on existing literature reviews, communicates managers' incentives to manipulate accounting numbers and refers to the factors restraining earnings management. Furthermore, it addresses the methodological issues related to earnings management detection and presents the last decade's empirical researches on the detection of earnings management. The fourth section presents studies that investigate – at any level – an interaction between the asset growth anomaly and earnings management.

2.2 Market Efficiency and capital asset pricing model

The efficient market hypothesis (EMH) has been of the most debated subjects. The efficient market hypothesis consists of three different forms:

1. The strong form implies that all information in markets is fully reflected in securities prices and thus insider information has no value in the markets and actually by definition does not exist.

2. The semistrong form implies that all publicly available information is fully reflected in securities prices and thus fundamental analysis has no value.

3. The weak form implies that all past market prices and data are fully reflected in securities prices and thus technical analysis has little or no value.

Thus, the main difference in the forms is how the prices reflect different levels of information. The main implication from the transparency of the information is what kind analysis would be beneficial for the investors to do in order to earn excess returns in the markets. Under the weakest form of the efficient market hypothesis, the future stock prices cannot be predicted by analyzing past price behavior or performance. This implies that investors are not able to systematically profit from inefficiencies, even though by fundamental analysis unsystematic excess returns are possible to obtain in the short term.

Last decades' literature on market efficiency is concentrated on views on investors' use of information and the presence of frictions in capital markets such as transactions costs. Thus, we have a variety of versions of the efficient markets' hypothesis. These versions have been expressed by a number of authors in the literature (e.g., Rubinstein 2001, Schwert 2003). Rubinstein (2001) refers to maximal rationality as the version of market efficiency where all traders efficiently use all available information. Transactions costs do not matter because traders do not make any systematic errors in the way they employ available information, resulting in prices that are always right.

A slightly weaker version of the efficient markets hypothesis is rationality. The rationality version assumes that at least some traders do not make mistakes in using information, and are not constrained by transactions costs in alleviating the mistakes of others. The author acknowledges that the mountain of evidence on return predictability has lead researchers to discard maximal rationality and rationality in favor of minimal rationality. In minimal rationality, at least some investors are aware of mispricing, but mispricing persists because transactions costs and arbitrage risk limit the ability of the smart traders to drive prices back to fundamental value. As a consequence, minimal rationality permits return predictability, but only within the bounds of transactions costs. Rubinstein (2001), Schwert (2003), Basu (2004) and others argue that although considerable evidence documents predictable returns, little evidence exists to refute the minimally rational version of the efficient markets' hypothesis. Even though the efficient market hypothesis is describing the basic framework and the structure of the financial markets, it cannot stand alone as a tool for the asset pricing in the markets.

Asset pricing theory was marked by one of the most prominent theories so far, Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965) and Black (1972), which was built on the assumptions of the efficient market theory. CAPM describes the positive relation between the expected return and the beta factor of the security, which according to the principle idea of model should capture all the cross-sectional variation in expected returns. Although, several studies have documented that the beta is not able to all the dimensions of the risk, the debate of the suitability of CAPM is overshadowed by the fact that the model is hard to test due to difficulties in defining market portfolio.

As mentioned above, under the efficient market hypothesis, share prices should fully reflect all available information (Fama 1970). The securities prices quickly adjust to new information as readily that information is available. However, it is well documented that there are certain patterns in average stock returns that are considered to be anomalies since they are effects unexplainable by the efficient market hypothesis (Jensen, 1978). Market anomalies are the unusual occurrence or abnormality in smooth pattern of stock market. Existing literature has documented more than 150 return predictors[1].Thus, the claim that capital markets are fully information efficient is still debatable.

Banz (1981) first documented the size effect when he concluded that the monthly returns of the fifty smallest stocks listed on NYSE tend to outperform the fifty largest stocks. Arbel and Strebel (1982) introduced the neglected firm effect, arguing that the lesser-known companies realize higher returns on their stock shares, due to the fact they are less likely followed by market analysts and that their better performance could be attributed to the higher risk/higher reward potential of small, lesser-known stocks, with a higher relative growth percentage. One of the earliest studies investigating the implications of liquidity on average stock returns is the one conducted by Amihud and Medelson (1986), who document a positive relationship between excess returns and illiquidity with the use of the relative bid-ask spread. The value effect refers to the empirical studies' results where stocks with high book-to-market value tend to realize positive abnormal returns (Fama and French, 1992). The momentum effect refers to the empirical studies' results where the recent past winners outperform recent past losers (Jegadeesh and Titman, 1993). Sloan (1996) concludes that higher accruals predict lower stock returns. Cohen, Gompers and

[1] Appendix A (panel A, B and C) presents these 150 return predictors.

Vuolteenaho (2002) find that more profitable firms tend to have higher average stock returns.

Fairfield, Whisenant and Yohn (2003) as well as Titman, Wei, and Xie (2004) show that firms that invest more have lower stock returns. One of the most recently documented anomalies is the one observed by Ang, Hodrick, Xing, and Zhang (2006) and referred to as the idiosyncratic volatility anomaly. The scholars provide evidence that stocks exhibiting high idiosyncratic volatility tend to have low future returns. All the above-mentioned documented irregularities are few of the many during the last century. Literature provides four primary explanations for market anomalies: (1) mispricing, (2) unmeasured risk, (3) limits to arbitrage, and (4) selection bias. However, during the last decade or so, there is an increasing interest regarding the asset growth anomaly.

2.3 The Asset Growth Anomaly

2.3.1 The Asset Growth Effect Anomaly: Evolution Of Existing Literature Over Time

Academic treatment of growth anomalies on future abnormal returns can be traced back to 1996. Researchers have vastly documented that corporate investments and asset growth (e.g., acquisitions; capital investment; debt and equity offerings) are usually negatively related to subsequent stock returns. However, it wasn't until Cooper et al. (2008), who provided the starkest findings from this line of research.

Prior to 2008, studies in the literature use various measures based on the information available in financial statements to represent growth and examine its implication on future stock returns. In particular, stock returns are shown to be negatively related to accounting accruals (Sloan, 1996; Richardson et al., 2005), net operating assets (Hirshleifer et al., 2004), abnormal capital expenditure (Titman et al., 2004), investment-to-asset ratio (Lyandres et al., 2008; Chen et al., 2010), capital investment growth and investment-to-capital ratio (Xing, 2008) and net share issuance (Daniel and Titman, 2006; Fama and French, 2008; Pontiff and Woodgate, 2008). However, these studies examine the effects

of growth on stock returns by using components of a firm's investment or financing activities. Many of these studies focus on intertemporal changes in the size of firms' balance sheets, or equivalently on various components of assets and liabilities.

Sloan (1996), finds that operating accruals, or changes in working capital minus depreciation, are negatively related to subsequent stock returns. Thomas and Zhang (2002) report that firms realizing large increases in inventory tend to experience poor stock returns in the future. Fairfield et al. (2003) indicate that changes in long-term net operating assets (change in property plant and equipment plus change in intangibles less depreciation and amortization expense) lead to lower future returns as well. Certain other studies (Fairfield et al., 2003; Lyandres et al., 2008;) suggest that changes in firms' fixed assets may have predictive power for returns. Titman et al. (2004) find evidence of weak stock price performance following large increases in capital expenditures. Hirshleifer et al. (2004) examine whether the levels of net operating assets predict stock returns in the cross-section. The results show a statistically significant negative relation to stock returns. Chan et al. (2006) indicate that each component of accruals, i.e changes in accounts receivable, inventory changes, and changes in accounts payable, are negatively associated with the cross-section of future returns.

Fama and French (2008) revisited the size, value, profitability, growth, accruals, net stock issues and momentum anomalies. The objective of studying all these anomalies together was to see which variable probably has information about average stock returns that is missed by the others. They used NYSE, Amex, and NASDAQ stocks from 1963 to 2005. Consistent with the methodology followed by Chan et al. (2008), they pointed out the significance of microcaps which could dominate the whole sample, since they tend to have more extreme values of the explanatory variables and hence, more extreme returns. Thus, to avoid this problem, they estimated separate regression models for microcaps, small stocks and big stocks, as well as for a sample excluding microcaps. The measure of asset growth used was the natural logarithm of the ratio of assets per split-adjusted share at *t-1* divided by assets per split-adjusted share at *t-2*, which is equivalent to the natural log of the ratio of gross assets at $t-1$ divided by gross assets at $t-2$ minus net stock issues from $t-2$ to $t-1$. They provided evidence that the negative relation between average stock returns and asset growth is powerful among microcaps, weaker but still statistically significant among small stocks and probably nonexistent among big stocks.

The work of Cooper et al. (2008), is thought to be the base line of the asset growth anomaly from thereon. Their motivation came from the fact that all prior studies on the effects of growth on returns use components of a firm's total investment or financing activities, thus, ignoring the larger picture of the potential total asset growth effects of comprehensive firm investment and disinvestment. They used a simple and yet comprehensive measure of firm asset growth, the year-on-year percentage change in total assets. Their data referred to U.S. stock returns over the 1968 to 2003 period. Their overall empirical findings suggest that there is a strong negative correlation between a firm's asset growth and subsequent abnormal returns, even after controlling for previously documented determinants, such as the book-to-market ratio, firm cap, lagged returns, accruals, growth sales, growth in capital investment, and net operating assets. An interesting point is that the asset growth effect is particularly *strong for changes in operating assets*, on the investment side of the balance sheet, and *for changes in debt and stock financing*, on the financing side of the balance sheet.

In line with the findings of Fama and French (2008), they indicate that the relative importance of a firm's total investment or financing activities varies across firm size. However, we should keep in mind that they formed three size groups and they made no provisions for microcap. Growth in debt financing exhibits the strongest effect within small and medium sized groups, whereas growth in stock financing leads to the strongest effect within large groups. Furthermore, high growth firms tend to have higher Price to Earnings (PE) and return on assets (ROA) ratios, as well as higher levels of accruals (accounting income exceeding cash income), than low growth firms. Finally, their results are most consistent with the interpretation that investors over-extrapolate past gains to growth.

Chan et al. (2008) aimed to explore the economic rationale behind the predictability of growth in the size of firms' balance sheets, or in the size of various balance sheet components on the cross-section average returns. They were motivated by the fact that previous studies did not efficiently discriminate between possible different explanations, to interpret this phenomenon. Using already documented growth measures (capital expenditures, growth in net operating assets and growth in total assets), they wished to reveal different insights of the same underlying trend in average stock returns and, thus, assess the hypothesis made for the observed association between asset growth and subsequent returns. Their sample included stocks listed on NYSE for the period of 1968–2004. In contrast with the methodology followed by Fama and French (2008) regarding

data filtering, they excluded from their sample all possible extremes, i.e. the smallest firms, in order to reduce return measurement problems as well as instances where asset growth is large in percentage terms but not in economic terms. Furthermore, in line with the Russell indicts, they formed five size groups, selected in a way that each group constituted a well-diversified portfolio with a meaningful share of market capitalization. In doing so, the asset growth effect measured as a change in total assets, is present only among firms with large changes in their total assets.

Their findings suggest that although the asset growth effect might be driven by the poor long-term performance of acquiring firms, corporate acquisition activity cannot stand as the only explanation. Furthermore, when the hypothesis in question is an underperformance following equity issues where managers aim to be benefited from a temporary overvaluation of their stock, the results suggest that future returns are poor regardless of the funding source. Regarding the two behavioral hypotheses: a) investors' extrapolation of past gains or b) investors' reaction to managerial over-commitment to empire building, they find evidence that they are indeed two other possible causes behind the asset growth anomaly. An interesting point made was that two sets of firms depart from the negative relation widely documented. First, firms in the high growth category experiencing high past ROE and thus having the ability to generate profit from previous investments, tend to have higher returns than firms with low past ROE. Second, firms experiencing increasing cash balances, tend to have future abnormal returns not much different from zero, indicating a financial flexibility to maintain investments in research and development.

Lam and Wei (2008), motivated by recent developments in behavioral finance, examined how limits to arbitrage can contribute to the asset growth anomaly. They do not address the question of what causes the asset growth anomaly itself, but they document why the anomaly is not arbitraged away. The main hypothesis in question is that if the underperformance of the stocks of high asset growth firms is attributable to investors' initial underreactions to information about adverse changes in firms' fundamentals, the underperformance should be greater when the arbitrage is riskier or more difficult to implement. Thus, the asset growth anomaly should be more profound among stocks experiencing more severe limits to arbitrage.

They include three major aspects of limits to arbitrage: arbitrage risk proxied by idiosyncratic stock return volatility, information costs proxied by a) the existence of a long -term S&P credit rating (which indicates an informed investor), b) the number of institutional investors holding the firm's shares (which indicates shareholder sophistication), or c) the CRSP firm age (which indicates information quality), and transaction costs divided into overall transaction costs inversely proxied by share prices or the market value of equity (which indicates the overall transaction cost) and individual transaction costs inversely proxied by a) the percentage of outstanding shares held by institutional investors (which indicates short-sale constraints), b) bid-ask spreads, c) the Amihud's (2002) illiquidity (representing illiquidity), or d) the dollar trading volume (representing liquidity).

Following Cooper et al. (2008), they use as a measure of asset expansion and capital investment growth the percentage of growth of total assets from fiscal year *t-1* to fiscal year *t*. The analysis includes all domestic firms listed on NYSE, AMEX, and Nasdaq from 1971 to 2007. Their overall findings suggest that high asset growth firms experience even lower stock performance when limits to arbitrage are more severe. However, an interesting observation made is that underperformance is not necessary, in cases of low arbitrage risk or when investors are informed. Thus, arbitrage delays the incorporation of information regarding fundamental changes into stock prices. Their findings are consistent with the hypothesis of investors initially underreacting to overinvestments driven by empire-building. Finally, in line with Cooper et al. (2008) and Fama and French (2008), they investigate the relationship between firm size and limits to arbitrage. They find proof that firm size is negatively correlated with several aspects of the degree of difficulty to arbitrage.

Lipson et al. (2009) investigate the negative relation between asset growth and subsequent stock returns in respect to two possible explanations: as an underlying risk factor and as a correction to previous mispricing naturally requiring some limit to arbitrage. Their data contains US stocks from 1968 to 2006 and six measures of asset growth: asset growth rate (CGS) as defined by Cooper et al. (2008), investment-to-asset ratio (LSZ) from Lyandres et al. (2008), growth rate in capital expenditures (XING) from Xing (2008), firm capital expenditures divided by the average capital expenditures over the past three years (TWX) from Titman et al. (2004); ratio of capital expenditures to net property, plant, and equipment (PS) from Polk and Sapienza (2008), and firm capital expenditures divided by

capital expenditures two years previously (AG) from Anderson and Garcia-Feijoo (2006). As a measure of holding costs, in their arbitrage hypothesis, that are required to sustain mispricing, they use firm idiosyncratic volatility.

Through a variety of tests, they conclude that for both the cross section and time series returns, idiosyncratic volatility is linked to the asset growth effect, as a necessary condition for the anomaly to take place. However, they find no evidence of asset growth measures generating a risk premium once firm growth is acknowledged. Thus, they tend to believe that the bias in stock returns is more consistent with mispricing. Finally, as already observed by Cooper et al. (2008) and Fama and French (2008), size matters. They find that the asset growth effect is smaller among larger firms.

Li and Zhang (2010) examine whether q- theory applies to the investment – to – assets and asset growth effects, when investment frictions are taken into consideration. Their main idea is that the expected return–investment relation should be sharper with firms facing high investment frictions than with firms facing low investment frictions. As investment frictions, they generate three firm-level proxies of financing constraints: a) asset size, b) payout ratio, and c) bond ratings. In line with Lipson et al. (2009), they incorporate six investment-related anomaly variables: investment-to- assets (Lyandres et al., 2008), asset growth (Cooper et al., 2008), investment growth (Xing, 2008), net stock issues (Fama and French, 2008), abnormal corporate investment (Titman et al., 2004), and net operating assets (Hirshleifer et al., 2004). They use in their analysis all domestic stocks listed on NYSE, Amex, and Nasdaq from 1963 to 2008.

Their findings indicate that q-theory's predictive power is weak. The consideration of investment costs does not enhance q-theory's explanatory power over the investment growth, net stock issues, abnormal corporate investment, or net operating assets anomalies. Their overall conclusion is that, the behavioral explanation of mispricing including proxies for limits-to-arbitrage is more suitable than the rational explanation of q-theory including proxies for investment frictions.

Gray and Johnson (2011), motivated by Cooper et al. and using the financial statement data on Australian listed firms made available by the introduction of the Australian

Financial Accounting Information (DAFAI), are the first to examine the asset growth effect in Australian equities. They examine, besides the existence of an asset growth anomaly in Australian equity market, the pervasiveness of the anomaly across different size groupings following the findings of Fama and French (2008) and Cooper et al. (2008). They perform their analysis separately for partitions of the full sample based on firm size and specifically separately for big, small and micro size groupings from 1983 to 2007. Finally, addressing the question raised by previous researchers, they assess whether the observed asset-growth effect is due to risk or mispricing.

They find evidence supporting the negative relation between subsequent stock returns and past levels of growth in total assets. However, in contrast to the results documented by Fama and French (2008) and Cooper et al., (2008), the asset growth anomaly is present amongst the largest Australian stocks, even after controlling, at an individual stock level, for other well-known determinants of future stock returns (e.g., firm size, book-to-market, momentum). An interesting observation made is that, this negative relation in big stock groupings turns to be statistically insignificant, when returns are adjusted for risk factors associated with the market, firm size and book-to-market ratio. Finally, since their results suggest that the inclusion of asset growth factor does not enhance the predictive power of the model used, the asset growth anomaly could be attributable to investors' overextrapolation of past gains supporting a mispricing explanation.

Since the asset growth anomaly was mainly examined in the U.S stock market, in 2011 Yao et al. (2011), studied the asset growth anomaly in Asian markets. Specifically, their analysis was performed on data from: Japan (representing a well-developed economy), China (representing one of the most rapidly growing economies), Hong Kong, Taiwan, Korea, Malaysia, Singapore, Thailand, and Indonesia (representing developing equity markets) from 1981 to 2007. Their motivation came first from the fact that the Asian economies are generally experiencing fast economic growth, rapid firm asset growth and active capital market activities during recent decades. Furthermore, Asian financial markets are very different from the U.S, in respect to corporate ownership and governance characteristics. Finally, most Asian economies are bank-based financial systems whereas the U.S. economy is a capital-based market. Thus, they examine whether the economic growth, corporate governance characteristics, and especially, the characteristic of a bank-based economy, may provide new insights regarding the growth–return relation comparing the U.S. and Asian markets, and across the Asian markets.

They find proof of a weaker asset growth effect in Asia, which is quite puzzling if we attribute the anomaly to investors' sophistication and market efficiency. Undeniably, the U.S. stock market is more efficient than the Asian markets and U.S. investors are more sophisticated. They document that asset growth rates present a homogeneity, mechanically driving the weaker asset growth anomaly, which can be attributed to the fact that Asian firms are exposed to similar economic shocks, or that firm growth is mainly underfunded in bank-based financial systems. An additional hypothesis for the weaker asset growth effect could be the weaker impulse towards overinvestment. To assess this hypothesis, they decompose asset growth into growth of various asset components from both sides of the balance sheet, in accordance with the methodology of Cooper et al. (2008). An intriguing point derived is that different ways of financing (internal vs. external financing and debt vs. equity financing) affect quite differently the anomaly in question. The profound tendency towards debt (bank loans) and internal financing is an indicator of the weaker asset growth effect in Asia. Finally, they find evidence that the reliance on bank financing, among other effects, reduces the magnitude of the growth anomaly whereas corporate governance has only a small influence on firm growth, growth persistence, profitability, or the growth anomaly itself.

Cao (2011), was the first to set forward the question whether the total asset growth anomaly is a noisy manifestation of the net operating asset (NOA) growth anomaly, attributable to market's inability to incorporate the negative implications of NOA growth. To examine his case, he decomposes total asset growth into NOA growth (that is, growth in operating assets financed by growth in debt and equity) and two additional components: a) growth in operating assets financed by growth in operating liabilities (OAOL) and b) growth in cash and marketable securities (CASH). He silently examines an arbitrage consistent hypothesis and hence, he replicates the studies of Lam and Wei (2010) and Lipson et al. (2009) using both NOA growth and TA growth. His data consists of all NYSE, AMEX and NASDAQ nonfinancial firms for the period from 1968 to 2008.

Cao (2011) argues that TA growth anomaly is indeed robust to the NOA level, consistent with the results of Cooper et al. (2008) but this is not the case when NOA growth is used. He supports his case stating that since NOA growth proxies an unexpected NOA component, which is already documented (Papanastasopoulos et al., 2010), this drives future negative returns, thus, NOA growth representing new information not yet priced, is

more likely associated with unexpected returns than the NOA level. His overall results suggest that the TA growth anomaly is totally subsumed by the NOA growth anomaly. The results stand for both short- and long- window returns, value-weighted and equal-weighted portfolios and as well as a variety of risk factors.

Furthermore, by decomposing TA growth into its three abovementioned sub-components he provides evidence that: a) since the market, on average, treats growth in any asset component as a good signal for future profitability, the negative relation between subsequent stock returns and asset growth should be attributable to the market's misinterpretation of the NOA growth's negative implications for future profitability, and b) growth in operating assets financed by growth in operating liabilities (OAOL) and growth in cash and marketable securities (CASH) do not appear to have negative implications for future profitability and, on average, are correctly priced by the market. Finally, these two additional components tend to reduce the predictability of NOA growth by reducing abnormal returns.

Cooper and Priestley (2011) examine the negative impact of corporate asset growth and investments on subsequent future stock returns, from a macroeconomic perspective. They address two questions: a) what is the cause of this negative relation since there are evidence of both rational[2] and behavioral theories and b) in turn can the investment factor be accounted for as an economic risk factor related to the business cycle. Once more, U.S listed non-financial firms in NYSE, AMEX and NASDAQ for the period 1961 through to 2005 are used as data sample. In line with Cooper et al. (2008), they also use total assets as their measure of asset growth. They use the five factors proposed by Chen et al. (1986) to regress against stock returns loadings (a measure of systematic risk), since they can efficiently represent the business cycle as risk factors.

Through their battery of tests, they document that the investment (asset growth) anomaly cannot be attributed solely to behavioral explanations such as stock mispricing. Instead,

[2] (Xing (2006) concludes that an investment factor captures information similar to the HML factor of Fama and French (1993), Lyandres, Sun and Zhang (2007) indicate that the post SEO underperformance is substantially diluted when an investment factor portfolio is included as a common risk factor, Chen and Zhang (2008) present that in a three factor model, containing the market portfolio, an investment factor and a productivity factor, the average return spreads across test assets formed on momentum, financial distress, investment, profitability, net stock issues and valuation ratios can be well explained).

it is primarily based on the differences in systematic risk of high investment (asset growth) and low investment (asset growth) firms. They find strong evidence supporting the predictive power of both the real options theory and the q-theory. Finally, their return factors formulated as the excess returns of low investment (asset growth) firms over high investment (asset growth) firms are proved to be positively related to future industrial production growth and hence, they seem to have a predictive power on future real activity as a macroeconomic risk factor.

Lam and Wei (2012) revisit the anomaly by simultaneously assessing its rational and behavioral explanations. They form three hypotheses, each one deriving from a possible documented explanation. If there is a rational explanation (as proposed by the q-theory or real options model) behind the lower (higher) future returns for high (low) growth or investments firms, then the subsequent realized average returns on these firms should be lower (higher) regardless of subsequent growth or investments and thus, the observed negative relation should stand unrelated to subsequent asset growth or investments (first hypothesis). If further corporate growth or investments are associated with the recognition of previous overinvestments, the decline in stock returns should be more severe correcting previous mispricing (as proposed by the theory of underreactions to overinvestment and empire building) and thus, the observed negative relation should be stronger when subsequent asset growth or investments of high growth or investments firm are high (second hypothesis). Finally, based on the extrapolation and growth-based style investing explanation if a firm shows a consistency in sense that previous high (low) growth or investments are followed by high (low) growth or investments, investors should probably reward (penalize) them accordingly and thus, we should not observe any change in subsequent stock prices. On the other hand, if firms initially experience low (high) growth or investments and then initiate high (low) growth or investments, investors should reward (penalize) them and thus, we should observe their stocks to decrease (increase). Thus, according to their third hypothesis the observed negative relation should be weaker if firms consistently experience high (low) asset growth or investments and stronger if the initial high (low) asset growth or investments are followed by low (high) subsequent growth or investments.

As a measure of overall corporate asset growth or investments, they use total asset growth (TAG) (Cooper et al., 2008). Furthermore, they examine other documented corporate investment having negative relations with future stock returns, namely: a) total accounting

accruals (TAA) proposed by Richardson et al. (2005, 2006), b) an alternative accruals measure proposed by Cohen and Lys (2006), c) net operating assets (NOA) documented in Hirshleifer et al. (2004), d) abnormal capital expenditure (ACE) from Titman et al. (2004), e) investment-to-asset ratio (I/A) proposed by Lyandres et al. (2008) and Chen et al. (2010), f) capital investment growth (ΔI/I) and investment-to-capital ratio (I/K) documented by Xing (2008), and g) net share issuance (NSI) in Daniel and Titman (2006), Fama and French (2008), and Pontiff and Woodgate (2008). Their sample consists of U.S. domestic firms traded on the NYSE, Amex, and Nasdaq exchanges from 1971 to 2009.

Firstly, their analysis suggests that there is no apparent relation between firms' size and subsequent growth. Then, their results reject both the rational and the underreaction hypothesis but fail to reject the extrapolation and growth-based style investing hypothesis. In general, they find proof that the association of corporate asset growth or investments and subsequent stock returns are weak or even move in the opposite direction when subsequent growth tend not to reverse. Finally, the anomaly tends to be stronger when the growth reversals tend to be more extreme.

Wen (2012) goes beyond the documented firm-level asset growth effects and examines the predictive power of an aggregate asset growth measure on future stock returns in an out of sample analysis. From a methodological point of view, he further tests whether cross-sectional return predictors at the firm-level may also be valid for returns in a time series analysis. Furthermore, he aims to investigate whether the behavioral explanation – that is, investors overreact to asset expansions or contractions as possible indicators of firms' future business prospects - in a firm level could stand for the aggregate asset growth as well. His data consists of firms listed in the S&P500 for the time period of 1951 to 2009 (overall sample) and for the time sub-period of 1968 to 2008 (ensuring a sufficient number of individual firms). In line with the methodology followed by Hirshleifer et al. (2009), he constructs his aggregate measure of asset growth as a value-weighted average of asset growth[3] for firms with December fiscal year ends in year $t-1$, using market capitalization at the end of December $t-1$ as weights. Since he examines an aggregated effect, he uses the earnings-to-price ratio (EP), the dividend-to-price ratio (DP), the book-to-market ratio (BM), the treasury bill rate (TBL), the term spread (TMS), the default yield (DFY), the

[3] As in Cooper, Gulen, and Schill (2008), the firm-level asset growth is defined as the percentage change in the book value of total assets from fiscal year ending in calendar year $t-2$ to fiscal year ending in calendar year $t-1$.

net equity issuance (NTIS), the equity variance (SVAR), the investment-to-capital ratio (IK), and the consumption-wealth ratio (CAY) as other variables having a predictive power over future stock returns.

His results, derived from an in and out of sample analysis, suggest that at an aggregated level, the asset growth remains a strong and robust negative predictor of aggregate stock returns. In addition, he finds that the aggregate asset growth seems to be a strong negative predictor of future aggregate earnings and thus, he forms an aggregate measure of abnormal returns around earnings announcements to assess his hypothesis of investors misinterpreting the implications of aggregate asset growth for future earnings. His overall results indicate that the behavioral explanation of investors' overaction stands in an aggregated level and a high level of aggregate asset growth motivates an overvaluation of the stock market.

Maggina and Tsaklanganos (2012), are the first to examine the predictability of assets growth with reference to firm performance in Greece's puzzling economy. Their goal is to highlight differences between companies with positive versus negative asset growth, through a discriminant analysis and a logit specification test. They form four variables indicating a firm's performance, which are then used as predictors in the models and as discriminating factors between companies with positive versus negative asset growth. These four indicators are: Net Income/Total Assets (NITA) which represents the profitability of assets; Sales/Total Assets (SATA) representing how efficiently a company uses its assets to produce income; Net Income/Sales (NISA) representing the percentage of sales contributing to net income; Net Income/Equity (NIEQ) representing the profitability of the owners' investment; and Receivables/Sales (RECSA)representing the percentage of sales that are made with a deferred payment arrangement.

Their model proves to predict the direction of asset growth with accuracy above 85% in large companies. An interesting point is that the only discriminating variable being positively associated with asset growth is NIEQ (Net Income/Equity). Finally, although discriminant analysis provides similar results in the full sample as well as the small and large firm sub-samples, logit provides similar results only in the full sample and large firm sample analysis.

It should be obvious by now that, most studies focus on the U.S stock market. Motivated by this fact Watanabe et. al (2013), investigate the existence of an asset growth anomaly in international financial markets using a sample of 43 countries, as well as its possible explanations Through a cross-country analysis, one could get new insights on the asset growth anomaly due to the different country characteristics. To begin with, if the asset growth anomaly is attributed to mispricing, it is only logical to be stronger in countries where stocks are less efficiently priced or with severe limits to arbitrage. On the other hand, if the anomaly is due to managerial empire-building, capital structure market timing, or accounting manipulation, its effect should be weaker in countries with stronger corporate governance, better investor protection, and less room for accounting manipulation.

In turn, if the asset growth effect is attributed to a rational explanation such as optimal corporate investment decisions, it should be stronger in more efficient markets where stocks prices stay closer to the fundamental values and the expected returns exhibit a closer relation to risks. In line with the above they form three hypotheses: a) the first captures the relation between market efficiency and the asset growth anomaly under the optimal investment explanation and q-theory (rational explanations) or the mispricing explanation (behavioral explanation); b) the second captures the relation between the asset growth effect and limits to arbitrage, under the assumption that if the anomaly is attributable to mispricing, it should be more profound in countries where mispricing is difficult to arbitrage away, and c) the third hypothesis, investigates what enables the anomaly under the assumption that it is driven by mispricing (i.e firms' overinvestment tendency, opportunistic financing behavior, and earnings management practices). In accordance to the third hypothesis, the negative relation between asset growth and future stock returns should be stronger in countries where there is less investor protection and lower accounting quality.

The period under examination for the 43-country data is from 1982 to 2010, including the U.S market, in order to make the necessary comparisons. Their findings in reference to the first hypothesis suggest that, the more efficient a market is, the stronger the investment-return relation should be, supporting the optimal investment explanation. In respect to the second hypothesis, international data suggests that limits to arbitrage (represented by arbitrage costs) play a relatively weak role in explaining the asset growth effect across different countries. Regarding their final hypothesis of investor protection and

accounting quality, their analysis gives relatively weak and somewhat conflicting results. It proves that there is a positive relation between investor's protection and accounting quality with the asset growth effect, and that relation could be explained by the optimal investment theory. However, if there is sufficient investors protection mechanism and less room for earnings management, managers' inducement follows shareholders', and insiders' inducement follows outsiders'. This probably drives firms to engage in value-enhancing investments, and thus, to a more profound investment effect based on the q - theory. All of that, assuming an informationally efficient market to begin with. Their overall findings suggest that the asset growth anomaly is also apparent in international equity markets, country characteristics play indeed an important role in the magnitude of the effect and strangely the asset growth effect is more profound in markets that are more informationally efficient.

Titman et al. (2013) revisit the issue using a sample of 40 countries during the 1982–2010 period, excluding from their sample stocks with market capitalization of less than US$100 million, in line with the methodology incorporated by Chui et al. (2010), to avoid microcap stocks dominating the analysis. Besides Cooper et al. (2008) asset growth measure, they incorporate as a measure of corporate investment, the capital expenditures scaled by net fixed assets and its variants (Titman et al., 2004). However, adjusting for the fact that substantially more firms report total assets than capital expenditures, they choose to document the results based on asset growth. Since financial markets' development can influence the anomaly, they prefer to focus on the relation between the development of financial markets and the asset growth effect. In their examination, they form two hypotheses regarding the cause of the anomaly: the q-theory of optimal investment hypothesis and the overinvestment hypothesis suggested in their previous paper (Titman et al., 2004). They classify financial markets based on whether a country is a developed or developing economy and re-estimate the regressions based on this classification. Furthermore, they consider the observation made by Fama and French (2008) and Copper et al. (2008) regarding small stocks. They perform a separate analysis on a country level re-estimating regressions, after the exclusion of what they consider to be microcap stocks, for all subgroups based on their measures of financial market development (that is, corporate governance, and limits to arbitrage). However, a direct implication of excluding small firms is that the regression outcomes do not find solid ground under the hypothesis that the asset growth effect is stronger in countries with weak corporate governance than in countries with strong corporate governance.

Their analysis indicates that the asset growth effect is related to various proxies of financial market development such as IMF classification of developed markets, the access-to-equity market index, the market-cap-to-GDP ratio, the stock-value-traded-to-GDP ratio, and the stock-value-traded-to-market-cap ratio. Furthermore, they conclude that the asset growth effect is significantly stronger among firms located in countries with more developed financial markets than in countries with less developed financial markets. In line with the results suggested in Watanabe et al. (2013), they do not find a significant relation between the asset growth effect and various measures of corporate governance or trading costs. Hence, this evidence is inconsistent with the hypothesis that the asset growth effect is driven by overinvestment due to weak governance. Rather, the evidence supports the q-theory explanation.

Bavarsad et al. (2014) are the first to examine the asset growth effect in addition to the relationship between the variables in the Fama and French model in Tehran Stock Exchange, from 2001 to 2008. They document their four hypotheses as follows: a) There is significant relationship between risk premium and return on the firms' stocks return (deriving from the MKT factor in Fama and French), b) there is a significant relationship between the firm's size and the return on the firm's stocks (deriving from the SMB factor in Fama and French), c) there is a significant relationship between the growth and the return on the firm's stocks (deriving from the BE/ME factor in Fama and French), and d) there is a significant relationship between the asset growth rate and the return on firms' stocks. Their findings suggest that none of their hypotheses is rejected, hence, an asset growth effect is apparent in the Tehran Stock Exchange.

Fu (2014), instead of examining whether there is a rational or behavioral explanation causing the anomaly, he surveys whether we are actually facing an anomaly or just an alteration driven by some known return evenness. Motivated by Shumway (1997), he firstly investigates whether there is a delisting bias leading the observed return patterns. He constructed his data based on all NYSE, AMEX, and NASDAQ nonfinancial firms for the period of 1968 to 2013. Following Cooper et al. (2008), he measures asset growth rate (AG) as the year-to-year percentage change in total assets (TA). He concludes that the outperformance of the low asset growth portfolios is substantially attributable to the delisting bias in CRSP’s monthly stock return file. After correcting the bias, the lowest asset growth portfolio earns similar returns to other asset growth portfolios except for the

two highest asset growth portfolios. These portfolios experience an asset increase so large that the only possible explanation is raising funds externally. Thus, he further investigates the mechanical relation between high asset growth and external financing but he does not focus on the determinants of a possible external financing anomaly.

He examines his case in two sequential parts: a) first he surveys whether the extent of large increases in firm assets is due to external financing; and b) in turn, he investigates whether the underperformance of the high asset growth firms is driven by the widely-documented return underperformance following large equity or debt issuances. The first part requires the construction of variables representing the external financing. He chooses to do this by both using the balance sheet and the cash flow statement. The second part is based on the methodology proposed by Fama and French (2008) indicating the importance of equity issues in affecting the asset growth anomaly. However, since their measure of asset growth - asset growth on a per share basis, controlling for the growth of assets due to new equity issues, stock-swap acquisitions, and stock repurchases – does not consider the asset growth driven by debt issuances, Fu (2014) complements this asset growth variable on a per share basis by subtracting net debt issues. Using this adjusted variable, he does not find evidence supporting an independent effect of asset growth on stock returns. Thus, he proposes that instead of treating some newly-found return patterns as independent anomalies, researchers should further explore their potential relations to existing styled return patterns.

Li and Sullivan (2015), following the path of Watanabe et al. (2013) and Titman et al. (2013), examine the existence and the persistence over time of an asset growth effect in global financial markets. Their next logical step is to examine whether its global evidence is driven by a market mispricing, systematic risk(s), higher arbitrage costs due to the lack of close substitutes, idiosyncratic volatility, and transactions costs. Finally, they investigate to what extent the degree of country-level governance and market development influences the cross-country differences in the asset growth effect. For their research purposes, they use the MSCI World Index universe - currently consisting of 23 developed countries – for the period from 1985 to 2009. In line with the methodologies incorporated when limits to arbitrage are involved, using the MSCI World Index has the benefit of excluding all small or microcap. They adopt Cooper et al. (2008) calculation of asset growth. Their results find evidence that a strong asset growth effect stands in international markets and it is persistent over time, even in different subsample periods. An interesting observation

deriving from their analysis is that the anomaly seems to strongly influence firm performance for up to three years after initiation.

They conclude that the asset growth effect could be probably driven by a mixture of market mispricing along with some global risk factor, across countries and regions. In contrast to the results presented by Watanabe et al. 2013 and Titman et al. (2013) they find evidence that countries providing easier access to capital and studier governance exhibit a stronger asset growth anomaly. However, such a result is contradictory with a mispricing explanation because it is only logical that more developed countries having more efficient capital markets and stronger governance should exhibit weaker asset growth mispricing. Regarding the influence of arbitrage costs and arbitrage risks, they document that the anomaly is more ubiquitous when the idiosyncratic volatility and the transaction costs are high (that is, among small and illiquid stocks). Since they address their research mainly to market practitioners, they highlight that investors exploiting the opportunity to earn abnormal returns must bear greater uncertainty in the form of higher idiosyncratic risk and higher transactions costs.

Cao (2015) motivated by all the different decompositions of total assets (TAs), used by the literature, readdresses the question of whether all growth components have similar effects on subsequent stock returns when financing sources are included in the analysis. He extends his work (Cao, 2011) in three ways: a) he exhibits that not all types of asset growth are created in an equal manner and addresses the relevant economic rationale behind the different effects of the different sources funding growth, on subsequent stock performance; b) he supports his earlier statement that the TA growth anomaly is only a noisy manifestation of the NOA growth anomaly, by extracting those components with a non-negative effect from TA growth; and c) he provides evidence that the capital investment anomaly suggested by Titman et al. (2004) and Anderson and Garcia-Feijoo (2006) is subsumed by NOA growth. His data comes from listed nonfinancial firms in NYSE, AMEX, and NASDAQ throughout the period of 1968 - 2012. Mainly, his decompositions of asset growth aim to combine both sides of the balance sheet. To demonstrate the importance of acknowledging the substantial differences among growth components, he presents the empirical benefits of removing growth financed by suppliers from TA growth. Furthermore, he finds evidence that indeed the capital investment anomaly is subsumed by NOA growth but not by TA growth.

Cao (2015) essentially extends Cooper et al. (2008) decomposition of TA growth, since instead of using either the left or the right side of the balance sheet he provides an interactive decomposition engaging simultaneously in both assets and sources of financing. Thus, he could provide new insights on the combined implications on future performance.

Cooper et al (2017) examine the efficacy of the link between the empirical specification and theoretical motivation of the investment factors in Hou, Xue, and Zhang (2015) and Fama and French (2015). Notably, their motivation draws from the fact that the investment factors used in the empirical tests of both Hou, Xue, and Zhang (2015) and Fama and French (2015)are not based on traditional measures of firm investment (such as measures based on capital expenditures and the growth in property, plant, and equipment (PPE)). They investigate whether the "investment factor" in these models explains anomalies because it picks up co-movement in returns of firms with similar investment levels. The authors provide evidence that suggest this may not be the case. First, the investment factor used in Hou, Xue, and Zhang (2015) and Fama and French (2015) is measured using firm-level growth in total assets which is difficult to justify as the most accurate available measure of investment. When they construct it using many other (arguably more direct) measures of corporate investment, the explanatory power of the Hou, Xue, and Zhang (2015) and Fama and French (2015) models is greatly reduced. Second, they show that using some subcomponents of asset growth (e.g. growth in noncash current assets or growth in long-term debt) to construct the investment factor, drives the obtain models to perform virtually as well as the Hou, Xue, and Zhang (2015) and Fama and French (2015) models. They conclude that, the performance of these factor models can be replicated using measures of investment that are arguably incomplete, but cannot be replicated using traditional measures used in the literature or more complete measures that include investment in intangible capital (e.g. Peters and Taylor (2017)). Thus, their findings suggest that these models as more appropriate for performance benchmarking purposes, and we caution against using them to estimate expected returns or to investigate the risk-return tradeoff.

Papanastopoulos (2017), investigates the asset growth anomaly using an integrated European stock market sample by examining whether the anomaly extends across both profit and loss firms. The author is motivated to investigate the asset growth anomaly conditional on the sign of earnings and particularly losses, due to the fact that losses are

more transitory and less informative than profits about firms' future prospects. As a consequence, traditional valuation models, such as the discounted residual earnings model, may be unable to yield reliable estimates of firm value for loss firms. In addition, since market participants face greater difficulties in predicting and valuing losses, could create considerable price uncertainty for loss firms. Furthermore, the unique characteristics of loss firms, as well as the possibility of using losses as a heuristic (either due to bounded rationality and/or to reduce the transaction costs of processing information) can give rise to systematic errors that affect market prices in the reaction to financial information. Under a mispriced based explanation, investors are more likely to misunderstand asset growth of loss firms and therefore, the asset growth anomaly is predicted to be more pronounced for loss firms relative to profit firms. The author concludes that conditioning on the sign of accounting earnings, although the asset growth anomaly extends across profit and loss firms, it appears to be much more severe within loss firms and is considerably attenuated within profit firms.

2.3.2 Indicators Of The Asset Growth Effect

Prior to the study published by Cooper et al. (2008), all measures used to represent a firm's growth incorporated capital expenditures (Titman et al., 2004; Andreson and Garcia – Feijoo, 2006; Xing, 2008; Polk and Sapienza, 2008). Capital expenditures are derived from the cash flow statement. Many stakeholders make their decisions based on the cash flow statement, since they feel that it is the most transparent of the financial statements (i.e., most difficult to fudge indicating the true performance of a business). Capital expenditures are directly related to an increase of a firm's assets, since they indicate the funds used by a company to acquire or upgrade tangible assets such as property, plants and equipment. One should keep in mind, that the amount spent among firms can vary depending on the industry features and demands.

Capital expenditures, as a measure of growth, can produce rather puzzling outcomes. Increases in capital expenditures could be treated favorably for several reasons. To begin with, increased investment expenditures may indicate greater investment opportunities. Further, if a firm's increased investment expenditures are funded by capital markets might mean a greater confidence in the firm and its management. Finally, firms may publicly disclosure only those capital expenditures that are likely to be treated favorably. On the

other hand, high capital expenditures may lead to negative stock returns as well. Investors failing to perceive managements' incentive to oversell their firms (empire building), may provoke a negative relation between the increase in capital expenditures and subsequent stock returns. In addition, there are studies examining the investment behavior for financial misstating firms. McNichols and Stubben (2008) show that earnings manipulators over-invest in capital expenditures during the manipulation period, and no longer do so in the post-manipulation period. They propose that earnings management creates an over-investment tendency because investment decision makers within the firm might believe the misreported growth due to their over-optimism or unawareness of the misstatement. Kedia and Phillipon (2009) conclude that managers who want to hide low productivity of their firms must not only manage earnings but also hire and invest as if productivity was high.

Lyandres et al. (2008) propose the investment to asset ratio. On the numerator, we have the sum of the differences within two subsequent years in Inventories and Gross Property, Plant and Equipment. Both these assets participate in a firm's operating income and are measures of real investment. An increase in these assets, indicating investing in income-producing assets, could probably represent a firm's incentive to improve its operations, or a necessary upgrade/ expansion in order to keep up with the market's needs. Such a ratio takes into account both long-term and short-term assets, thus, it considers "full operational performance and a somewhat strategic investment policy". The fact that they use Gross Property, Plant and Equipment has its benefits and its drawbacks. Depreciations and impairments not taken into consideration, could prove to be beneficial since differences in depreciation (among different firms or within a firm through different years) can skew the results. However, it is likely that the values stated on the balance sheet do not necessarily correspond to their actual ones. Furthermore, differences in the valuation of Inventories can skew the results as well.

Although, a decrease in the Inventory could be a positive sign – a decrease in finished goods could be interpreted as the goods being sold, or a decrease in raw materials could possibly mean an increase in the production- regarding the normal operating circle of a company, one should keep in mind that this is not necessary the case. For instance, even if all finished goods are sold, the company's customers do not necessarily pay on time (leading to a high balance in accounts receivables). Hence, we should look for any special events leading to such a decrease before we conclude that business is going well. Finally,

having total assets of the previous fiscal year on the denominator enables a quick assessment of: a) how many income-producing assets a company owns to fulfill its purpose relative to anything else that a business owns, has value, and can be converted to cash (i.e its total assets) and b) how many investments did that firm make during the last year to fulfill its purpose.

Hirshleifer (2004) proposes the level of net operating assets as a measure of a firm's growth. A basic accounting identity states that a firm's net operating assets are equal to the cumulation over time of the difference between net operating income and free cash flow. Hence, net operating assets reveal any discrepancy between accounting value added and cash value added. Net operating assets can also represent a cumulation over time of a firm's operating accruals and investment in operations, so they effectively reflect the full history of flows generated by a company. The author states that a high level of net operating assets may reveal a lack of sustainability of future profitability. Further, it could probably cast doubts about the profitability of investments. It is well documented that investors fail to interpret a firm's fundamentals (deriving from its financial statements) and the implications of accounting rules changes or earnings management. Thus, a high level of net operating assets could be a result of an extended pattern of earning management that must soon be reversed.

With that being said and since stakeholders believe that the cash flow statement is more difficult to fudge, a measure combining and somewhat comparing the information of the balance sheet relatively to those of the cash flow statement could be a better indicator about a firm's actual growth.

Cooper et al. (2008) argue that total asset growth subsumes the explanatory power of other prevailing measures. Incorporating total assets into a measure surely captures a larger picture of the potential total asset growth effects of comprehensive firm investment and disinvestment. It enables to evaluate a firm's growth utilizing all the firm's assets (it captures the aggregate growth) and it further highlights how successful management is in deploying both short-term and long-term assets. Further, it allows for a decomposition into the major balance sheet components related to a firm's investment and financing decisions. From that decomposition, an analyst can distinguish which variable is the main source of a firm's growth and how it is related to subsequent stock returns (it could be

possible that not all subcomponents are negatively related to stock returns). Furthermore, using the right-hand side's decomposition one could conclude whether a firm's growth is indeed coming from its assets (items that a firm owns and produce income) or from a source of financing (money that a firm owes and must repay). However, the authors argue that, since, the asset growth is the sum of both the left or right hand side of the balance sheet, it synergistically benefits from the predictability of all sub-components and, thus, no decomposition or no sub-component can be superior than the total asset measure itself.

On the other hand, one could argue that, since, total assets capture the benefits of all its sub-components it could also bear its drawbacks as well. Since, it relies solely on the fundamentals of the balance sheet, it could probably be sensitive to management's discretional accounting practices and to bloated balance sheets. Furthermore, although it incorporates all sub-components of a balance sheet it uses them distinguishably (either the left or the right-hand balance sheet's accounts). Finally, accruals besides the income statement affect the balance sheet as well, which represents liabilities and non-cash-based assets used in accrual-based accounting. Total assets include, among others, accounts receivable, inventory and PP&E, where management has a high degree of accounting flexibility and thus, they are characteristically prone to manipulation.

Cao (2015) revisits the measure used by Hirshleifer (2004) and evolves his idea. His motivation came from the decomposition of total assets stated in Cooper et al. (2008). Cao's (2011, 2015) measure distinguishes operating assets into those financed by suppliers (OAOL) and those financed by debt and equity (NOA), and so he combines the two sides of the balance sheet. Furthermore, instead of using the level of net operating assets he uses Net Operating Asset Growth. NOA growth is a better proxy for unexpected NOA and, thus, related to new information, while NOA_Level includes NOA information that has been already historically priced (in line with the formations followed by Bernard and Thomas, 1989; Cao and Narayanamoorthy, 2012, representing time series unexpected earnings as a change in earnings, instead of earnings level).

However, he defines Net Operating Assets as the difference between operating assets and operating liabilities. He does not utilize the information of the Cash Flow statement, as it would be suitable in his choice of measure. From our perspective, any measure based on balance sheet's fundamentals representing a firm's growth might be sensitive to

earnings management and probably one should consider a variable and/or a method that takes into account any misstatements.

2.3.3 Drivers Behind The Asset Growth Anomaly: Existing Literature

The negative relationship between asset expansions and changes in subsequent stock returns has been discussed and examined by academics. The conspicuous explanations for this negative relation can be, initially, divided into two mutually exclusive groups: a rational group and a behavioral group of explanations.

The first rational explanation refers to the forward-looking q theory of investment (Zhang, 2005; Xing, 2008; Li et al., 2009; Liu et al., 2009; Chen et al., 2010; Li and Zhang, 2010; Wu et al., 2010) suggesting that firms increase their growth and investments when their costs of capital, which is expressed in their expected returns, are lower. When their costs of capital and thus their expected returns are higher, they tend to invest less.

The second rational explanation is based on real options model (Berk et al., 1999; Carlson et al., 2004, 2006) proposing that when firms expand, risky growth options are turned into safer real assets. In turn the suggested reduced risks, cause the decrease of the relevant future stock returns. Under both rational explanations, an asset growth variable should prove to be a priced risk factor.

The second group of explanations is based on a behavioral (mispricing) background. The first behavioral explanation (Titman et al., 2004) states that the bias observed is due to investors' misinterpretation of information regarding corporate growth and investments, and their underreactions to overinvestments pursued by managers with a tendency towards empire building. They conclude further that the negative investment-return relation is stronger among firms with greater managerial investment discretion and is significant only during periods when external corporate governance is weak.

The second behavioral explanation (Lakonishok et al., 1994; Barber and Shleifer, 2003) is based on the extrapolation biases and style investing based on growth classification.

Per this explanation, firms exhibiting a consistency in the magnitude of their growth should not either underperform or outperform. On the other hand, firms that exhibit high (low) growth in the begging but subsequently present low (high) growth or investments should underperform (outperform). Similarly, Cooper et al. (2008) attribute the anomalies to investors' overreactions to changes in firms' future business prospects implied by asset expansions or reductions.

A third explanation refers to capital structure market timing when raising and retiring external financing (Baker and Wurgler, 2002), as it has proved to be an important aspect of real financial policy. A great portion of the relevant published studies acknowledges the importance of the financing side of the balance sheet. Cao (2011, 2015) states that measures combining both sides of the balance sheet – that is the asset expansion and the way this expansion is financed - play a very important role in examining any growth effect.

Finally, the anomaly could be somewhat attributed to earnings management prior to financing activities or acquisitions (Teoh et al., 1998a, 1998b). Titman et al. (2004) show that the abnormal returns cluster around earnings announcements.

Many papers tend to combine and examine more than one of the above-mentioned behavioral explanations. A representative example is the study conducted by Sougiannis et al. (2008), who examine: a) whether mergers and takeovers are drivers of growth in assets (the long-run underperformance of acquirers after mergers), b) whether the past performance and external financing affect the asset growth (investors' extrapolation of past growth - underperformance following equity market timing by managers), and c) investors' perceptions of the quality of managerial decisions (over-expansion by managers).

To the best of our knowledge, the two groups were mutually exclusive up until 2010. Either the effect was attributable to a rational theory – that is q-theory or real option model – or to a behavioral one. Since 2011, when worldwide data became available and easily accessible allowing researchers to focus on an international asset growth effect, a mixture of both rational and behavioral explanations seems to be the case behind the asset growth

anomaly (Li and Sullivan, 2015; Cooper and Priestley, 2011). However, the drivers of an asset growth effect remain still an ongoing debate.

A great body of literature investigates, besides the existence of the phenomenon and its causes, factors that could influence the persistence and magnitude of an asset growth effect. Since most of the early research proposes a mispricing explanation, it is the next logical step to examine whether arbitrage influences its persistence. Arbitragers are the first to perceive an inefficiency and in turn to take advantage of the mispricing, ultimately leading the market to an equilibrium. However, if the risk or costs to arbitrage the market are high (severe limits to arbitrage), the anomaly will not be quickly arbitraged away. Lipson et al. (2009) show that the asset growth effect is greater among stocks with higher arbitrage costs measured by idiosyncratic return volatility. Titman et al. (2004) by supporting an overinvestment hypothesis – that is, firms exhibiting an increase in their investments tend to overinvest, and investors initially underreact to the negative implications of the overinvestment – prove that due to limits to arbitrage, the mispricing is not quickly arbitraged away, and thus generating an anomaly. Finally, Lam and Wei (2008) suggest that the persistence of the anomaly is indeed affected by the degree of difficulty to arbitrage.

As mentioned above, managers implementing their own incentives may also cause the anomaly to take place (e.g. through their tendency towards empire building). Management's investment discretions have proved to be a factor affecting the asset growth effect. Literature proposes that if corporate governance is weak then the asset growth anomaly should be more profound (Titman et al., 2004; Chan et al., 2008; Cooper et al., 2008).

Last but not least, another important factor that must be considered is the type of the economy under examination and its features. Studies have found that a market's financial development can influence the anomaly in many ways (Titman et al., 2013; Watanabe et al., 2013; Yao et al., 2011 etc). To begin with, in less developed markets, there are fewer market participants, leading to greater fluctuations in expected returns and fewer providers of liquidity that arbitrage away mispricing. Second, financing frictions to enable new investments tend to be higher in less developed markets. Finally, corporate governance

and market disciplines are likely to be weaker in less developed markets. An interesting point is the one suggested by Titman et al. (2013).

By examining each of these features in isolation, it will probably lead us to a stronger asset growth effect in less developed markets. But when instead, we consider them together, on multiple occasions the asset growth effect is strongest in the more developed markets. In addition, in less developed capital markets, a firm that can finance itself (internally) an increase in capital expenditures may be considered good news, and, thus, induce an offsetting positive relation between asset growth and stock returns. Yao et al. (2011) distinguish the differences in asset growth effect rising from a bank-based economy (like China for example). Since banks have a direct access to corporate financial information and since they monitor a firm's business performance, once they finance its investments, they can effectively restrain firms' overinvestment tendency. Finally, banks may underfund firms' growth opportunities, leading to capital rationing, probably to underinvestment and more homogenous expansions.

2.4 Earnings Management

2.4.1 Early Research

If capital markets were to be complete and perfect, financial disclosures and thus the demand for accounting or accounting regulation should not be of any importance (that is, share prices would reflect all public information and appropriately incorporate and evaluate any transaction reflected in firms' accounting numbers – financial statements). Since there are many unexplainable patterns in average stock returns that cannot comply with the efficient market hypothesis, it is only logical to believe that capital markets are indeed imperfect and incomplete markets. Hence, in an environment of imperfect and incomplete markets, the need for accounting and accounting regulations justifies the belief that accounting disclosures and accounting-based contracts could play an important role in addressing market imperfections (Fields et al., 2001; Sloan, 1996; Xie, 2001). For several

decades, researchers extensively examine the management or manipulation of corporate financial statements' numbers.

Various manipulation methods and a battery of contexts that provide incentives to manipulate accounting numbers have been documented. Accounting research on the determinants and on the implications of earnings management can be traced back to the 1960s. Healy and Wahlen (1999), McNichols (2000), Fields et al (2001), Xu et al (2007), Verbruggen et al (2007), Marai and Pavlovic (2014) and Riuz (2015) review this research. To keep the task manageable, we shall use as our baseline these reviews to briefly present early research on the topic, the incentives behind earnings management, any voids in this line of research as well as the techniques used and methodologies followed to detect such a behavior.

We have noticed that almost all reviewers base their layouts, and thus address their perspective on the issue, on a definition of earnings management. From our perspective two definitions are worth mentioned: "Earnings management is taking advantage of the flexibility in the choice of accounting methods to indicate the management decision-making on future cash flows" (Sankar and Subramanyam, 2001 p.) and "Earnings management is the use of accounting discretion, intentional accounting misstatement, or use of real transactions to alter the number reported in the financial statements to influence outcomes that depend on reporting accounting numbers" (Hall et al., 2013 p. 106).

The first definition incorporates a well stated observation in Fields et al. (2001, p. 260): "Although not all accounting choices involve earnings management, and the term earnings management extends beyond accounting choice, the implication of accounting choice to achieve a goal are consistent with the idea of earnings management". Furthermore, this definition is consistent with the Statement of Financial Accounting Concepts regarding the Usefulness of Financial Statement Reporting for Making Decisions. That is, that the quality of information about the features of a firm's financial performance deriving from its financial reporting is relevant to a specific decision made by a specific stakeholder (decision-maker).

The second definition addresses three forms of earnings management. Many accounting statutes and guidelines permit accounting discretion, and thus a form of earnings management, so as to allow a firm's management adjust its earnings matching a predetermined target. Earnings management can take place for the purpose of income smoothing, where firms aim to keep their accounting – financial performance figures relatively stable, using accounting-based earnings management. In "real earnings management" , Earnings are manipulated using methods that differ from normal business practices for the purpose of achieving a certain level of earnings. Assuming that both these forms of earnings management are within the permittable levels of flexibility of accounting standards, they are two forms of "unharmful" earnings management to the financial statements' users.

Finally, from our perspective, the term intentional accounting misstatement refers to the accounting choices made in order to manipulate accounting numbers in an illegal fraudulent way, otherwise stated as "manipulative earnings management", which can be viewed as a third form of earnings management.

Up until the 1990s, there are three published literature reviews referring to earnings management. Each one addresses the issue from another point of view, which we believe communicates the relevant research to a different category of users (decision-makers). Healy and Wahlen (1999) review the academic research from the perspective of standard setters. Since standard setters define the accounting language and terminology used by management to communicate firms' performance to external stakeholders, they provide the means, through financial reporting, to distinguish best-performing firms from the poor performers and enables efficient resource allocation and decision making by stakeholders.

Hence, financial reporting and standard setting add value if they empower financial statements to adequately illustrate differences in firms' financial position and performance in an appropriate and reliable way. Standard setters need to provide managers with some room to exercise their judgement in financial reporting, since they need to match their knowledge about the business and the firm's opportunities – performance with the reporting methods and estimates. However, this need creates the ground for earnings management in the sense that managers may select reporting methods and estimates that misstates their firm's financial position. To understand how much discretion should be

permitted to management, standard setters should probably try to assess which accruals enable earnings management, the degree and frequency of earnings management as well as its implications on resource allocation in the economy. Healy and Wahlen (1999) find that academic research to date mainly concentrate on detecting the existence of earnings management and when earnings management is enforced.

McNichols (2000) communicates the trade-offs related to the three research designs commonly used in earnings management literature, thus taking a somewhat more technical view on the issue. Her work could probably be taken into consideration by practitioners such as analysts, traders or anyhow a more "technical" users in general. Brown and Caylor (2005) report a noteworthy increase in the number of analysts, in the number of firms monitored by analysts, an increased attention by the media paid to analysts' forecasts, and the accuracy and precision of analysts' forecasts. Satisfying or beating analysts' earnings expectations has always been an incentive towards earnings management. However, the degree these incentives affect accounting choices has increased since analysts have taken a more prominent role in the functioning of capital markets. Securities analysts, acting as accounting and finance professional with industry expertise, refine and circulate information disclosed in firms' financial statements. Since, they are skilled to evaluate accounting and financial numbers and features, it is for their benefit, maintaining their good reputations and scores, to detect manipulated numbers in time and Dyck et al (2010) communicate their valuable role as whistle blowers, since they are usually the first to reveal corporate fraudulent behaviors.

Finally, Fields et al (2001) review earnings management literature in respect to three types of market imperfections, affecting managers' choices: agency costs, information asymmetries and externalities affecting non-contracting parties. Agency costs are generally associated with managerial compensation and debt covenants. Information asymmetries generally reflect the relation between (better informed) managers and (less well informed) investors. Externalities are generally associated with third-party contractual and non-contractual relations. We believe that their work communicates earnings management literature to those stakeholders having a more "direct" relationship with the firm, such as existing and potential investors, lenders and other creditors. According to FABS N.8 "The primary focus of financial reporting is information about an enterprise performance provided my measures of comprehensive income and its components. Investors, creditors and others who are concerned with assessing the prospects for

enterprise net cash inflows are especially interested in that information". Modern accounting treats stakeholders as mere consumers of financial statements, thus the issue here should be the degree of earnings management deceiving the stakeholders.

All of the abovementioned authors conclude that earnings management literature, up until the 1990s at least, provides only modest insights on the issue. Specifically, Fields et al (2001) argue that most of the progress made came from the 1970s and 1980s, rather than the 1990s. They agree that the voids lie on the difficulty in determining research designs (measures, methods and detection techniques) that incorporate the intricacy of the issue: meaning the simultaneous impact of multiple accounting choices/manipulation methods, multiple goals/incentives and econometric implications. Furthermore, they state that research literature mainly focuses on understanding whether earnings management occurs and the drivers of such a behavior. However, it should be mentioned that most of the studies conducted use research setting where earnings management is more likely to occur.

Healy and Wahlen (1999) document that from the perspective of a standard setter, additional evidence on which accounting standards are exploited to manipulate earnings, the frequency of earning management, as well as earnings management implications on earnings and resource allocation. They believe that future progress should not be based on more powerful tests on the existence of earnings management, but instead futures studies should focus on how frequently accounting discretion is used to manage earnings and how important are the implications on earnings. Finally, they argue on the importance of reconciling the conflicting results on the implications of earnings management on stock prices and resource allocation.

McNichols (2000), from their technical perspective, states that earnings management measures relying on the Jones and modified Jones model are not adequately robust or solid to estimate earnings management behavior in many contexts. She argues that future progress should focus on modeling the behavior of specific accruals under the existence as well as under the absence of earnings management. She states two needs that future research should aim to fulfill: a) understanding how accounting numbers, either using aggregate accruals or specific accruals, portray the underlying transactions and to depict financial statement relationship and b) further examination, evolving empirical method to

better represent any further progress/knowledge on the issue, on the factors that drive managers to manipulate earnings.

Finally, Fields et al (2001) propose three paths that will evolve research literature: a) since empirical results fail to provide compelling evidence on the influence of alternative accounting methods, future research should focus on determining the nature of such influences. More specifically, it should be examined whether accounting differences influence firm valuation or existing empirical method fail to distinguish such effect. b) Since, there are various incentives, as well as various goals to be achieved, simultaneously it has been proved insufficient to examine one accounting issue or one goal/incentive in isolation. Hence, the authors express their need for a more inclusive scheme of accounting choice. However, they do not believe that such a context will become available, in the near future at least, due to the intricacies inherent in such a model. Finally, c) they propose, in contrast to Healy and Wahlen (1999), that future researchers should aim to develop more powerful statistical techniques and research designs.

Most literature reviewers, based of course on the existing published papers, document two basic sub-sections: a) motivations and b) approaches of detecting earnings managements. The motives driving managers towards earnings management are more or less the same through the decades, although reviewers may choose to report them in different taxonomies. It should be noted that when companies and their CEOs accordingly choose to engage in earnings management, they willingly bear the risk of damaging their reputation as well as the costs associated with their accounting choices. Hence, they will only engage in such a behavior if their benefits are higher than the risks and costs involved. Riuz (2015) states that most early research focuses on positive accounting theory suggested by Watts and Zimmerman (1986). However, recent accounting research tends to investigate capital market motivations (Xiong, 2006). Following this shift of researchers' interest, we shall present the incentives behind earnings management using the aforementioned taxonomy, that is a) motives under the positive accounting theory and b) capital market motivations.

2.4.2 Managers Incentives

2.4.2.1 Motives Under The Positive Accounting Theory

Positive accounting theory is based on three hypotheses around which its predictions are organized.

2.4.2.1.1 Bonus plan hypothesis

The influence of executive compensation contracts - bonus plans on firms' accounting choices is one of the most extensively examined fields of empirical accounting choice research. Short-term bonus awards are often related to reported accounting performance measures such as net income, ROA and ROE. On the other hand, longer-term incentive compensation is often related to stock performance. Dye and Verrecchia (1995) argue that the reporting flexibility leads to a more informative signal about firm performance. Evans and Sridhar (1996) provide a practical reason for this deriving from their model: it is costly for the principal to eliminate all reporting flexibility. Finally, if managers manipulate either accruals or real transaction to alter their compensation, then the manipulating accruals may lead to a lower wealth losses to principals than manipulating real activity.

Another reason for accounting discretion in compensation contracts is efficient contracting. Efficient contracting argues that, although financial reporting flexibility may enable managers to increase their compensation, such flexibility also improves the alignment of their interests with those of shareholders (Watts and Zimmerman, 1986). If higher compensations need higher accounting earnings, then in turn higher accounting earnings may lead to higher share values or lower probabilities of bond covenant violations. Furthermore, in markets characterized by rational expectations, managers will not have the chance to increase their total compensation by opportunistically selecting accounting methods because their total compensation package already incorporates the anticipated effect of such choices. However, researchers find little evidence, on whether such adjustments to compensation packages are implemented.

Healy (1985), argues that managers choose current discretionary accruals to maximize both this period's bonus and the expected value of next period's bonus. He proposes that if earnings are expected to be between the upper and lower bound, managers will adopt income-increasing practices. On the other hand, if earnings are expected to be either above the upper bound or (significantly) below the lower bound, managers fluctuate income to future periods to maximize multi-period compensation. Guidry et al.'s (1999) results are consistent with Healy's bonus plan hypothesis using internal data from different business units within a single corporation. Their methodology has the benefit that division managers' actions are less influenced by external agency conflicts and stock-based compensation. However, Gaver et al. (1995) find conflicting results to those in Healy's research. They find that when earnings before discretionary accruals fall below the lower bound, managers select income-increasing accruals (and vice versa) supporting an income-smoothing hypothesis. Holthausen et al. (1995) find support in the Healy hypothesis only at the upper bound. Holthausen et al. argue that features of Healy's research design could explain the differences in empirical results at the lower bound between Healy and Holthausen et al.

Examining CEO cash compensations, Gaver and Gaver (1998) find that the compensation function is asymmetric: cash compensation is positively related to above the line earnings as long as earnings are positive whereas cash compensation seems to be shielded from above the line losses. The same results stand for nonrecurring items. Ittner et al. (1997) expand the Healy analysis by investigating the extent to which CEO bonus contracts also are based on non-financial measures. They find evidence that the dependence on non-financial measures increases with the noise of financial measures, with regulation, with corporate innovation, and with corporate quality strategies. Chen and Lee (1995) find that the decision between taking a write-down in oil and gas properties or shifting to the successful efforts method is related to the pre-write-down level of accounting income and that executive bonuses for both write down and shifting firms are likewise related to accounting net income. Firms with accounting losses prior to a write-down were more likely to take a write-down, which is consistent with Healy's (1985) lower bound hypothesis. Still, these authors did not investigate alternative explanations for the results.

In the same vein, there are studies that address CEOs incentives to maintain their good reputation, their good performance or in cases of CEOs changes and retirements. Several studies find evidence that incoming CEOs clearly have the motivation to decrease

earnings in the year of the executive change and increase earnings the following year (Strong and Meyer, 1987; Elliott and Shaw, 1988; Pourciau, 1993; Francis et al., 1996), probably to boost the incoming CEO's reputation. Following the same line of research, Dechow and Sloan (1991) conclude that CEOs spend less on research and development during their final years in office, probably due to the short-term motivations driven by bonus contracts (although CEO stock ownership may reduce this effect). They argue that accounting based contracts can motivate managers to take actions that increase their bonus compensation but reduce shareholders' wealth (by more than the bonus amount). However, many of the above-mentioned studies may have some problems with endogeneity.

Murphy and Zimmerman (1993) conclude that the conditioning events used in Dechow and Sloan (1991) are likely to be related to the analyzed events. They find that asserted turnover-related changes in research and development, advertising, capital expenditures, and accounting accruals are due mainly to poor performance rather than to direct managerial discretion. Hence, the CEO departure and the observed reductions in R&D, advertising, and capital expenditures are not likely to be independent events. The authors document that, to the extent that outgoing or incoming managers exercise discretion over these variables, the discretion is limited to firms where the CEO's departure is preceded by poor performance, suggesting that poor performance may have led to both CEO departure and lower R&D investments.

Lewellen et al. (1996) conclude that when firms provide voluntary disclosure of stock performance compared to benchmarks, the benchmarks are selected to maximize relative reporting-firm performance, probably to boost managers' perceived performance. However, the authors present no evidence on whether such a scheme has an apparent influence on stock prices, management compensation or CEO reputation. Dechow et al. (1996) examine the features of firms pressing against the 1993 Exposure Draft on stock-based compensation to interpret the motivations of these firms to politick. They conclude that their opposition was based on compensation concerns, rather than on firm size, concerns about debt covenant violations, or fears that the new standard would raise their cost of capital.

Even though the goal of incentive-based compensation is to align managers' interests with those of shareholders, the inappropriately designed bonus contracts can lead to perverse outcomes and thus the actions made by the managers shall lead to wealth reductions for shareholders. Klassen (1997) documents that firms with high tax rates and low inside ownership, when they choose to dispose major assets, they essentially trade-off larger taxable gains (or lower losses) for financial reporting gains, probably due to bonus considerations. What may seem like a trade-off of earnings at the expense of higher cash taxes is probably caused by the differences in proceeds across divestiture methods. DeFond and Park (1997) find evidence that when firms face poor current earnings but their expected future earnings are favorable, managers acting under the pressure for their job security, "shift" temporarily earnings from the future into the current period and vice versa, incorporating discretionary accruals for income smoothing.

Another aspect that must be considered is a somewhat managerial opportunism at the expense of value maximization. Christie and Zimmerman (1994) incorporate a different methodology to make a distinction between opportunistic and value maximizing behavior. They use a sample of takeover targets, stating that these firms are likely to have had inefficient management that eventually led to changes in corporate control. They find evidence that, the takeover targets compared to their surviving industry peers, tend to have a higher frequency of income increasing accounting methods for up to 11 years prior to the corporate control action. On the other hand, they also find evidence that maximizing firm value is more valuable in accounting choice for the takeover targets than is managerial opportunism by exploiting the three choices they studied: depreciation, investment tax credit, and inventor.

2.4.2.1.2 Debt covenant hypothesis

Beside management's incentives may researchers were interested in examining accounting choices and information in respect to debt contracts. The main issues here are: why debt covenants rely on reported accounting numbers and why these covenants leave room to companies' discretion to select and change accounting methods following the debt issuance. The literature body (at least up to 2000) incorporates two methodologies to assess the impact of bond covenants on accounting method choices. To begin with, researchers assume that managers select or change accounting methods to avoid covenant violations, known as debt hypothesis. There are two paths followed

within this line of research: the first attempts to explain accounting choices with closeness to debt covenants and the second studies firms that have violated debt covenants. The second methodology investigates which firms are more likely to be adversely affected by mandated accounting changes by analyzing stock price reactions around the announcement of, or the lobbying behavior prior to, mandated accounting changes, which was abandoned in the1980s.

In the 1980s, most studies focused on the debt hypothesis used vulgar proxies such as the leverage ratio for the proximity of the firm to violation of its debt covenants. However, Lys (1984) states that since leverage is determined endogenously, it could be an inappropriate proxy for default risk, unless there is a control for the risk of the underlying assets. On the contrary, Duke and Hunt (1990) conclude that the debt to equity ratio is a suitable proxy for the closeness to some covenant violations, including retained earnings, net tangible assets and working capital, but not for other covenants.

Many studies in the 1990s examined firms that actually violated covenants to sidestep the use of proxies. Healy and Palepu (1990) investigate whether managers make accounting changes to avoid violating the dividend constraint in debt covenants, by gauging the proximity of the firm to violation of the debt covenant as the ratio of funds available for dividends to dividends paid. They document no difference in the frequency of accounting changes by the sample firms compared to a control group. However, they also document that firms close to violating the dividend constraint reduce and even omit dividends, when there is no lower cost getaway. Following the same methodology, Sweeney (1994) used a sample of firms that actually defaulted by violating debt covenants along with a matched firm control sample. The author finds that managers of firms near default by breaching debt covenant (most often net worth or working capital restrictions) tend to make income-increasing accounting changes. She documents that the defaulting firms made more accounting changes (cash-increasing accounting changes) in the period leading up to default and that a higher percentage of these changes were income increasing compared to the control group. However, she finds no statistically significant evidence that these firms made accounting changes, including income-increasing accounting changes, during the period surrounding default. Finally, she also documents mixed results on the influence of taxes (cash outflows) on accounting changes.

DeAngelo et al. (1994) assess the evident importance of actual debt covenant violations on accounting choices, by using a sample of financially distressed firms cutting dividends and some of them did so due to binding debt covenants. They hypothesize that firms facing potentially binding debt covenants have greater motivations to make income-increasing accounting choices than firms without such binding debt covenants. Since they report no statistical difference in the accounting choices made by the two groups of firms, they argue that the accounting choices reflected the firms' financial difficulties rather than efforts to either avoid debt covenant violation or conceal their financial distress. However, since the sample firms renegotiated many of their covenants over the examination period, the researchers explicitly note that it is difficult to relate any evidence of accounting manipulation with any one contractual concern such as debt covenants.

DeFond and Jiambalvo (1994) also use a sample of firms that reported debt covenant violations for accounting choices (income-increasing accounting changes) in line with the debt hypothesis. They investigate whether these firms manipulate accruals rather than making specific accounting method changes, assuming accrual manipulation is less costly than accounting method changes. They report that in the year prior and in the year of the violation's occurrence, abnormal total accruals and abnormal working capital accruals are both significantly positive, consistent with the debt hypothesis.

Moving away from using samples of firms that actually defaulted, Haw et al. (1991) examine a specific accounting choice with real economic impact, the decision as to when to settle an over-funded defined benefit pension plan, which leads to a current period gain for the firm. The authors report two incentives in determining the timing of the settlement:
a) to counterbalance a decline in earnings from other sources (which they assume to be associated with compensation contracts), and b) to reduce restrictive debt covenant constraints. They gauge the closeness to debt covenants' violation for both sample and control firms and conclude that the sample firms were closer. However, they do not assess the impact of the settlement on the debt covenant that was close to violation or whether the settlement itself influenced the debt covenant. In contrast to the above studies, Chase and Coffman (1994) document evidence that the investment-related accounting choices made by colleges and universities is not affected by the level of debt.

Chung et al. (1993) examine the trade-offs between use of GAAP and non-GAAP accounting methods in lending contracts. Using a subset of small oil and gas firms, they report that creditors tend to rely more on (non-GAAP) reserve recognition accounting than on historical book values. Malmquist (1990) also using a sample of oil and gas firms investigates whether these firms apparently choose full cost or successful efforts accounting due to efficient contracting considerations or because of apparently opportunistic motives, incorporating the debt to equity ratio as a proxy for debt covenants. The author states that his evidence is consistent with efficient contracting and thus rejecting an opportunistic behavior. Francis (1990) analyzes the economic trade-offs between costs of covenant violation and costs of covenant compliance and concludes that managers make cost-minimizing decisions.

Rosner (2003) investigates whether firms in distress will engage in earnings management and manipulate their annual accounting numbers to cloak their failing performance. Finally, Louis and Robinson (2005) state that the accrual alarms, along with another alarming behavior such as stock splits might be an appropriate manner of communicating private information. Instead of suspecting that managers alter accounting numbers for their personal motives (opportunism), they examine the possibility that earnings management might be the only way to address their optimism.

2.4.2.1.3 Political cost hypothesis

The final group of incentives under the positive accounting theory for accounting choice is that of influencing third parties. Acknowledging that third parties use accounting-based information, or information that must conform with reported accounting numbers, firms may find reasons to manage their reported numbers due to potential implications on their disclosure policies on third parties. Following the financial turmoil in the 1980s, the shifts towards fair value reporting and increased risk-related disclosures intended to narrow earnings management and improve information quality towards stakeholders. Since the turmoil was concentrated in the savings and loan industry, the majority of published papers referred to bank or insurance companies.

Moyer (1990), Scholes, Wilson and Wolfson (1990), Beatty, Chamberlain and Magliolo (1995), and Collins, Shackelford and Wahlen (1995) concluded that banks reaching their

minimum capital requirements have the tendency to overstate loan loss provisions, understate write-offs, and recognize abnormal realized gains on securities portfolios. Many of the papers included in this section examined whether strict surveillance by the relevant authorities can lead to earnings manipulation. It has been stated that corporations under inspection for anti-trust violations presented negative abnormal accruals during the inspection years (Cahan, 1992). Dechow, Sloan and Sweeney (1996) propose that firms obliged to enforce SEC actions for financial reporting violations frequently make seasoned equity offerings following the violation, but before its detection.

The different legal frameworks (i.e. code versus common law), which represent the level countries' investor protection (La Porta, Lopez-de-Silanes, Shleifer & Vishny, 1997, 1998), are also proved to affect firms' behavior. There are results proposing that a country's legal framework has an impact on earnings management and more specifically, firms in code law countries engage in different earnings management techniques in relation to common law countries due to the level of investor protection (Archambault & Archambault, 2003; Leuz et al., 2003; Soderstrom & Sun, 2007; Enomoto, Kimura & Yamaguchi, 2015). A representative example is Leuz et al.'s paper (2003) that present evidences that accrual manipulation narrows in countries with stronger investor protection. Furthermore, García Lara et al. (2005) conclude that companies acting under code law are more willing to smooth out earnings than their common-law peers. Finally, Enomoto et al. (2015) report a preference towards real activity manipulation as a substitute for accrual manipulation in countries with stronger investor protection.

Researchers, up to 2001 (based on Field et al), most commonly attribute this kind of behavior to the hypothesis that firms select accounting methods to reduce or defer taxes and to avoid potential regulation. The accounting choice literature that addresses tax issues refers to whether firms select accounting methods to minimize the present value of taxes. One apparent motive to do so is the changes in tax rates. Dhaliwal and Wang (1992) conclude that affected firms overhauled their accounting numbers by shifting permanent and timing differences across periods to minimize the tax implications of the alternative minimum tax (AMT). Boynt on et al. (1992) investigate whether firms classified as conceivably subject to the AMT provisions manipulate discretionary accruals to reduce the impact of AMT. They find evidence that the response fluctuates by firm size with only smaller firms manipulating discretionary accruals.

Guenther (1994) examines the effects of a decrease in tax rates resulting from the Tax Reform Act of 1986 on firms' manipulation of discretionary current (taxable) financial reporting accruals. He concludes that firms swift net income from the higher to the lower taxed periods by means of current accruals. Shane and Stock (2006) state that analysts fail to recognize shifts in earnings as optimal tax planning. When the market does not distinguish this form of earnings management, these firms might be punished for their strategic tax planning.

Another body of the tax-based accounting choice literature takes the accounting choice itself as its premise. This group directs its interest towards the choice between LIFO and FIFO, mainly because of the requirement of book/tax conformity for firms that use LIFO for tax purposes. Prior to the 1990s, empirical evidences have been ambiguous and often peculiar. Stock price responses have not been consistently positive in reaction to the LIFO adoption announcement (assuming tax savings and associated cash inflows) nor have the announcement period returns for the first earnings announcement been consistently negative or zero. Tse (1990) analyzes the announcement period market reaction to income generated by liquidating LIFO inventory (with the underlying assumption that inventory liquidations are strategic and planned by management) and, in general, finds no consistent reaction. However, when he controls for the estimated tax rates of firms, he finds that firms with low tax rates experience a positive market reaction to the liquidation income.

Cloyd et al. (1996) follow a different path in investigating the implications of tax considerations on a firm's accounting choices. Rather than focusing on the trade-off between tax costs and non-tax benefits, they assess whether firms adopting an aggressive tax treatment also choose a corresponding financial reporting treatment to present conformity and increase the probability that the IRS will permit the tax treatment if challenged, even though book-tax conformity is not required. Guenther et al. (1997) use a sample of publicly traded firms that were obligated under the Tax Reform Act of 1986 to shift from the cash to accrual method for tax purposes along with a matching control sample of accrual tax method firms. They find evidence that firms acting on cash basis significantly increased the level of deferred financial statement income after they were obligated to conform on accrual basis.

Instead of examining tax incentives in isolation, some studies, detecting managerial behavior conflicting with the simple model of minimization of the present value of the tax liability, propose alternative non-tax explanations for managerial behavior: a) tax costs to other contracting parties due to deferred revenue recognition and accelerated expense recognition (Scholes et al., 1992), b) the impact on debt covenants of shifting income into net operating loss years (Maydew, 1997), c) increased cash flow and smoother earnings (Maydew et al., 1999) and d) the effect on earnings used for performance measurement; and the effect on equity valuation (Klassen et al., 1993).

Haw et al (2005) investigated whether listed firms engage in earnings management to reach regulatory benchmarks and whether regulators and investors incorporate earnings' quality in their respective regulatory and investment decisions. They find evidence that managers implement transactions involving below-the-line items and engage in income-increasing accounting accruals as a reaction to China's governmental regulations requiring a minimum of 10% ROE for enterprises that wish to issue bonds or offer shares. They also find evidence that investors comprehend the differences in earnings' quality and put less value on earnings signaling a greater degree of management.

Finally, Johnston and Rock (2005) investigate whether firms classified as potentially responsible parties (PRPs) under the Comprehensive Environmental Response, Compensation, and Liability Act (more commonly referred as Superfund) engage in earnings management to minimize their exposure to Superfund clean-up and transaction costs. They examine thoroughly the discretionary accrual behavior of PRPs and enhance their tests' power by identifying those PRPs that are most keen to manipulate earnings during PRP identification years. They find strong evidence consistent with the hypothesis that these PRPs incorporate income-reducing discretionary accruals during PRP identification years in order to minimize Superfund clean-up and transaction costs.

2.4.2.2 Capital Markets' Motivations

As mentioned above, a great body of the research literature on earnings management is dedicated to managers engaging in financial statements' manipulation to meet capital markets' expectation by increasing an enterprise's results (Teoh, Welch and Wong, 1998a and 1998b; Ericson and Wang, 1999; Myers, Myers and Skinner, 2007), to avoid reporting

losses or decreases in earnings (Burgstahler and Dichev, 1997; Glaum, Lichtblau and Lindemann, 2004) and to beat or just meet analysts' forecasts (Burgstahler and Dichev, 1997; Graham et al.,2005; Lee, Petroni and Shen, 2006; Scott, 2009; Keung, Lin and Shih, 2010). Capital markets have many participants including individual investors, institutional investors, governments, companies and organizations, banks and financial institutions, analysts, auditors etch. For that reason, many researchers shifted their interest towards capital markets' incentive and it counterparties (eg. Analysts, auditors, stock prices among others.

A group of researchers chooses to examine the relation between accounting numbers and stock prices or returns, by assessing whether accounting method choices influence equity valuation or the cost of capital. This line of research aims to investigate managers' choices of accounting methods, in respect to influence stock prices (that is managers maximizing earnings in a given period, smoothing earnings over time, avoiding losses or earnings declines etc.). This line of research has its roots in the association between earnings and share prices first documented by Ball and Brown (1968).

A significant portion of these studies also relates to market efficiency by investigating whether accounting choices exhibiting no direct cash flow implications are related to changes in stock prices. Evidences that breach the market efficiency hypothesis can be attributable to several reasons: a) investor irrationality (investors mechanically respond to levels or changes in earnings regardless of source), b) manager signaling (managers provide private information through their accounting that drive the beliefs of rational investors), and c) contractual motivations (managers avoid violating debt covenants, thereby maximizing the value of the firm). Having so many different explanations, the rejection of market efficiency hypothesis can be rather difficult to reject. Even when there are direct cash flow implications from the accounting choice (e.g. the LIFO/FIFO decision) the market reaction to the increased cash flow can be attributable to other reasons (e.g., avoiding debt covenant violations), making it difficult to make cut clear interpretations. Several studies examine whether earnings management influences share prices by focusing on specific situations in which the incentives are arguably unambiguous, rather than relying on less well-defined goals such as smoothing earnings, maximizing earnings, or avoiding losses.

DeAngelo (1988) finds little evidence of earnings management from buyout firms, using as a measure of earnings management changes in accruals, since she believes that managers of buyout firms have a motive to “understate” earnings. On the other hand, Perry and Wiliams (1994) find that unexpected accruals, controlling for changes in revenues and depreciated capital tend to be income-decreasing prior to management buyouts. Furthermore, there is the incentive to “overstate” earnings in periods surrounding equity offerings probably in an effort to reduce the share price. The authors note that the difference in results between DeAngelo’s (1986) study and theirs is based on the differences in sample composition.

Teoh, Welch and Wong (1998a & b) propose that unexpected accruals tend to be income-increasing prior to IPOs and seasoned equity offers as well as there is a reversal of unexpected accruals following IPOs. The same results stand for stock-financed acquisitions as proposed by Erickson and Wang (1999). Erickson and Wang (1999) analyze firms using stock as a mode of payment in acquisitions. They find evidence that such bidders will manage earnings upwards via discretionary accruals in order to boost the share price and thus, decrease the number of shares that must be issued to complete the deal. The authors incorporate fairness opinions as a rationale for the earnings management but the range of what constitutes a ‘fair’ price in a fairness opinion puzzles any documented association between stock price and earnings.

Payne, Robb and Payne (1997) and Burgstahler and Eames (1998) conclude that managers manipulate earnings to meet analysts’ estimates. If pre-managed earnings are failing to meet analysts’ expectations, management will incorporate income-increasing techniques. If pre-managed earnings are exceeding analysts’ expectations, management will either incorporate income-decreasing techniques to use the “surplus” in an unfavorable period or will not engage in earnings management wishing fir an increase in stock return. Keeping up with analysts’ forecasts is essential, since firms satisfying or exceeding analysts’ forecasts experience higher returns, even in cases where this is accomplished by earnings management or expectation management (Bartov et al., 2002).

Consistent with SEC Chairman Arthur Levitt’s (1998) expressed concerns, Kasznik (1999) documents that managers providing earnings forecasts manage reported earnings toward their forecasts by using unexpected accruals, avoiding a negative market reaction if they

fall short of the target. He reports that firms reporting overestimated earnings exhibit significant levels of positive discretionary accruals. Nonetheless, motivations to manage accruals upward may also be attributable to the compensation and debt hypotheses. Barth et al. (1999) find evidence that firms with a time series of increasing earnings have higher price earnings multiples after controlling for risk and growth, than firms exhibiting no such pattern. However, Barth et al. do not specifically test for earnings management and thus, the observed earnings patterns cannot be clearly addressed to earnings management.

Burgstahler and Eames (2003) conclude that firms use earnings management to sidestep reporting small losses or earnings declines but analysts cannot distinguish these firms. Matsumoto (2002) aimed to pinpoint firms' characteristics that could probably signal this kind of behavior. She reports that firms with higher transitory institutional ownership, firms depending on implicit claims with their stakeholders or firms whose activities lie in industries where earnings have a higher value-relevance have a greater possibility to achieve or exceed forecasts, by engaging to earnings or expectations management. Ghosh et al. (2005) find evidence that firms exhibiting an increase in earnings along with an increase in revenues are less inclined towards earnings management. McVay (2006) report that firms opportunistically make discretional accounting choices over income statement classification to fluctuate expenses in categories that might be treated as less perpetual (such as special items) to meet analysts' forecasts.

Another feature driving earnings management is a firm's disclosure policies. Botosan (1997) differentiates from prior research on accounting choice by examining whether managers selecting higher levels of disclosure level gain lower costs of capital. She reports that, firms facing low security analyst following, present a negative association between the level of disclosure, as measured with a self-constructed quality of disclosure index, and the cost of capital, after controlling for firm size and beta. Botosan attributes this evidence to a trade-off between corporate disclosures and alternative sources of information, however her evidence cannot be generalized since she data from one industry and one time period.

Sengupta's (1998) results are consistent with the Botosan's (1997) results for the cost of debt, using a measure of corporate disclosure practices provided by the Association of Investment Management and Research (AIMR). Even though these studies are

innovative, they both fail to consider in their analysis the costs of disclosure, which can be essential in explaining why, if higher disclosure levels lead to lower costs of capital, all firms do not select the highest possible disclosure level. Empirical evidence on the usage of outcome-based measures of earnings management (eg. restatements) also imply that capital raising activities are related to earnings management (Dechow et al., 1996; Eferdi et al.,2007; Dechow et al., 2010).

The degree of flexibility permitted in segment disclosures has puzzled regulators since before SFAS 14 (1978) with firms often arguing that the benefits of informing the capital markets about firm value are smaller than the costs deriving from revealing to the information. Hayes and Lundholm (1996) develop a model for segment disclosures observed by both the capital markets and competitors and report that the firm's value is highest when it discloses that all segments have similar results, thus providing little information to the competitors. Harris's (1998) empirical evidence are in line with the results suggested by Hayes and Lundholm. Operations in less competitive industries are less likely to be reported as industry segments. She also documents that firms concerned about competitive harm exhibit a disincentive towards detailed segment reporting in their effort to protect abnormal profits and market share in less competitive industries.

Balakrishnan et al. (1990) find that the geographic segment data complements the predictive ability of annual income and sales for firms with significant foreign operations. Nonetheless, these geographic disclosures are infrequent and unreliable. In the same line of research, Boatsman et al. (1993) document that even though geographic segment disclosures are evidently incorporated in valuing common stock, their relation to returns is highly circumstantial, and thus there is little convincing evidence of a significant impact on security valuation. Finally, Bagnoli and Watts (2000) developed a game theoretic approach and concluded that firms may choose earnings management simply because they anticipate that their competitors to do so.

Another category investigates whether managers behave as the users of financial reporting data can be deluded and thus translate reported accounting earnings as equivalent to economic profitability. Gaver et al. (1995) conclude that when earnings before discretionary accruals fall below the lower bound (in a bonus plan) managers shift to income-increasing accruals (and vice versa). Their results challenge Healy's (1985)

bonus hypothesis, proposing that an income-smoothing hypothesis could be suitable. DeFond and Park (1997) find evidence that when firms facing poor current earnings but their expected future earnings are favorable, managers acting under pressure over job security, “shift” temporarily earnings from the future in the current period (and vice versa). Mainly this income smoothing is achieved by managing discretionary accruals. Burgstahler and Dichev (1997) document that managers clearly manage earnings to bypass earnings decreases and losses. They relate their conclusions to a transactions cost based theory rather than efficient contracting or managerial opportunism.

In order to narrow managerial opportunism, and thus reduce possible agency conflicts, CEOs’ and senior management’s compensations or bonuses are linked to the firm’s stock price. The kind of opportunistic behavior can be even more profound in cases where managements motivations lie both on meeting/beating forecasts and on affecting the stock price. Earnings management in respect to insider trading is addressed by Beneish and Vargus (2002), Park and Park (2004) and Cheng and Warfield (2005). Studies that address the relationship between earnings management and stock compensation through stock options (Baker et al (2003), Bartov and Mohanram (2004), Kwon and Yin (2006)). Ronen et al (2006) examined the influence of directors’ equity motivations on the occurrence of earnings management and the stock price as well as the firm’s value. They report that earnings management disfigures the stock price due to the market’s inability to offset the bias in the accounting report. In addition, earnings management trims the firm’s value because of its unfavorable effect on the manager’s effort.

A forever ongoing debate is whether capital markets are indeed efficient markets. Empirical evidence in the 1970s generally support market efficiency. During the 1980s and into the 1990s, studies often assume market efficiency and propose other economic rationales for evidence that apparently diverge from expectations under market efficiency. Throughout the 1990s, more studies report conflicting evidence to market efficiency, suggesting that investors are not necessarily rational, often drawing on the behavioral finance literature for possible explanations.

Beaver and Engel (1996) provide evidence that capital markets break down the allowance for loan losses (in the banking industry) into a nondiscretionary portion (which is negatively priced) and a discretionary component (which is positively priced). They argue that their

findings are consistent with the capital market effects of managers' discretionary reporting behavior. Subramanyam (1996) reports that, on average, the market prices discretionary accruals because managerial discretion is perceived to enhance the relation of earnings with economic value by either smoothing income to mirror its persistence and strengthen its predictability, or by communicating private information.

Hand et al. (1990) examine fundamental defeasances and provide evidences consistent with market efficiency. They report that, on average, stock (bond) prices respond negatively (positively), as expected, to fundamental defeasance. On the other hand, bond prices respond positively to the reduction in risk inherent in the defeasance, but at a lower level than expected. Stock prices respond negatively to the information about future cash flows implied by the defeasance. Since the defeasances can be attributable either to earnings window-dressing, to bypass avoid bond covenant restrictions, or as a use for excess cash on hand, these alternative explanations arguably could all influence investors' perceptions negatively.

The two aforementioned categories of incentives towards earnings management paint a rather clear picture of why managers are keen to manipulate reported accounting numbers. However, another category which cannot be included in this taxonomy is rather important as well. We refer to firms' characteristics in respect to: a) firms' size, b) firms' internal control-standards and governance and c) type of company.

2.4.2.3 Firms' Size As An Incentive Towards Earnings Management

Watts and Zimmerman (1986) find that firm size is negatively related with earnings quality, since firms of larger size would turn to income-increasing discretionary choices as an answer to greater political regulatory scrutiny. On the other, recent studies find that firm size is positively related to earnings quality due to the fixed costs required to maintain efficient internal control mechanisms over financial reporting, as stated in Ball Foster (1982). Doyle et al. (2007), as well as Asbbaugh -Skaife et al. (2007) conclude that small firms tend to have internal control inadequacies but are more prone to correct previously reported earnings.

2.4.2.4 Firms' Internal Control-Standards And Governance As An Incentive Towards Earnings Management

The schemes presented in this sub-section include characteristics of the Board of Directors (BOD), internal control procedures, managerial share ownership, intra-company standards and budget ratcheting.

BOD characteristics and internal control procedures, treated as internal control mechanisms tracking financial reporting policies, are believed to narrow a manager's opportunity or ability to manage earnings. Instead, managerial share ownership and managerial compensation are believed to influence earnings quality since they provide motivations towards earnings management. Ashbaugh-Skaife et al. (2008) find evidence that internal control procedures are related to a decrease in earnings management. On the other hand, empirical results on governance mechanisms, besides internal control policies are weak or conflicting. In respect to BOD characteristics, literature suggests that more independent boards (as it was measured by a greater proportion of outsiders), and higher audit committee quality (as it was measured by independence and meeting frequency) live less room for earnings management (Abbott et al., 2004; Krishnan, 2005; Vafeas, 2005; Farber, 2005 among others). However, Larcker et al. (2007) report conflicting results on the relations between the governance factors and earnings quality as proxied by discretionary accruals and restatements.

Evidence on ownership is again conflicting. There are studies proposing that greater managerial ownership has an encroachment effect, since controlling shareholders extrapolate private benefits at the expense of minority shareholders through accounting method choice and less conservatism (LaFond and Roychowdhury, 2008). However, there are also studies, reporting an incentive alignment effect of managerial ownership based on discretionary accruals (Gul et al., 2003).

Another reason for accounting-based or real activity earnings management, in an intra-company level, is to avoid budget ratcheting or to meet any internally established performance standards. Leone and Rock (2002) analyzed the accruals of several business units within the North American division of a large multinational company to investigate whether budget ratcheting relates to earnings management, by using both

transitory and permanent earnings innovations. They test the hypothesis that under budget ratcheting, managers will engage to income-decreasing unexpected accruals when the earnings changes are transitory. Their results support the hypothesis under examination. Murphy (2001) investigated the relationship between the nature of performance standards in incentive contracts and earnings smoothing. He reports that companies complying with exogenous standards (that is, externally determined), which are relatively unaffected by participants such as peer group standards, fixed standards or cost of capital, are less likely to adopt income-smoothing techniques than those companies that establish internal standards.

Finally, several studies report that private companies usually manipulate their accounting numbers more than public companies due to their higher level of information asymmetry among managers and the rest of the stakeholders (Mikhail, Walther & Willis, 1999) as well as due to the lower level of monitoring (Ball & Shivakumar, 2005). This pattern stands for both Anglo-Saxon countries (Beatty & Harris, 1999; Ball & Shivakumar, 2005) and continental countries (Vander Bauwhede & Willeken, 2000; Arnedo, Lizarraga & Sanchez, 2007).

Earnings management can be beneficial to the users of firms' financial statements in the sense that it permits managers to incorporate all their knowledge about a firm's business into its financial statements which are available to the public, and thus to all stakeholders. However, since there are too many different incentives that can be "harmful" to some stakeholders there is a need to somewhat constrain earnings management. We should keep in mind that the two main distinctions in earnings management is: a) within the generally accepted accounting principles and b) beyond (breaching) the generally accepted accounting principles, which implies a fraudulent behavior. Restraining factors can be either externally enforced (e.g. Accounting standards, SEC guidelines and state control) or internally enforced (e.g. Audit and firm characteristics).

2.4.3 Factors Restraining Earnings Management

2.4.3.1 Accounting Standards, Sec And State Control As Restraining Factors To Earnings Management

One way to constrain accounting-based earnings management is by establishing and enforcing more severe accounting standards, leaning less or no room for management's discretion. However, such a method could easily lead managers to engage in real activity manipulation (including abnormal, suboptimal, business practices) or just being unable to communicate any special features of their company to its stakeholders. Arya et al (2003) state that: "Accounting research shows that income manipulation is not an unmitigated evil; within limits, it promotes efficient decisions. (…) Earnings management and managerial discretion are intricately linked to serve multiple functions. Accounting reform that ignores these interconnections could do more harm than good (…) (p.111) The implicit role of regulators is to make earnings management challenging, not impossible (p.113)".

Tan and Jamal's experiment (2006) resulted to the conclusion that when earnings management is used to communicate with shareholders but restricted by authoritarian accounting standards, managers may turn to accounting choices that smooth earnings in the short run but have a negative impact on the company in the long run. Nelson et al. (2002) by interviewing auditors on how managers are managing reports earnings, concluded that under precise accounting standards, managers turn to structure transaction to manipulate earnings while when accounting standards permit managerial discretion they shift to unstructured transactions.

Financial statements' objective is to provide useful and reliable information. Baber et al. (2006) state that investors' ability to translate earnings and if necessary adjust them for earnings management, when additional information on balance sheet data and cash flows is disclosed. Healy et al. (2002) incorporating a simulation approach analyzed the trade-off between objectivity (in accounting for R&D investments) and relevance of the accounting information. R&D's investments' capitalization rule which permits the exercise of discretion (and thus earnings management) as to if and when the amounts shall be capitalized or written-off, remains more informative than expensing all R&D investments, even when earnings management is widespread. Chen et al. (2002) aimed to communicate the earnings gap between local GAAP and IAS, even after harmonization

attempts were made. One of the reason for this ongoing gap is that, due to inadequate supporting infrastructure and low quality auditing, earnings management was evidently present. All the above imply that high quality level of standards or very precise standards alone are not sufficient to eliminate earnings management. Van Tendeloo and Vanstraelen (2005) support this conclusion by investigating whether the voluntary adoption of International Financial Reporting Standards (IFRS)is related to lower earnings management in code-law countries with low investor protection rights. They found no evidence to support this hypothesis.

Besides accounting standards, themselves, state regulations and state oversight can also be a restraining factor. Dowdell and Press (2004) state that SEC scrutiny seems to have altered financial reporting practices in the 'right' direction. Chen and Yuan (2004) document that the 10% return on equity requirement as an attempt to prevent earnings management's occurrence, did not prevent many firms from issuing additional shares, authorized by the relevant state's approval, since they incorporated excess amounts of non-operating income.

2.4.3.2 Audit As A Restraining Factor To Earnings Management

Many studies conducted address the relation between audit(or) characteristics and earnings management by their client. Increased audit quality should result to increased quality of reported earnings. Many proxies of audit quality have been proposed. Krishnan (2003) and Van Caneghem (2004) proxied audit quality with auditors' industry expertise. Both found a negative correlation between the auditors' expertise and the occurrence of earnings management, proxied by discretionary accruals and earnings rounding up behavior. Another proxy commonly utilized is auditor size. Van Caneghem examining a UK sample and Vander Bauwhede and Willekens (2004) examining a Belgian sample could not support the assumption that auditor size (either as dichotomous Big x – NonBig x, or as continuous measure of size) narrows earnings management practices.

Kim et al (2003) concluded that Big 6 auditors proved to be more effective in deterring earnings management only in cases where managers engage in income-increasing accrual choices. The most important aspect in auditing is auditor's independence. This independence can deteriorate in cases when the auditor also provides non-audit services to the client, when the client is very important to the auditor, when the audit partner is in

business with a client for too long or when a client hires a CFO directly from its auditing firm. Frankel et al. (2002) and Ferguson et al. (2004) found a positive relationship between the purchase of non-audit services and earnings management proxies (earnings surprises, discretionary accruals, public criticism in financial reports, restatements). Chung and Kallapur (2003) found no evidence of a relation between client importance and discretionary accruals.

Carey and Simnett (2006) concluded that long tenure is positively associated with a lower propensity to issue a going-concern opinion and some evidence of just beating earnings benchmarks. Finally, Geiger et al (2005) examined the situation in which a company hires a senior financial reporting manager directly from its external auditing firm. In such cases, earnings management could emerge immediately before or after the hiring when auditor independence is impaired towards the future employer (before) or when the new CFO uses audit-firm-specific knowledge (after). The authors do not find sufficient evidence supporting this case, since discretionary accruals are no greater in these situations compared to control groups.

2.4.3.3 Company Characteristics As Restraining Factors To Earnings Management

Klein (2002) investigated whether there is a relation between audit committee characteristics (and board characteristics) with earnings management. She reports a negative relation between the independence of both and the presence of abnormal accruals. Kim and Yi (2006) state that there is an association between ownership structure, group affiliation and listing status with earnings management. The authors state that when ownership becomes more scattered, firms move towards earnings management, as proxied by the magnitude of unsigned discretionary accruals. this conclusion also stands for firms belonging to a business group which is publicly traded.

2.4.4 Earnings Management – Methodological Issues

This section of literature review is implicitly divided into two sub-sections. First, we shall present the different methodologies used to detect earnings management, including models proposed by the literature. Second, we shall address the techniques used to manipulate earnings, mainly focusing on accounting-based earnings manipulation and real-activity based manipulation. However, it should be noted that accounting-based

earnings management is further broke down to three sub-categories: earnings management using specific accruals[4], earnings management using cost allocation or income shifting and earnings management using disclosures (Verbruggen, Christaeus and Milis, 2007).

Methodologies used to detect earnings management:

Detecting earnings manipulations is a quite difficult task to handle. Firstly, earnings management is unobservable and thus, its magnitude can only be estimated and not measured directly. Furthermore, earnings management is implementing through many different techniques, which in turn leads to difficulties in terms of identifying precisely which techniques have been incorporated to alter financial numbers.

As stated in McNichols' (2001) literature review there are three research designs commonly used in earnings management literature: 1. those based on aggregate accruals, 2. those based on specific accruals and 3. those based on the distribution of earnings after management. Aggregate accruals methodology attempts to identify discretionary accruals based on the relation between total accruals and hypothesized explanatory factors. It relates to two underlying assumptions: 1. The first assumption lies on overpowering the difficulty of managers using various techniques to manipulated reporting earnings. Thus, the assumption implied is that managers will choose to manipulate reported earnings through accruals rather than manipulating cash earnings. 2. Th second assumption derives from the first and states that total accruals can be broke down to a non-discretionary component and to a discretionary component (Dechow, Sloan and Sweeney, 1995). Discretionary components depict management's accounting choices. Healy (1985) and DeAngelo (1986) were the first to introduce this method by using total accruals and change in total accruals, respectively, as measures of management's discretion over earnings.

[4] Although the term "specific accruals" shall be mentioned twice, we distinguish two different aspects: a. as a methodology used to detect the occurrence of earnings management and b. as a method adopted by the firms to manipulate reported earnings.

Healy (1985) acknowledges that total accruals embrace both non-discretionary and discretionary components, but eventually he does not distinguish between these two different aspects. The implicit assumption is that total accruals are equal to non-discretionary accruals under the absence of earnings management. DeAngelo (1986) define total accruals, which are used as a proxy of earnings management, as the difference between operating cash flows and net income. She also acknowledges that total accruals embrace both non-discretionary and discretionary components, chastising Healy's model arguing that if non-discretionary accruals are proved to be the larger portion of total accruals (that is, they are too large compared to total accruals), the latter shall prove to be insufficient proxy of earnings management in period *t=1.* Based on her observation that negative total accruals commonly involve a negative non-discretionary element, rather than intentionally understated earnings, she investigates whether the abnormal total accruals' average value is significantly negative in periods prior to buyouts. She translates her model's results as proof of a systematic earnings understatement, based on the assumption that the general change in non-discretionary accruals is roughly close to zero, where a significant average decrease in total accruals mainly implies a significantly decrease in discretionary accruals.

Jones (1991) introduced a linear regression approach to control for nondiscretionary factors affecting accruals, examining the relation between total accruals and change in sales and property, plant and equipment. To translate accruals-based tests as proof that earnings management did not occur, the user must have some certainty that the discretionary accrual proxy is sufficiently sensitive to represent it. To translate accruals-based tests as proof that earnings management occurred, the user must have some certainty that measurement error in the discretionary accrual proxy is not correlated with the partitioning variable in the study's research design. Thus, an important question is how accruals behave in the absence of earnings management. Until MacNichol's review, the aggregate accruals literature did not have sufficient evidence on what factors may explain accruals. Hence, it was rather difficult to rely on the estimates of discretionary accruals incorporating discretion by management.

The existing literature determined some parsimonious linear models to explain aggregate accrual behavior, but there was little theory or evidence for how these accruals behave with or without earnings management. Given a model of how accruals behave when earnings management does not occur, a researcher must determine next, what factors

drives management to exercise discretion and what relation does this imply between discretionary accruals and nondiscretionary accruals. Most of the aggregate accruals models assume that discretionary accruals are orthogonal to nondiscretionary accruals, however there are cases in which nondiscretionary accruals are correlated with discretionary accruals.

Dechow et al. (1995) refine, in a way, Jone's (1991) model with the purpose to expunge Jone's speculative tendency and thus accomplish to measure discretionary accruals with error when judgement is exercised over reported revenues. Basically, the complement Jone's (1991) model in the sense that revenue changes are corrected to "follow up" with changes in receivables during the period of event. The original model lies on the assumption that revenues there is no discretion over revenues through either the event or the estimation period.[5] The modified model lies on the explicit assumption that all credit sales changes during the event period are the product of earnings manipulation, since credit sales revenues are easier to manipulate than cash sales revenues.

Demski and Frimor (1999), McCulloch and Black (1999) and Bagnoli and Watts (2000) aim to understand management's incentives to manage earnings and suggest the assumed orthogonality is too restrictive. Demski and Frimor (1999) propose a model in which manipulation of performance measures is the equilibrium response to nonlinearities in the relation between compensation and performance. A key feature of their framework is the nonlinearity of motivations, causing the magnitude of manipulation to be nonlinear in what they call pre-managed earnings. The main idea is that managers tend to smooth the report of initial output to increase the expected pay-off in the second period.

McCulloch and Black (1999) find proof that if management manipulates accruals relatively to fluctuations in nondiscretionary accruals, thus reporting a smoother income series, there will be a negative correlation between nondiscretionary and discretionary accruals. Healy (1985) states that if there is no possible way to manipulate initial earnings upward enough to achieve positive results (that is earning are far below the stated target), there should be no correlation between discretionary and nondiscretionary accruals. On the other hand, a negative correlation between discretionary and nondiscretionary accruals

[5] Earnings management occurs in the event period but not in the estimation period. the estimation period, although, could probably encompass the effects of earnings management.

could exist if original earnings are already above target. Bagnoli and Watts (2000) examine how the existence of relative performance evaluation affects earnings management motivations. They conclude that the tendency to manage earnings and the amount are increasing in the firm's reliance on relative performance evaluation, as well as when they expect competitor firms to manipulate their earnings too.

As observed by McNichols (2001), the above-mentioned studies rely on the assumption that earnings management occurs in the test period but not in the estimation period. However, since there is a great variety of motivations, this can be a difficult assumption to follow up. The estimation period includes the impact of hypothesized earnings management and the estimate of nondiscretionary accruals in the test period includes a normal level of earnings management, weakening the power of the test. In addition, the accruals in the test period will include the reversal of estimation period earnings management activities plus any earnings management activities induced by current period motivations. Since motivations diverge across periods, the benchmark may understate or overstate the nondiscretionary accruals, proposing positive or negative discretionary accruals in the test period when there were none.

Peasnell et al. (2000) developed the margin model, a different cross-sectional model aiming to predict unusual accruals. Similarly to, Jones' (1991) model, as well as the modified Jones (1991) model by Dechow et al. (1995), they incorporate a two-stage approach. The first step includes the regression of accounting accruals on a battery of explanatory variables in an effort to identify those accruals that have not been managed. In contrast to the two previous models, they utilize different explanatory variables for the first-phase regression, which derive from a formal framework creating a link between accruals, earnings and sales. Furthermore, they differentiate from previous models in the sense that they utilize working capital accruals instead of total accruals, excluding depreciation from the margin model. They argue that the exclusion of depreciation from accruals measure is based on the fact that such an item is an insufficient proxy in systematic earnings management. They model the change in working capital accruals in respect to three key features: creditors (ΔCREDIT), debtors net of bad debt allowance (ΔDEBT) and stocks (ΔSTOCK).

It should be noted that, although Δ STOCK incorporates inventories of materials, works-in-progress and completed goods, all intermediate relocations between them involve the cancelling of entries that can be ignored when inventories are aggregated. Working capital is communicated as the product of two contributory margins, the margin on cash received - 'cash margin'-, and the gross margin on its cash flow analogue and sales. This final equation establishes accrual recognition prior to the effects of earnings management. By implementing this method, any working capital accruals that are not established through sales and cash collections throughout the specified time are identified as 'abnormal', and thus they are perceived to be as the most probable to manipulate (discretionary accruals). Finally, the authors believe that their margin model is more suitable for highlighting non-bad debt expense manipulations, while the modified Jones (1991) model is more suitable for identifying revenue-based manipulation.

Kothari, Leone and Wasley (2005) developed the Performance Matching model, a model focusing on detecting earnings management. As does the Jones model, their model also uses residuals from the annual cross-sectional industry regression. However, their model differs in two aspects; first, it utilizes return on assets, controlling for organizational performance. The second difference lies on the incorporation of a constant, providing a greater degree of control in terms of heteroskedasticity, and it further allows the discretionary measure to be more symmetric.

As one can observe from the different models used, there is the difficulty in choosing the most suitable measure of accruals or the most efficient explanatory variables for regressing against the accruals. Accruals' measures should be sensitive to the hypothesized earnings manipulations and their nondiscretionary component should be most quickly controlled. Many studies up until 2000s, define accruals as the change in current asset and liability accounts less depreciation. This line of measures has the advantage of allowing a larger sample size and longer time series than studies that require data from the Cash Flow Statement, which first became available after 1988. Collins and Hribar (2000) and Bradshaw et al. (1999), measure accruals using the changes in the current accounts derived from the Cash Flow Statement and specifically Operating Cash Flows. Jones (1999) states that current accruals provide a more accurate portrait of discretionary behavior than aggregate accruals, because the estimated discretionary portion of noncurrent accruals is less likely to represent year-specific discretion. Further, he concludes that discretionary current accruals are strongly negatively correlated,

consistent with reversal of discretion, whereas discretionary noncurrent accruals are strongly positively correlated.

Specific accruals methodology tries to model a specific accrual's (or set of accruals) behavior in an attempt to identify its discretionary and nondiscretionary components, often focusing on a specific situation, a specific industry or a specific accounting standard, in which a single accrual is sizable and requires substantial judgment (McNichols and Wilson (1988), Moyer (1990), Petroni (1992), Beaver and McNichols (1998), Penalva (1998), Nelson (2000) and Petroni et al. (2000)). Adopting this methodology, instead of the aggregate accruals methodology, a researcher can grow insight for the key factors affecting the behavior of the accrual. Furthermore, specific accruals can be incorporated in industries whose business practices cause the accrual under examination to be a material and a likely object of judgment and discretion.

Finally, it is possible to assess the relation between the single accrual and explanatory factors directly. However, specific accruals methodology has its drawbacks. First, since it is essential to accurately represent the exercise of discretion unless it is clear which accrual is used to manipulate earnings, then the approach's test power is weakened. Furthermore, specific accruals method essentially requires more institutional knowledge and data than aggregate accruals method. Finally, firms using a specific accrual to manipulate earnings can be probably less in numbers relatively to those using aggregate accruals, thus restricting the generalizability of the studies' conclusions.

Several studies adopting a specific accruals methodology have attempted to identify a suitable and reliable measure by focusing on a specific industry or set of industries. McNichols and Wilson (1988) choose industries with the highest ratios of receivables to total assets and the largest number of firms in the industry. The first standard aims to identify firms for which the allowance for uncollectibles is likely a material account and the second aims to identify industries with a sufficiently large number of firms (i.e observations) to permit reliable model estimation. The authors centered their study on bad debt provisions (specific accrual). As a proxy for the occurrence of earnings management they used the residual provision for bad debt. To get the residuals' estimations, they model the expected provisions for bad debt as a linear function of the beginning balance in the allowance for bad debt and the magnitude of current and next year's write offs. Another

portion of studies focus on discretion in loan loss provisions in the banking industry (Beaver et al. (1989), Moyer (1990), Scholes et al. (1990), Wahlen (1994), Beatty et al. (1995), Collins et al. (1995), and Beaver and Engel (1996)). Finally, Petroni (1992) used the loss reserves of property and casualty insurers as an ideal field for application of a specific accruals methodology.

One of the features that make this field ideal is the unique disclosures required by the SEC, which in turn permits the researcher to assess how reserve estimates initially reported correspond to ex post outcomes and to test hypotheses about the factors motivating this behavior. Access to this measure, due to its transparency, greatly reduces concerns about measurement error in the discretionary accrual proxy being correlated with the partitioning variable. Petroni (1992), Beaver and McNichols (1998), Penalva (1998), Nelson (2000), Petroni et al. (2000) and Beaver et al. (1999), exploit these unique disclosures. On the other hand, Beneish (1997) proposes a model based on several specific accruals (such as receivables, inventory and accounts payable), focusing on firms' financial ratios from several industries. He examines a sample of firms already identified by the SEC as generally accepted accounting principle violators to gauge alternative measures of earnings management. Although he utilizes several accruals, the modeling of each accrual's behavior is done separately, and the ability of the various accruals to identify GAAP violations is assessed account by account, revealing variation in the exercise of discretion across accruals.

Finally, the methodology based on the distribution of reporting earnings analyzes the statistical properties of earnings surrounding a specific benchmark to identify behavior that affects earnings, as developed by Burgstahler and Dichev (1997) and Degeorge et al. (1999). They both hypothesize that if firms have stronger motives to achieve earnings above a benchmark, then the distribution of earnings after management will have fewer observations than expected for earnings amounts just below the threshold, and more observations than expected for earnings just above the threshold. This implies that in cases where the distribution of reported earnings is balanced, there is no earnings management; however, if earnings are have different frequencies around an established benchmark or 0, there is a likelihood of earnings management implementation.

Following this approach, researchers should predict which group manipulates earnings, rather than estimating the better measure of discretion over earnings. These studies assess the behavior of earnings after management, which incorporates both discretionary and nondiscretionary components. This methodology identifies contexts in which large number of firms appear to manage earnings as well as an indication of the frequency of manipulation. The distribution approach does not reflect the methods applied to manipulate earnings. However, the way earnings are manipulated can be assessed for sample firms identified as earnings manipulators using the distribution approach. The methodology implies that since managers tend to avoid reporting poor performance (losses or decreases in reporting earnings), the distribution of reporting earnings should be examined around these points. The results suggest that there is a higher than expected frequency of firms with slightly positive earnings (or earning changes) and a lower than expected frequency of firms with slightly negative earnings (or earnings changes).

The study of Burgstahler and Dichev (1997) proposes the first cross-sectional distribution method in order to investigate whether, why and how firms engage in earnings management. They set forth three thresholds that could lead to earnings manipulation: a. to avoid reporting earnings decreases, b. to maintain positive earnings and c. to avoid losses. As mentioned above, the authors assume that cross-sectional distributions of earnings changes could be an indicator of earnings management in respect to avoid reporting decreases in earnings. This distribution will be characterized by uncommonly high frequencies of minor earnings increases and uncommonly low frequencies of minor earning decreases. In order to test their assumption, they incorporate two different forms of evidence: 1. A graphical presentation using histograms in order to illustrate the pooled cross-sectional earnings data, and to further highlight the changes in earnings around zero and the occurrence of any discontinuity in earnings; 2. A clearly statistical test that embodies the assumption that, under the null hypothesis of no earnings management, they expect to observe a smooth cross-sectional distribution of earnings changes and earnings levels. Technically, smoothness, from their point of view, is portrayed as the number of expected observations throughout any distribution period, where the number of expected observations is accumulated as the average of the numerous observations in the two intervals immediately closest.

Degeorge, Patel and Zeckhauser (1999) developed their methodology focusing on behavioral thresholds for earnings management. Their model aimed to portray the manner

in which attempts to outperform the thresholds create certain earnings management patterns. Following the methodology proposed by Burgstahler and Dichev (1997), they set as well three thresholds: a. the first threshold focuses on reporting profits, which derives from the psychological value recognized in terms of the distinction between negative and positive results; b. the second threshold represents any efforts to sustain recent performance; and c. the final threshold focuses on satisfying analysts' expectations, especially the consensus of analysts in their earnings predictions. Their underlying assumption is that executives engage in earnings management techniques in order to influence the views of outsiders, including banks, investors and suppliers, in order to gain personal satisfaction from making a target. In sync, outsiders incorporate the thresholds in order to evaluate executives' performance and compensate them accordingly. Due to this two-way reaction from both sides, the distribution of reported earnings may become inconclusive. Particularly, too many earnings fall above the threshold whilst too few fall below. A further assumption is that, when earnings are perceived to diverge from the acceptable range, upwards management incentives should be observed. Finally, if bonus plans caps are surpassed by earnings, the caps will be shifted, thus resulting to future bonus plans caps being easier to be met.

Gore, Pope and Singh (2007) contribute to existing literature in two key aspects. First and foremost, they were the first to analyze a wide-ranging non-American dataset and thus confirming that the results of previous studies are not just particular to the US environment. Secondly, they report innovative tests, enhancing the idea that the discontinuities in the distribution of earnings are associated with accruals centered on earnings management within their particular sample. Furthermore, they investigate the relations between working capital accrual discretionary components, earnings target achievement frequency and the discontinuity observed in the distribution of earnings alongside basic targets. The authors presented a thorough examination of earnings management in response to earnings thresholds, by analyzing a significant sample of organizations in the United Kingdom. Their results are consistent with earnings management incentives of achieving goals.

The trade-offs

Aggregated accruals approach: Healy (1985) and DeAngelo (1986), the first to introduce the aggregated accruals' methodology, developed their framework based on the

assumption that there is stability amongst non-discretionary accruals. Such an assumption is perceived to be unrealistic, since accounting accruals experience respond to changes of the economic environment (Kaplan, 1985, cited by Dechow et al., 2012). Another aspect investigated by existing literature, is the performance of alternative total accruals models in identifying earnings management. Dechow et al. (1995) and Guay et al. (1996) compare the overall performance of five different models in respect to measuring discretionary accruals, namely those of Healy (1985), DeAngelo (1986), Jones (1991) and Dechow & Sloan (1991), as well as the amended Jones model which they developed. Their results support a superiority of the amended Jones model, since it showed the greatest ability in terms of testing earnings management.

Furthermore, Subramanyam (1996) and Peasnell et al. (2000) believe that the Jones model provides better results when using cross-sectional data over their time-series counterparts. This fact can be attributable to the very nature of cross-sectional data, which reduces time effect issues and leads to a larger sample, thus resulting to greater coefficients estimates. The main advantage deriving from the adoption of this method is its capacity to capture the scale of earnings management. On the other hand, however, it provides no insight on the accounts manipulated. As mentioned above, many aggregate accruals incorporate residuals in order to estimate the discretionary accruals. Proxying the difference between abnormal and normal accruals throughout the estimation and event periods, respectively, by using residuals estimations is efficient when time-series data is examined. However, when using cross-sectional data, their efficiency reduces. According to theory, residuals should average zero, thus meaning that the model's specifications are significantly challenged when measuring discretionary accruals.

Specific accruals approach: Moving on to specific accruals methods, three advantages and three disadvantages are presented by McNichols (2000). Primarily, the main advantage is that researchers can encompass their insights on those factors influencing the accrual behavior, combined with their knowledge of generally accepted accounting principles; secondly, depending on the sector and its prevailing business practices, certain accruals tend to be a likely object of discretion and judgment. Based on that fact, researchers can incorporate a specific accrual method matching these exact accruals. Finally, this methodology proposes and investigates the direct association between the explanatory factors and single accrual factors.

However, there are three drawbacks as well: to begin with, the main problem is the difficulty to determine those accruals exploited for earnings management. Specifically, even if it is possible to determine the most suitable accrual and then test its behavior, the implications of managing a sole accrual may not be significant enough to achieve statistical significance. Secondly, it is expected that when firms engage in earnings management, they manipulate more than one accrual. As a result, even though the single accrual approach is sufficient to detect earnings management under some circumstances, in most cases using this method cannot draw sufficient evidence on the occurrence of earnings management (McNichols and Wilson, 1988). Finally, the number of firms choosing to manipulate the specific accrual under question could be relatively small to the number of firms that can be detected as "earnings-manipulators" using the aggregate accruals method, which restrains the generality and understanding of the results concerning particular accruals researches.

Both the aggregate accruals method and the specific accruals method are based on the way that researchers measure accruals. accruals can be estimated in two ways: either deriving from the balance sheet or from the cash flow statement. Although cash flows' data was available since 1988, a great portion of the existing literature follows an indirect balance sheet approach to measure accruals (Hribar and Collins, 2002). The authors suggest that accruals' measures based on the balance sheet may encompass estimation errors when non-operating events occur, such as acquisitions and accounting changes. Their results indicate that accruals estimates are biased when the partitioning variable is correlated with either mergers/acquisitions or discontinued operations. Kothari et al. (2005) investigated the differences between the power of 'traditional' discretionary accruals tests and tests based on performance-matched discretionary accruals. Their findings indicate the superiority of performance matching tests in the sense that they strengthen the reliability of inferences when the underlying hypothesis does not suggest that earnings management will diversifies with performance, or where the control sample is not anticipated to use earnings management techniques. Ball and Shivakumar (2006) state their preference towards nonlinear models encompassing timelier loss recognition (conservatism), since they find that linear models result in a substantial bias failing to incorporate the loss recognition asymmetry.

Statistical distribution approach: In respect to the distribution approach, its main characteristic is that it is relatively simple to implement, and it is a graphical depicture of

the earnings after the alteration of reported earnings has accrued. Researches do not have to estimate abnormal accruals, which is quite a difficult task to manage, and instead they examine earnings' distribution for abnormal cutoffs. Further, the researchers can estimate the degree of earnings management at these cutoffs. Furthermore, it is sufficient to identify earnings management while bypassing the issue of measurement error and misspecification associated with accrual-based earnings management models (Sun and Rath, 2010). Finally, it is considered a suitable powerful method for measuring earnings management when the sample under examinations is large.

However, empirical findings deriving from the shapes of earnings distributions as evidence for the occurrence (not) of earnings management do not suggest that earnings management can be completely explained by the discontinuity of the earnings distribution. Dechow, Richardson and Tuna (2003) do not find a relation between discretionary operating accruals and the earnings discontinuity. Furthermore, Durtschi and Easton (2005) conclude that distributions' shapes are influenced by deflation, sample selection and a difference between the characteristics of profit and loss observations (such as market pricing and analyst optimism/pessimism), thus suggesting that one should be cautious when incorporating the shapes of the frequency distributions of earnings as signal for earnings management practices. In the same vein, Beaver, McNichols and Nelson (2007), Durtschi and Easton (2009) argue that researchers should look for evidence beyond the shapes of distribution. That being said, statistical distribution approach can identify the occurrence of earnings management practices, but does not provide any insights into the techniques or magnitude of earnings management.

Ultimately, choosing between the approaches proposed lies on the purpose of a researcher's study: if the researcher wishes to focus on estimating the degree of earnings management but not so much on the approaches, the aggregate method would be sufficient. In cases where the purpose is to investigate whether particular approaches have been adopted to earnings manipulation, the specific accrual approach is suitable. Nonetheless, one should keep in mind that any evidence on the behavior of particular accruals can be problematic to generalize when particular accruals are not very sensitive. Finally, the approach of distribution frequency is efficient when the aim is to detect the presence or absence of earnings management, although it fails to assess the degree or the accounts utilized to alter the financial data reported.

2.4.4.1 Techniques used to manage earnings:

Managers often use more than one techniques to manage reported earnings. However, the simultaneous detection of all the techniques adopted is a difficult task. Literature distinguishes two main forms of methods to manipulated earnings. That is, accounting-based earnings management and real activity earnings management. Accounting-based earnings management deals with the alteration of financial data reported, while real activity earnings management refers to restructuring transactions in order to influence reported earnings. Firstly, we will present the accounting-based techniques, namely earnings management by utilizing specific accruals, by utilizing cost allocation or income shifting and by utilizing disclosures.

Earnings management by utilizing specific accruals: As with the methodology of detecting earnings management, this technique often relates to a specific situation, a specific industry or a specific accounting standard. The most common specific situations that might trigger firms' management to manipulated their reported financial results are equity offerings, management buyouts and earnings decreases (Marquardt and Wiedman, 2004). The "usual suspects", meaning the account most frequently used in earnings management are among others the tax expense (Dhaliwal et al., 2004), restructuring charges (Moehrle, 2002), salvaging values of long-term assets and expected lives, deferred taxes, losses from asset impairments and bad debt, obligations for pension benefits and other post-employment benefit. As mentioned above, since the turmoil in 1980s many researchers shifted their attention towards the savings and loan industry.

Since 2000, in the class of specific industries studied are banks (Capalbo(2003) and Gray and Clarke (2004)), insurance companies (Beaver et al., 2003) and investment property companies (Dietrich et al., 2001). As one can notice these industries remain still under researchers' microscope. Usually the specific accruals altered are: allowance for loan losses, pension accounting, loss reserve accrual and valuation of property, respectively.

Finally, some of the accounting standards analyzed, permitting discretion over reported features, are: SFAS 89[6] (Picconi, 2006) and SFAS 109[7] (Schrand and Wong, 2003).

Earnings management by utilizing cost allocation or income shifting: Cost allocation techniques usually refer to assigning joint costs to those activities that are valued highly by the public, by relocating costs to below-the-line items or by relocating costs/revenue to/from other subsidiaries that are established in regions with another tax or accounting system. One of the most commonly used classification in Income statements is to distinguish core expenses and revenues from financial expenses and revenues, as well as from special items. Users of financial statements' data often assess a firm's performance judging from the core financial data, thus making it useful for companies to relocate expenses from core expenses to special items. Jaggi and Baydoun (2001) as well as McVay (2006) found evidence of such practices in Hong Kong (prior to SSAP2) and the US, respectively. Beatty and Harris (2001) and Krull (2004) found evidence of income relocation between one subsidiary to another for tax optimization purposes by incorporating gain realizations and permanently reinvested earnings.

Earnings management by utilizing disclosures: This section refers to disclosures besides the balance sheets or Income Statements. Balsam et al. (2003) report that firms engage in earnings management through the pro forma stock option expense, under SFAS No 123[8]. The objective of this standard was to invite enterprises expensing employees' stock-based compensation plans based on their fair value instead of reporting them in the pro forma impact of stock option as a footnote. The authors state that even in cases where firms choose to disclose the expense instead of recording it as a recognized expense, they seem to manipulate this expense when their CEO's compensation and

[6] SFAS 89 (Financial Reporting and Changing Prices): This statement supplanted FASB Statement N.33 and its subsequent modifications and make voluntary the supplementary disclosure of current cost/constant purchasing power information.

[7] SFAS 109: This statement establishes financial accounting and reported standards for the effects of income taxes that results from a company's activities during the current and preceding years. This statement supplanted FASB Statement N.96. The objectives of accounting for income taxes are to recognize: a. the amount of taxes payable or refundable for the current year and b. deferred tax liabilities and assets for the future consequence of events that have been recognized in an enterprise's financial statements or tax returns.

[8] SFAS 123 (Accounting for Stock-Based Compensation): This statement establishes financial accounting and reporting standards for stock-based employee compensation plans. This statement also applies for to transactions in which entities issue its equity instruments to acquire goods or services from nonemployees. Those transactions must be accounted for based on the fair value of the consideration received or the fair value of the equity instruments issued, whichever is more reliably measurable.

value of stock option grants are relatively high with the purpose of narrowing public criticism about these compensation practices.

Nelson et al (2003) interviewed 515 auditors to get their real-life experience on the matter. The most commonly used techniques, gathered by these interviews, are: recognizing reserves (e.g. loan losses in banks), recognizing asset impairment, capitalizing/deferring too much or too little, reducing previous accrual (e.g. deferred tax asset valuation allowance), modifying depreciation, cut-off manipulation, deferring revenue, bill-and-hold sales, sale-and-lease-back transactions, misestimating percentage-of-completion, income statement classification, avoiding consolidation etc.

2.4.4.2 Accounting-based earnings management versus real activity earnings management

Earnings are defined as the sum of cash flow and accruals. Thus, earnings management can take the form of accruals' manipulation and/or operating cash flows' manipulation, as highlighted by Xu, Taylor and Dugan (2007). Operating cash flows' manipulation is commonly referred to as real activity earnings management, organizing their transactions deviating from usual business practices, so as a certain accounting standard does/does not apply leading to a more "convenient" income statement or balance sheet. Real activity earnings management encompasses alterations in: selling price cuts, just-in-time adoption, R&D budget cuts, as well as changes in production, debt–equity swaps, discretionary expenditures and the reduction of prices (Xu, Taylor and Dugan, 2007). Kothari et al. (2016) distinguish accounting-based and real activity earnings manipulation in the sense that accrual manipulation (that is accounting-based earnings management) permits managers to exercise their judgement and subjectivity by accounting choices in the financial reports, and thus misrepresent a firm's underlying operating performance. Nevertheless, it does not necessary imply reshaping operations themselves.

Mande et al (2000) found evidence of a notable reduction in R&D-expenses in Japanese firms during the 1990's recession. The firms which exhibited a tendency towards long-term R&D vision, turned to myopic income-increasing patterns. The authors concluded that these cutbacks in expenses are deriving from earnings management techniques instead of optimal business decisions. Barton (2001) concluded that firms incorporate

derivatives and discretionary accruals when engaging to earnings management. He argues that earnings smoothing is accomplished by smoothing cash flows, using derivatives as hedging tools and by increasing/decreasing accruals. His empirical findings suggest that firms holding derivative portfolios with large notional values also exhibit lower absolute levels of discretionary accruals. Thus, derivatives and discretionary accruals can be treated as partial substitutes for earnings smoothing. Kinney and Wempe (2004) argue that the choice of implementing just-in-time practices (JIT)- which is perceived to be a fundamental operational decision- is affected by the relationship of firms' LIFO reserves with their income smoothing, debt covenant and tax motivations.

Roychowdhury (2006) reported evidence that companies provide price discounts so as to increase sales, move towards overproduction (also reported in Lin, Radhakrishnan and Su, 2006; Zang, 2012) so as to reduce the cost of goods sold and suppress discretionary spending to improve margins. Cohen et al (2008) also support the idea of discretionary cost reduction and they further state that such a technique can have a negative impact on the firm's strategy and thus lead to a decrease in future results. Hribar et al (2006) analyzed stock repurchases as means of boosting earnings per share ratio. Although researchers commonly focused on the numerator (earnings) in order to detect the occurrence of earnings management, these researchers chose to examine whether managers boost the EPS ratio by decreasing the denominator (number of shares). Their results suggested that these stock-repurchases proved to be essential, for the firms under investigation, to meet EPS forecasts, otherwise an unexpectedly large number would have missed the EPS forecasts.

In the same vein, Marquardt and Wiedman (2005) concluded that firms turn to contingent convertible bonds (COCO's) to boost their diluted EPS. Specifically, according to SFAS N.128 these bonds do not have to be included in the denominator of diluted EPS. Their results are consistent with Nelson et al (2003) conclusion that firms will turn to transaction structuring under the presence of clear-cut accounting guideline and to discretion when accounting rules leave room for further interpretation.

It should be noted that for many decades, researchers focused on identifying earnings management through accounting-based methods rather than real activity earnings manipulation, since accounting-based methods are perceived to be less costly. That is,

accounting-based manipulation does not influence cash flows and does not disrupt a firm's growth. However, as stated by Graham et al (2005) managers seem to prefer real activity earnings management rather than accrual-based techniques. The authors further state that real activity earnings manipulation is more unethical than accounting based earnings management. Cohen and Zarowin (2010), as well as Cothari et al. (2016) argue that real activity earnings management ultimately may lead to a reduction in the future valuation of the company and in its profitability and long-term competitiveness, respectively.

These observations imply that managers might be more interested in shirt-term and as suggested by Graham et al. (2005) they seem to be willing to modify their business plans and sacrifice resources in to fulfill previously set objectives, even if this will ultimately lead to an increased risk of reduced future investments. Campa and Camacho-Miñano (2015) distinguish the factors that lead managers to choose between accounting-based and real activity techniques as internal and external forces. External drivers towards real activity earnings manipulation are, among others: the overvaluation of firm's stock prices (Badertscher, 2011), the audit quality (Burnett, Cripe, Martin & McAllister, 2012), the high marginal rates, initial public offering and lightly regulated market (Alhadab, Clacher & Keasey, 2013), the forthcoming credit rating changes (Kim, Kim & Song, 2013) and the strong investor protection (Enomoto et al., 2015). Durnev (2010) argue that managers shall move towards accrual manipulation under the presence of lower taxation conditions or in cases where the country does not have a stable situation.

Another "external aspect" that drives managers to choose between accrual or real activity manipulations is the lawmaking of legislation reforms, where the decision is related to the type of reform and whether they are voluntary or mandatory. Cohen et al. (2008) report a preference towards real activity manipulation after the Sarbanex and Oxley Act, while there was a significant engagement in accrual manipulation just in the previous period. Ewert and Wagenhofer (2005) report a tendency towards accrual manipulation after the accounting standards were strengthened whereas after the mandatory adoption of IFRS the tendency shifted towards real activity manipulation (Ipino and Parbonetti, 2011).

An interesting shift between the two methods is proposed by Zang (2012). The author presents the manner in which managers manipulate earnings through real activity manipulation during the fiscal year and then, adjust the results in line with their goals

through accrual manipulation after the earnings' announcement. That being said, one should acknowledge that accrual manipulation and real earnings management could be utilized simultaneously or as substitutes, given different circumstances.

2.4.5 Earnings Management – Last Decade's Literature

Riuz (2015) presents some interesting statistics, which we feel that it is worth mentioning[9]. Since 2001 publications referring to the earnings management have notably increased, showing a remarkable rise especially in 2008. The number of articles increases from 80 papers per year in 2006, to more than 400 papers per year from 2011 onwards. Another interesting observation is the number of "earnings management" citations in published articles, which almost doubled from 2007 to 2008 leading to more than 10,000 references in the year 2014 (that is a 95% increase during the last decade). Having these figures in mind, we chose to present empirical studies on the topic during the last decade as a separate section. However, we will mainly focus on studies published from the year 2010 and onwards.

Firms exhibiting large positive accruals are generally perceived to be growing through investing in assets, generating sales, and expanding their businesses. This usually means that they will also exhibit, resulting from their growth strategies, negative transitory cash flows. Due to the conservative nature of accrual accounting guidelines, which encompasses reliability and measurement concerns, they do not account for the fair-value of future prosperity on the balance sheet. Specifically, they directly expense most of these investment cash flows and permit to capitalize, as assets, only a small portion under specific circumstances. In such instances, accrual adjustments are likely to enhance earnings persistence in the sense that they soothe the transitory effect of these negative cash flows on earnings.

On the other hand, firms exhibiting large negative accruals are perceived to contracting their assets and downsizing. As a firm liquidates lines of businesses and assets (e.g. inventory, goodwill, property, plant, and equipment), it could also exhibit lesser market values compared to its book values. In such instances, accounting rules center on readjusting the balance sheet through assets' write-offs accounted for their fair value.

[9] **Original source**: Web of Science Database

Accrual adjustments in this case, require firms to record impairment charges, restructuring charges, and other special items in earnings, in order to communicate transitory special items adjustments that reduce earnings persistence.

Dechow and Ge (2006) investigate whether high accruals could therefore be the product of rules with an income statement perspective or on the other hand, low accruals could be the product of rules with a balance sheet perspective. If this is the case, earnings persistence is impacted by both the magnitude and the sign of accruals, suggesting that the properties of earnings themselves are indeed influenced. The authors argue that since accruals encompass the applicable accounting rules, they should diverge for firms expanding or contracting their asset bases and thus, affecting earnings persistence. They further investigate the effects of their assumption on the accrual anomaly documented by Sloan (1996). Finally, they also examine investors' and analysts' reactions. Specifically, they examine whether analysts and investors avoid these firms as being fundamentally more risky and difficult to value.

Fundamental risk is firm-specific and thus, it can be diversified. They use two proxies for fundamental risk: a) bankruptcy risk and b) a proxy associated to information uncertainty. Information uncertainty can be reflected in the difficulty to obtain information about a firm or in disagreements among investors about the value of a firm. Thus, the authors choose to measure the degree of disagreement among investors about firm value by the share turnover and the degree of available information about a stock by the analyst's coverage. Their sample covers all firm-years with available data on Compustat and CRSP for the period 1988–2002, and it is not restricted to only NYSE/AMEX firms thus eliminating any estimation bias. Following the methodology proposed by Hribar and Collins (2002), who argued that measures deriving from the cash flows are more accurate, they exclude from their sample all observations prior to the release of SFAS 95[10] so as to calculate accruals from the statement of cash flows.

Dechow and Ge (2006) encompass two definitions of accruals, as well. Once again following the methodology of Hribar and Collins (2002), their first definition of accruals is

[10] This Statement determines standards for cash flow reporting. It supplants APB Opinion No. 19 (Reporting Changes in Financial Position), and requires a statement of cash flows as part of a full set of financial statements for all business enterprises in place of a statement of changes in financial position.

Operating accruals, deriving directly from the cash flow statement and measured as the difference between earnings and cash flows from operations. Their second definition is Total accruals, measured as the difference between earnings less free cash flows. Free cash flows are calculated as the sum of Operating Cash Flows and Investing Cash Flows; thus, it expresses both the effects of cash spent on property, plant and equipment, acquisition and other investments that have been capitalized as assets on the balance sheet and cash received for sale of divested assets and other investments. They choose to calculate total accruals based on the cash flow statement in order to avoid including assets and liabilities obtained through mergers and acquisitions.

The authors conclude that firms exhibiting high accruals tend to have high earnings persistence relative to that of cash flows, and cash flows and accruals are negatively correlated. On the other hand, firms exhibiting low accruals tend to have low earnings persistence relative to that of cash flows, and cash flows and accruals are positively correlated. They highlight that the persistence of both cash flows and earnings differs in line with the magnitude of accruals, which in turn implies that firms in extreme accruals deciles are operating in more volatile business environments. Furthermore, they find evidence that special items have a significant explanatory power on the lower persistence of earnings in low accrual firms.

Sloan (1996) documents that the accrual component of earnings is more transitory than the cash flow component. They refine his results by finding evidence that both the magnitude and sign of accrual impact on earnings persistence. Especially, firms exhibiting low accrual tend to also exhibit more transitory earnings than high accrual firms, due to accrual adjustments made for special items on the balance sheet. They further address the issue of stocks' reaction (that is investors reactions) and they report that low accrual firms with special items outperform other low accrual firms. This conclusion implies that investors tend to misinterpret the transitory nature of special items. They find evidence that investors undervalue special item-low accrual firms. Their tests suggest that these firms are characterized by poor past sales growth, losses, poor past stock price performance, high bankruptcy risk, and a share turnover is unusually high. Due to these features, which augment the uncertainty and pessimism about the prospects of these firms, the authors also found evidence that analysts have dropped coverage and institutional investors have reduced their holdings in these firms. However, special items' reporting seems to be the "threshold" where the negative momentum ends and since that

point these firms seem to turn themselves around at higher rates than expected by investors.

Myers et al (2007) investigated the implications of reporting long “strings” of consecutive increases in earnings per share (EPS) on firms’ stock returns. They further investigate the sources behind those long strings and whether it can be attributed to earnings management. Their underlying assumption of managers engaging in earnings management to sustain the reported long strings of consecutive non-decreases in quarterly EPS, implies that managers are essentially aiming to smooth earnings. In cases where the actual (unmanaged) quarterly EPS is expected to be less than the prior period’s reported EPS, the authors assume that managers will make discretionary choices so as to boost current period reported EPS, either by engaging in real activity earnings management or accounting-based earnings management.

Likewise, when the actual EPS is high enough to sustain an increase in reported EPS, the authors assume that managers will make discretionary choices to reduce reported EPS. Hence, they aim to capture both earnings-increasing and earnings-decreasing earnings management techniques. Specifically, in the first case when the economic performance begins to crumble (even in the sense of lower growth due to maturation rather than poor management performance), managers will probably engage in earnings management to continue the earnings growth. This behavior could be irrational, in the sense that they ultimately are intensifying overvaluation, however they try to gain time since their prospect is that the economic performance will revert to a better position, allowing them to untangle any aggressive accounting choices. In cases where managers’ expectation about future performance fall short and since accruals choices reverse at some point, managers who remain unwilling to report decreases in EPS will have no choice but to make even more aggressive accounting choices, which in extreme cases leads in accounting fraud.

Their sample consists of firms exhibiting long “strings” of consecutive increases in quarterly earnings per share (EPS) for the period 1963 until the first quarter of 2004. By long strings the authors require their sample to exhibit for at least 20 quarters (five years) consecutive non-decreases in seasonally-adjusted, split-adjusted EPS, where changes in EPS are calculated relative to EPS four quarters prior. Their research setting contributes to the existing literature in three ways. First, their research design is set so as to avoid

estimating discretionary accruals models. Second, previous researches sometimes investigating firms that are “suffering” by debt covenant violations, Securities Exchange Commission (SEC) enforcement actions, or earnings restatements, thus excluding firms “successfully” engaging in earnings management. By incorporating these firms, their sample includes a more representative set of firms whose managers have incentives to manage earnings. Finally, their assumption establishes a straightforward management’s goal, that is avoiding reporting decreases in quarterly EPS, and thus facilitating tests of earnings management. In order to provide evidence of earnings smoothing occurrence, Myers et al (2007) incorporate four sets of tests: a) tests related to the time-series correlation between changes in cash flows and changes in accruals, b) tests related to the reporting of special items, c) tests related to the management of shares outstanding and d) tests related to the management of effective tax rates.

Their first conclusion is that earnings momentum itself (that is exhibiting long strings of consecutive increases in quarterly EPS) is a prima facie evidence of earnings management. They find evidence that firms exhibiting such a momentum consistently realize abnormally strong stock market performance over the earnings momentum period as well as, their performance is stronger relatively to that of firms exhibiting consistent increases in annual (but not quarterly) EPS. Furthermore, the negative market reaction following the end of these strings is more injurious for firms reporting longer strings. Their further tests on the characteristics of these companies suggest that their earnings are less volatile than those of the control sample with similar overall earnings growth, and that this lower earnings fluctuation is not attributable to lower cash flow variability. Supporting the earnings smoothing hypothesis, they found evidence that the cash flows are remarkably strongly correlated with accounting accruals. Furthermore, they provide evidence on the tools used by management to smooth earnings, namely reporting of special items, strategically building firms’ stock repurchases and mutatis mutandis effective tax rates in line with the magnitude of earnings’ changes.

Li (2010) in his study incorporates two fields that both prior and recent literature argue to bring innovative insights on earnings management research: real activity earnings management and the association between earnings management techniques and subsequent stock returns. He investigates the implications of real activity earnings management to subsequent stock returns. He utilizes the abnormal levels of cash flows from operations and production costs (defined as the sum of cost of goods sold and

inventory growth) as his two measures of real activity earnings management. His underlying assumption is that if investors are unable to fully distinguish these REM activities or fully identify the implications of these REM measures and thus interpret and take actions in response to the reported earnings relatively uniformly, they are likely to misprice stocks of firms with high (low) levels of REM activities. However, since investors are expected to gradually distinguish and identify the implication of these REM measures, firms with relatively high (low) levels of REM activities are expected to realize negative (positive) subsequent abnormal stock returns.

To further test the effectiveness of these REM measures, the author directly analyzes the relation between his REM measures return predictive power and the proxies for earnings management. He argues, that since REM affects both current and future period earnings and cash flows, he expects to detect a significant relation between current period abnormal cash flows from operations and future period earnings and cash flows. Nevertheless, since different REM techniques could exhibit adverse implications on current period cash flows from operations, the occurrence of such a relation is more of an empirical assumption to be examined. Specifically, if a firm decreases its current discretionary expenses and overproduction, which are both REM techniques to boost current period earnings, but it generally settles these expenses by cash then the former could result in an increase current period cash flows while the latter would reduce current period cash flows given sales levels.

His results indicate that there is a strong relation between his two REM measures and subsequent stock returns. Firms exhibiting abnormally low (high) levels of operating cash flows tend to underperform (outperform) in the subsequent year, while firms exhibiting abnormally low (high) levels of production costs tend to outperform (underperform) in the subsequent three years. This relation is stronger among firms with greater likelihood of earnings management, whilst it does not exist for the normal levels of operating cash flows and production costs. Furthermore, he reports a likewise significant relation between each of the two REM measures and subsequent operating performance (as proxied by industry adjusted operating cash flows and return on assets). In order to assess the robustness of his variable, he estimates this relationship after controlling for other return predicting variables including many earnings-related anomalies. The relationship remains robust even under the presence of other well-known explanatory variables for firms of all sizes. Finally, throughout his tests, he finds evidence that the explanatory power of his REM

measures can be attributable to a mispricing hypothesis rather than a systematic risk factor hypothesis.

On the other hand, Stubben (2010) examines existing models on accounting-based earnings manipulation. Specifically, he investigates the ability of revenue and accrual models to detect simulated and actual earnings management. Many published studies investigating the effectiveness of accrual models draw the conclusion that such models tend to provide biased and noisy estimates of discretion, which in turn questions the results deriving in studies that use them (Bernard and Skinner 1996). The author argues that a different measure of earnings management, namely discretionary revenues, grants more reliable and conclusive reasoning than existing models. His measure of choice (which is often utilized in revenue manipulation) is premature revenue recognition and its implications on the relation between revenues and accounts receivable. As prematurely recognized revenues, he incorporates sales recognized before cash is collected either adopting an aggressive or incorrect application of Generally Accepted Accounting Principles.

He develops a model like existing accrual models (Jones 1991; Dechow et al. 1995), but refines it in three ways; First, he encompasses in his model the receivables accrual, instead of aggregate accruals, as a function of the change in revenues. This is because receivables have the strongest empirical and most direct visionary relation to revenues compared to other major accrual components. Second, his model is based on the relation between receivables accrual and the change in reported revenues, rather than the change in cash revenues (Dechow et al. 1995). He acknowledges that his model will probably provide systematically understates estimates of discretion in revenues, but he argues that it will be less prone to overstate estimates of discretion for firms whose revenues are less likely to be realized in cash by year-end (e.g., growth firms). Finally, he models the change in annual receivables as a linear function of two components of the change in annual revenues: (1) change in revenues of the first three quarters, and (2) change in fourth-quarter revenues. This is due to the observation that revenues in the early part of the year are expected to be collected in cash by the end of the year, thus influencing differently the year-end receivables than a change in fourth-quarter revenues. He further refines his model by permitting the relation between receivables and annual revenues to diverge in line with the firms' credit policies. These two last aspects encompassed in his model, contribute to more reliable and less biased or misstated results.

In order to develop his research design, Stubben defines discretionary revenues as the difference between the actual change in receivables and the predicted change in receivables based on the model. Discretionary revenues can emerge in many ways. In some cases, they emerge from real activity manipulations such as sales discounts, relaxed credit requirements, channel stuffing, and bill and hold sales or in other cases from revenues recognized using an aggressive or incorrect application of Generally Accepted Accounting Principles (GAAP), fictitious revenues, and revenue deferrals. He chooses to investigate premature revenue recognition and its implications on the relation between revenues and accounts receivable. Premature revenue recognition encompasses a great portion of the above-mentioned form, thus being a more representative proxy (it may include channel stuffing and bill and hold sales in cases where customers do not settle their accounts in cash for the inventory, and revenues recognized using an aggressive or incorrect application of GAAP). Furthermore, premature revenue recognition has proved to be one of the most commonly incorporated forms of revenue management. Unexplainable changes (high or low) receivables, based on the model indicate revenue management. To assess his model performance against existing models, he analyzes the ability of his revenue model against commonly used accrual models (Jones 1991; Dechow et al. 1995; Dechow and Dichev 2002; Kothari et al. 2005) to identify combinations of revenue and expense management.

The author, as many other researchers do, chooses to calculate his variables based on the cash flow statement that the balance sheet or income statement. Once again, since the Statement of Financial Accounting Standards No. 95 (FASB 1987) was not available before 1988, his sample period begins in 1988 and ends in 2003 but uses 2004 data for cash from operations. Financial, insurance and utility firms are eliminated from his sample, since their revenues and accruals likely differ from those of other firms. He further eliminates from his sample firms already suspected of manipulation (e.g., firms targeted by the SEC) when estimating the model coefficients. He then utilizes the estimated coefficients to calculate discretionary revenues of suspected firms. Furthermore, he assesses estimates of discretion from the various models by determining the models' abilities to identify simulated revenue and expense manipulation and by relying on actual earnings and revenue manipulation in a sample of firms known as "manipulators". His findings suggest that the revenue model is less biased and better specified than accrual

models, resulting in estimates that could be utilized as a measure of revenue management or as a proxy for earnings management.

Both the revenue model and the accrual models face difficulties in identifying discretion in expenses. However, the author argues that the superiority of his revenue model at identifying earnings management relies on the relative frequency of revenue versus expense manipulation. For equal amounts of simulated revenue and expense manipulation across the entire sample, the revenue model outperforms each of the accrual models. Furthermore, his model manages to identify earnings management by firms subject to SEC enforcement actions, while the performance-matched accrual models fail to do so. Finally, his specification tests on the existing accrual models suggest that the Jones model (Jones 1991) demonstrates better specification than the modified Jones model (Dechow et al. 1995), and that the Dechow-Dichev model (Dechow and Dichev 2002; McNichols 2002), which was originally developed to estimate earnings quality, demonstrates greater misspecification than other accrual models when used to estimate discretionary accruals.

In the same vein, based on the criticism that many of the accrual models are misspecified and their results are biased, Dechow et al. (2012) develop a new method for detecting accrual-based earnings management, based on the underlying assumption that, in any period, accrual-based earnings management would reverse during another period. the authors further argue that in cases when the researcher has acceptable priors in respect to the reversal period(s), the power and specification of tests for earnings management can be significantly enhance by incorporating these priors. Motivated by Ecker, Francis, Olsson and Schipper (2011), as well as by McNichols and Stubben, (2008) who argue that firms' size and new investment, respectively, have proved to be potentially important correlated omitted variables in tests for earnings management, Dechow et al. developed some tests to alleviate the misspecification problem associated with any associated correlated omitted variable. In their attempt to alleviate the misspecification in tests by encompassing accrual reversals for earnings management in samples with omitted economic characteristics, their tests have the sole limitation that the omitted variables do not reverse in the same period as the earnings management. Their simulation findings indicate that encompassing the timing reversals empower the tests conducted by as much as 40%, and may also mitigate the misspecification problem resulting from omitting related variables.

Chen (2012) also investigates the problems associated with the alternative accrual-based models in identifying accounting-based earnings management, using a sample of Chinese "ST" listed firms exhibiting a loss for two years. However, his research centers on the two most commonly used models, namely the Jones Model (1991) and the Modified Jones Model. In China firms exhibiting losses for two year are obliged to bear the "ST"[11] hat before their names, indicating that investors should be cautious since these companies will be delisted if they continue to report losses for a third year. ST companies clearly have incentives to manipulate earnings since a) investors are already alerted to be cautious by the "ST" symbol and b) they are on the edge to be delisted. Thus, the author's underlying hypothesis is that in the year prior of reporting a loss, they would engage in income-increasing earnings management techniques to increase reported profit. On the other hand, in order to bypass the "ST" hat, these firms will engage in income-decreasing techniques for the first year when they suffered loss, so as to have more room to report an increase in profit of the second year. The author further assumes that ST companies should have non-zero discretionary accruals.

His results firstly indicate that the modified Jones model remains the best approach to detect earnings management compared to all other methods in the existing literature. However, since he also concludes that the Modified Jones Model has proved to be sometimes problematic, a researcher should incorporate other approaches at the same time to identify earnings management in other aspects and compare the empirical evidences derived from the alternative model to those of the modified Jones model. Thus, he supports the notion that the usage of one sole model is not effective to draw reliable conclusions and that future progress lies on developing a better approach.

Following the research designs of investigating earnings management emergence surrounding special events, Cecchini et al. (2012) investigate whether or not the IPO organizations engage in earnings management through the utilization of an individual accrual account on the balance sheet and an individual accrual account on the income statement, namely the allowance for uncollectible accounts and bad debt expense, respectively. To develop their research design, the authors compare the scaled allowance of non-IPO organizations to the scaled allowance of IPO organizations and in turn they

[11] "ST" stands for special treatment

center their analysis on the ratio of the receivables allowance to leading write-offs. Their underlying assumption is that since leading write-offs is primarily related to the receivables allowance in year *t*, a ratio of 1 should suggest that the allowance is precisely adequate. Ratios above 1 imply that the organization has exaggerated its allowance, while ratios below 1 imply that the organization may have understated its allowance. In respect to bad debt expense, Cecchini et al. (2012) investigated the differences in the scaled bad debt expense between IPO firms and matched non-IPO firms through the utilization of scales as a scaling variable.

The authors concluded that IPO firms exhibit conservative, rather than aggressive, allowances in the annual periods adjoining to their stock offerings. More specifically, the average IPO firm has an allowance that is over four-times leading write-offs. Their results further imply that IPO firms record larger, rather than smaller, bad debt expense and are less keen to engage in income-increasing bad debt expense than matched non-IPO firms. Hence, their study contradicts previous literature's results, which propose that IPO firms understate receivables-related accrual accounts.

Doukakis (2013) investigates the implications of mandatory adoption of International Financial Reporting Standards (IFRS) on both accrual-based and real earnings management tools. His study contributes to the existing literature in many ways; Prior research on the implications of the mandatory adoption of IFRS on earnings management techniques mainly focused on accrual based earnings manipulation. The author, on the other hand, investigates IFRS' impact on both accrual and real earnings management and thus, providing a more representative and comprehensive picture. Second, by encompassing a sub-sample of firms with relatively strong earnings management incentives, his study highlights the fundamental role of firm-level reporting incentives in affecting financial reporting quality. Finally, the author provides some indirect evidence for the role of reporting enforcement initiatives in improving financial reporting quality. He used a sample of 15,206 observations from 22 European countries for the period between 2000 and 2010, and encompasses a control sample of voluntary adopters. He includes in his research design a differences-in-differences approach to handle for puzzling concurrent events. As a proxy for accounting based (accrual) earnings management, he incorporates absolute discretionary accruals and he utilizes the modified Jones model to estimate discretionary accruals. In respect to real activity earnings management proxies,

the author takes into account three measures: the abnormal levels of productions costs, cash flows from operations, and discretionary expenses.

His results provide insights for standard-setters and policymakers in determining whether mandatory IFRS adoption satisfies its stated objective of enhancing accounting quality. Furthermore, securities regulators in countries thinking of enforcing IFRS adoption, as well as investors and analysts who want to assess the implications of a mandatory IFRS adoption on accounting numbers can also be benefited from his results. Doukakis' results indicate that mandatory IFRS adoption do not significantly impact either the level of accrual nor real activity earnings management. However, he notes that his empirical evidence does not imply that standards are irrelevant, but that there might be other factors also affecting earnings management practices. Furthermore, even if a mandatory IFRS adoption has not proved to materially influence earnings management practices, there are some evidence implying that concurrent regulatory changes (other legislative initiatives implemented under the FSAP) might evolve the enforcement of financial reporting and enhance financial market regulation. Finally, his further analysis supports the notion that firm-level incentives are fundamental in forming earnings management behavior.

In contrast to previous literature, which suggests that the proxies of earnings management deriving from firms' Statement of Cash Flows are more reliable, representative or suitable than those deriving from the balance sheet or income statement, Hejani et al. (2014) motivated by the tools incorporated in evaluating firms' performance, and more specifically by the DuPont analysis, choose to rely on measures calculated based on the balance sheet's and income statement's numbers. In DuPont analysis, a firm's return on assets is decomposed into asset turnover (ATO) and profit margin (PM). The authors investigate whether the ratio of ATO / PM provides higher information content in identifying earnings management compared to non-discretionary accruals using a sample of all accepted companies in Tehran Stock Exchange during the period of 2002-2011. Based on Penman's (2007) framework for forecasting, which suggested that there should be a constant correlation between operating sale and income in income statement and between sale and net operating assets in the balance sheet, the authors argue that since there is a connection between the income statement and balance sheet and the implications of earnings management should be reflected in operating income and net operating assets, ATO and PM will move in the opposite directions under the presence of earnings management. Hence, their main underlying hypothesis is if there is a simultaneous

increase (decrease) in PM and decrease (increase) in ATO, it could be a diagnostic of upward (downward) earnings management.

Their findings are consistent with their hypothesis. Their tests suggest that a simultaneous increase (decrease) in PM and decrease (increase) in ATO is indeed an alert of earnings management occurrence. Finally, the authors suggest that their ATO/PM ratio has higher information content than performance-adjusted non-discretionary accruals, especially in cases where there is no apparent incentive to manipulate reported earnings.

Irani and Oesch (2014) examine how managers differentiate their earning management techniques in response to the presence of securities analysts. The authors choose to examine both the usage of real activity earnings management techniques and accounting-based (accrual) earnings manipulation techniques as a reaction to securities analysts' pressure, since they argue that one earnings management technique in isolation cannot provide efficient insights on the issue. They present some methodological issues related to the empirical identification, at a firm-level, of the analysts' monitoring implications on the incorporation of real activity or accrual-based earnings management techniques. Firstly, there might be some severe endogeneity issues. If a regression analysis reveals a relationship between coverage and a measure of earnings management, it is naïve to rule out reverse causality, since it is well documented that corporate prospects and policies -including transparency (Healy et al., 1999; Lang and Lundholm, 1993)- unavoidably drive decisions to initiate and terminate coverage.

Then, there is the misspecification issue of omitting factors that drive coverage and also impact on earnings management (such as a seasoned equity offering, as suggested by Cohen and Zarowin, 2010). To estimate the causal impact of securities analysts on earnings management techniques adopted by firms being followed, they incorporate a quasi-experiment that employs exogenous reductions in analyst monitoring deriving from brokerage house mergers. They use a sample of 13 brokerage house merger events staggered over time from 1994 until 2005 and accommodates all publicly traded U.S. Their 13 brokerage house merger events result into 1.266 unique firms, which constitute their treatment sample. Quasi-experiments are subject to concerns regarding internal validity, since treatment and control groups may not be comparable at baseline. To address this problem, the authors incorporate a difference-in-differences approach, contrasting the

adjustment in earnings management behavior of the treatment sample relatively to a control group of empirically comparable firms uninfluenced by the merger. Hence, they isolate the causal change in earnings management strategies resulting from the loss of coverage.

Their study contributes to the existing literature in two ways. Firstly, it adds insights to the empirical literature on the interaction between analyst coverage and earnings management. They provide new evidences on the negative relation between earnings management and analysts' monitoring, refining the research conducted by Yu (2008) in two ways. First, by adopting a quasi-experimental approach, they can build a direct causal relationship and validate that a reduction in analyst coverage leads to an adjustment in earnings management. Second, they take into account firms' overall earnings management strategy rather than accrual manipulation in isolation. Their final contribution is to the earnings management literature, which has shifted towards real activity earnings management since the survey conducted by Graham et al. (2005).

They address two issues: a) real activity earnings management and b) whether there is any complementary or substitute interaction with accrual-based practices. In particular, they investigate how securities analysts impact managers' choices on the mix of accrual and real activities manipulation. Their overall results suggest that firms that lose analyst coverage tend to move far from real activities manipulation and towards accrual-based earnings management. However, a more important observation deriving from their experiments is that although analyst coverage may be related with lower accrual-based earnings management, the pressure to meet analysts' expectations may result in engaging in real activities manipulation.

Following the research design proposed by Hejani et al. (2014), Mohaghegh (2015) also aims to examine whether changes in the profit margin and asset turnover ratio can be indicators of earnings management and in turn, develop a suitable model by identifying the relationship between the profitability components in the tenable economy. However, their sample diverges from that of Hejani et al. (2014), who also examined listed companies on Tehran Stock Exchange, in the sense that they focus on investment companies listed on the Stock Exchange for the period from 2007 until the end of financial year 2012. Their findings suggest that there is a significant inverse relationship between

the aggregate accruals and changes in profit margins, and a significant direct relationship with the changes in asset turnover ratio.

As one has already noticed, many of the published studies on earnings management since the year 2010 focus on real activity earnings management, its detections and its implication as well as its differences with accrual based earnings management. In respect to the latter, Enomoto et al. (2015) investigate the differences between accrual-based earnings management and real activity earnings management across different countries in respect to investors' protection. Their first hypothesis is that countries characterized by strong investors' protection are expected to restrain accrual-based earnings management through their strict guidelines. Their second first hypothesis is that in countries characterized by strong investors' protection, firms are expected to engage in real activity earnings management as a substitute to accrual-based earnings management practices. Their third and final hypothesis is that real activity earnings management is less often carried out, as with accrual-based earnings management. In order to assess their hypotheses, they examine a sample of firms from 38 countries for the period 1991-2010.

Adopting the approach proposed by Leuz et al. (2003), they proxy accrual-based earnings management using three measures: (i) the ration of the standard deviation of operating income to that of operating cash flow using time series data for each firm included in the sample; (ii) the correlation between changes in accruals and changes in operating cash flow computed using a pooled data from each country included in the sample; and (iii) the ration of the absolute value of accruals to that of operating cash flow calculated in each firm-year. They proxy real activity earnings management using two measures: (i) the correlation between changes in sales and production costs and (ii) the correlation between changes in sales and discretionary expenses. Finally, they proxy investors protection using two variables: (i) the strength of legal enforcement and (ii) the extent of outside investors rights under corporate and security law. The authors consider the disclosure index and analysts' following as critical factors influencing investors' protection.

Their empirical findings support their second hypothesis that there is a substitution effect between the two methods of earnings management and further propose that there is a negative correlation between outside investors' protection and accrual-based earnings management, whilst there is a positive correlation between outside investors' protection

and real activity earnings management. Furthermore, their results suggest that analysts' following is restraining real activity earnings management. Their findings remain the same after controlling for audit quality, alternative variables proxying investors' protection or the use of accrual-based and real activity earnings management proxies calculated by country and year. Finally, their first hypothesis is also supporting by their empirical evidences.

An innovative study is conducted by Iqbal et al. (2015). The authors aim to develop a signal-based index, namely ESCORE, which captures the context of earnings management. Incorporating the framework from the existing literature, they develop this composite index that amasses 15 individual signals of earnings management behavior. Since it is well documented that there is a difficulty in reliably proxying earnings management practices using accruals models, they bypass this difficulty by proxying the likelihood of earnings management without having to directly measure discretionary accruals. In other words, their research design does not aim to directly measure discretionary accruals, which lacks a formal theory about the determinants of accruals in the absence of earnings management, but rather aims to construct an empirical proxy that reliably portray circumstances where earnings management is more likely to occur. The index consists of fifteen individual binary scores.

That is, that each individual score can have a value of either one or zero, where 1 indicates that the firm is more likely to engage in earnings management and zero otherwise. The authors group these individual alerts into four broad categories, to portray the most common outlay researchers use in their literature reviews. The first category includes signal referring to the incentives for earnings management. The second category encompasses the pressures. The third aims to capture factors restraining the emergence of earnings management and more specifically, balance sheet bloat and external auditor. The last category represents firm's other innate characteristics. The ESCORE index can theoretically extend from zero to fifteen, with higher values indicating a more 'susceptible context' in which earnings management is more likely. To assess their index effectiveness, they examine its performance of predicting one-year-ahead stock returns by using a sample of UK listed firms during the period 1995 to 2011.

In order to characterize a firm as exhibiting too high (low) values of ESCORE, they constructed for each individual signal a benchmark ESCORE[12]. Benchmark ESCOREs are constructed on an industry-level. Their contribution to the existing literature is twofold. First, their concept of constructing such an index can bypass the inherent difficulty of misspecification of accruals models. Second, they provide new insights on the 'market anomalies' literature by providing empirical evidence that the market indeed misprices earnings management, but it fails as well to fully appreciate the information contained in the context surrounding such manipulation. Their findings suggest that ESCORE can indeed capture the context of earnings management and reliably predict future stock returns.

Stocks exhibiting high-ESCORE indeed engage in earnings management in larger magnitude and are more likely to utilize aggressive earnings management practices. Their empirical evidences suggest that a zero-investment hedge portfolio that takes long position in low ESCORE stocks and short position in high ESCORE stocks could realize an average abnormal return of 1.37% per month after controlling for other well-known risk loadings, namely the market, size, book-to-market and momentum factors in up to one year after portfolio formation. Although prior research suggests that aggressive (conservative) earnings management is related to negative (positive) future stock returns (Xie, 2001), they find new evidences suggesting that the very presence of earnings management, regardless of the direction, influences stock returns negatively in the sense that any deviation from the actual earnings could dilute the usefulness of reported earnings.

The authors argue that utilizing their index in future research shall be beneficial for two reasons; Firstly, ESCORE enables financial statement users to quickly determine the reliability of reported earnings by incorporating the surrounding context instead of the magnitude of the actual earnings and its components, which is rather challenging to achieve. This advantage can be quite useful in settings such as emerging markets which are characterized by severe data unavailability and thus difficulties to calculate traditional measures of earnings management (such as the Jones discretionary accruals). The

[12] For a more detailed discussion on the theoretical framework related to the variables' choice and the ESCORE formula, visit: "There's no smoke without fire: Does the context of earnings management contain information about future stock returns?", Abdullah Iqbal a,, Nguyet T. M. Nguyen b, and Radha Shiwakot (March 26, 2015). Available at SSRN: https://ssrn.com/abstract=2618776 or http://dx.doi.org/10.2139/ssrn.2618776)

second reason is that their index can be utilized by investors to distinguish the information about the context of earnings management which is mispriced by the market, and draw their strategies accordingly to realize economically large abnormal returns.

Artikis and Papanastasopoulos (2016) analyze the persistence, pricing and economic significance of the earnings' cash component using a sample of U.K. listed firms for the period of 1981-2013. Motivated by the study conducted by Dechow, Richardson, and Sloan (2008), who were the first to disintegrate and analyze the cash component of earnings into three sub-components: retained cash flows, cash flows associated with debt financing activities and cash flows associated with equity financing activities, as well as the study conducted by Chen and Shane (2014), who further disintegrate retained cash flows into normal (fundamentals-driven) changes in cash and abnormal (agency-related) changes in cash, the authors decompose and examine the cash component of earnings into changes in the cash balance and into issuances/distributions to debtholders and equity holders. They refine the work of Chen & Shane (2014) and Dechow et al. (2008) by analyzing the accumulative relation of the cash component of earnings with the future profitability and stock returns after controlling for the level of current profitability.

Hence, their research design could reveal differences in the realized near-future profitability and stock returns of firms exhibiting similar profitabilities attributable to greater cash earnings. Furthermore, they enhance the methodology commonly used in this line of research by incorporating both the actual level of the independent variables and the decile rankings of the independent variables. In doing so, their approach considers potential non-linearities and provides results that are not driven by extreme outliers. Following the methodology of Fama and French (2008), who argued that the results deriving from a portfolio analysis can be driven by micro-cap stocks, they investigate whether their results are robust across different size groupings.

Another important aspect of their research design is that they further refine their portfolio analysis by examining the robustness of their results using two subperiods: a. the subperiod before the recent global financial crisis (up to 2007) and b. the subperiod after the crisis (after 2007). Finally, in the same vein, the scholars also perform additional subsample analyses inspired by certain major events affecting the U.K. institutional environment such as the introduction of FRS 3 in 1992 and the mandatory adoption of the

IFRS in 2005. Their first cash subcomponent of earnings, changes in cash and short-term investments taken together with the accrual component of earnings, reflects the portion of retained earnings. To reflect the portion of earnings allocated to firms' stakeholders, the scholars incorporate two additional cash subcomponents of earnings, namely distributions/issuances to debtholders and equity holders. The very nature of this decomposition can portray the relation between cash available for firms' future growth– that is, retained earnings – and firms' obligations towards external financing sources – that is, their debtholders and equity holders. Hence, their analysis could reveal the possible relations between the component of earnings related to the return of changes in net investment and in the cash component of earnings related to external financing activities. It should be noted that they proxy earnings' cash component with a free cash flow measure that excludes all accruals associated with investing or operating activities.

The authors find evidence, consistent with the results documented in the U.S., that the earnings' cash subcomponents exhibit systematic differences in their persistence with the equity holders' cash flows having the highest persistence. However, opposed to the U.S. results, U.K. results suggest that there is a difference in the level of persistence for the retained cash subcomponent and that of accruals, probably caused by the differences in the respective reporting systems and managerial discretionary accounting choices related to earnings. Furthermore, the debtholders' cash subcomponent and the accruals exhibit almost equal levels of persistence, due to the low indicative nature, regarding future earnings performance, of issuances/distributions to debtholders. Another difference between the two markets is that U.K. do not misprice the effects of retained cash flows for future earnings performance, whilst they tend to At the same time, we show that investors underrate the consequences of the cash component of earnings, due to cash allocation to stakeholders. Finally, their various subperiod analysis indicates that through hedge trading strategies based on cash distributions to either debt or equity holders, one can realize positive raw and abnormal returns in the future. More specifically, the largest returns are realized in the post-IFRS subperiod and from micro stocks.

In 2017, Lo et al. motivated by Christopher Cox's, Chairman of the SEC, argument that "the jargon of lawyers has taken over" and that the tendency towards hard-to-read disclosures is attributed to the fact that "the main purpose of the drafting exercise has shifted from informing investors to insuring the issuer and the underwriter against potential claims" (SEC, 2007), investigate the readability of annual financial statements in respect

to earnings management. Their objective is to assess whether this type of managers' behavior (that is, shifting towards complex disclosures) extends beyond the presence of "legalese" and whether it serves the purpose of concealing information from investors. In order to measure readability, they incorporate the Fog Index[13] proposed by Li (2008). The authors aim to explore the two different reasons of this choice of disclosures as suggested by Bloomfield (2008): a. concealing bad performance or b. the inherent difficulty of communicating bad news.

In doing so, they focus on cases where managers have clear incentives to engage in upward earnings management techniques to meet or beat an earnings target and more specifically on the management discussion and analysis section of the annual report (MD&A). The implied notion is that when actual performance diverges from the reported one, managers will attempt to make it harder for the investors to detect earnings management and thus assess firms' true fundamentals.

The authors find evidences that in cases where firms meet or beat the previous year's earnings, the Fog score gets higher and readability decays. In cases where firms are more likely to have used earnings management techniques (either accrual-based or real-activity) to achieve their targets, the aforementioned relationship is even more profound. In the latter case, more complex MD&A reports are disclosed. The findings deriving from firms that are perceived as "earnings-manipulators", further suggest that the increased complexity of firms' financial statements is more likely attributed to befuddlement rather than the difficulty of communicating bad news. Finally, the scholars note that although both the befuddlement and the perceivable discrepancy lead to readability's decay their results fail to support one cause over the other.

2.5 Asset Growth And Earnings Management

Real-life experience (examples of accounting Frauds such as the Enron case or the WorldCom case among others) has proved that it might be naïve to rely on the reported numbers to assess and evaluate a firm's performance. Although earnings management does not necessarily mean accounting fraud, it is well recognized that any measure

[13] Higher values of the Fog Index indicate that financial disclosures are more difficult to be interpreted.

deriving from a firm's financial statements could be affected by firms' earnings management accounting choices. Many scholars acknowledge this fact. Richardson et al (2005), Richardson et al (2006) and Bradshow et al (2006) argue that earnings management accounting choices related to a high NOA growth can also lead to a decline in future profitability. Furthermore, DuCharme et al (2004), Jiang (2008), Kim and Park (2005), Liu et al. (2010) as well as Teoh et al (1998 a,b) find evidence that firms carefully select which information to disclose to the debt and equity markets, mainly revealing positive information and even engage in earnings management techniques to boost their stock prices or lower their interest rates. From the studies presented in the previous section, one could conclude on five basic types of financial statement manipulation (either for earnings smoothing purposes or fraudulent purposes)[14]:

1. Fictitious sales. Revenues growth inconsistent with cashflow growth could probably mean earnings manipulation mechanisms in the sense that sales are easier to manipulate than cash flows and that the two should move in a similar way over time. In the same vein, an accelerated and unusual increase in the number of day's sales in receivables associated with growing inventories may reveal obsolete goods for which fictitious future sales are recorded.

1. Inappropriate expense recognition. When an industry is dealing with pricing pressures, a company reporting persistent gross profit margins could be inappropriately not recognizing expenses or engaging in aggressive revenue recognition. An unusual expansion of fixed assets could indicate the usage of operating expense capitalization, rather than expense recognition.

2. Improper asset valuation. When a firm's depreciation methods or estimates of assets' useful life (or salvage values) are inconsistent to those of the industry are also indicating earnings manipulation.

3. Concealed liabilities. To hide debt off the balance sheet, firms may exhibit an outsized frequency of complicated third-party transactions. Furthermore, firms on the edge of violating debt covenants have a clear incentive to conceal debt-related liabilities to adjust their leverage ratios.

[14] In order to distinguish between "harmless" earnings management, in the sense that managers try to better communicate their firms' performance or future prospect, and fraudulent behaviors we refer to the former as earnings management for the purpose of earnings smoothing. We acknowledge the fact that in an fluctuating environment, such as capital markets, it is rather difficult to maintain a stable performance throughout the years, and thus we believe that engaging in earnings management for that purpose is less likely to imply a severe investors' misleading.

4. Unsuitable disclosures. Disclosures, as they are established by the SEC, include items associated with firms' financial condition, operating results, management compensation and other important areas. An unexplainable surge in a firm's performance could be a red flag for earnings management since many firms are under immense pressure to meet or beat analysts' forecasts. In addition, an inordinate amount of managers' compensations/ bonuses linked on short-term targets can also provide a clear incentive to manipulated reported numbers and disclosures.

Asset growth expansions include acquisitions, property investments, public equity offerings, bank loans, IPOs and public debt offerings. On the other hand, asset growth contractions may take the form of share repurchases, spin offs, dividend initiations and debt prepayments. These definitions can portray three effects that could possibly interact with each other. An investment effect deriving from the expansions and contraction on the asset side of the balance sheet. A financing effect deriving from changes in the liability side of the balance sheet. And an accrual effect deriving from changes on both sides of the balance sheet.

Some scholars try to assess this interaction and whether the one effect is subsumed by the other (and vice versa). For example, Fairfield et al. (2003) investigate the accrual effect by considering the net operating asset growth. Their evidence suggests that the accrual effect could be a subset of a more general growth effect since it seems to be a general market mispricing of growth in net operating assets. In addition, Baker and Wurgler (2002) as well as Teoh, Welch, Wong (1998) suggest that an asset growth effect (proxied by changes – growth in external financing, as a subcomponent of a general asset growth) could be attributed either to capital market structure timing or to earnings management techniques.

That being said, earnings management techniques can be linked to balance sheet growth components. In accruals context, Chan, Chan, Jegadeesh and Lakonishok (2006) report that high accruals can capture the presence of earnings management activities and thus earnings management could possibly drive an accrual effect. In the same vein but this time related to an external financing anomaly, Teo, Welch and Wong (1998) report a tendency towards earnings management prior to financing activities, which results in low

stock returns in the subsequent periods. Consequently, such studies provide evidence that the earnings management activities can provide a potential explanation for the subcomponents of the asset growth effect. In this section, we will present studies that investigate the relation between earnings management and subcomponents of the asset growth, as well as studies that investigate possible interactions between the accrual anomaly and measures representing asset growth[15] or relating the accrual anomaly to a more general growth effect.

Fairfield et al (2003) examine whether the findings suggested by Sloan (1996) and Xie (2001) – that is, the persistence of earnings performance differs in line with the proportions of the cash and accrual components and market's mispricing comes from investors' inability to fully appreciate the significance of cash flows and accruals on future earnings performance – related to accruals can also stand for another form of growth in net operating assets. More specifically, they examine whether the findings in respect to the accruals' lower persistence and market mispricing stand for long-term growth in net operating assets and whether the accruals' lower persistence can be attributable to the differential impact of growth in net operating assets relative to cash flows on the denominator of the earnings performance measure. Their motivation came from two definitions: a) Sloan (1996) defined earnings performance as the operating income divided by contemporaneous average total assets which transforms operating income into return on assets (ROA); b) accruals is defined as growth in operating working capital less depreciation and amortization expense and thus, it represents both a component of operating income in the numerator of current ROA, and a component of growth in net operating assets.

The latter influences average total assets in the denominator of one-year-ahead ROA. The scholars expect a higher correlation between accruals, being a component of growth in net operating assets, and the average total assets rather than between accruals and cash flows from operations. Thus, their first hypothesis is that the observed lower persistence of accruals versus cash flows is due to the differences in correlations between the two components and the denominator of one-year-ahead ROA. Furthermore, their second explanation for the diverging persistence of accruals is that, conditional upon current ROA, the expected negative relation of accruals to the one-year-ahead ROA, is due to the

[15] Namely, for example, net operating assets, abnormal capital expenditures.

disproportionate influence of growth in net operating assets relative to cash flows on the denominator of the ratio. Hence, their second hypothesis is that the negative relation should extend beyond accruals, to growth in long-term net operating assets and one-year-ahead ROA. However, they also expect this relation not to be observed when lagged average total assets, instead of contemporaneous average total assets, are incorporated as the deflator of the earnings performance measure.

In order to replicate Sloan's research design, they examine firms with required financial statement and stock price data for the 30-year period 1963-1992, which is more or less the same with Sloan (1996). Furthermore, they incorporate the balance sheet approach as Sloan does. An interesting feature in their research design is that they exclude from their sample firm-year observations influenced by one or more of the following instances, since they believe that these could contain an increased noise in the measurement of either accruals or net operating assets: (1) working capital components are estimated, (2) voluntary accounting changes made by managers impact either working capital or operating income, or (3) the recorded amount of goodwill increases from year to year. Their results indicate that, conditional upon current ROA, the observed negative relation between accruals and ROA also extends to growth in long-term net operating assets, which is probably due to the influence of the growth in the denominator of ROA. In addition, their findings also suggest that accruals do not provide additional information beyond its roles as components of either ROA or growth in net operating assets. The scholars argue that the differential persistence of accruals versus cash flows is not driven by their associations to operating income in the numerator of one-year-ahead ROA, but rather to the differential associations between cash flows and accruals to the denominator of one-year-ahead ROA, which in turn indicates that earnings quality cannot be the primary factor for the differential persistence observed by Sloan (1996). Hence, their overall results indicate that the accrual anomaly could probably be the result of a more general market mispricing of growth in net operating assets, regardless of whether the growth comes from accruals or growth in long-term net operating assets.

Hirshleifer et al (2004) expect in cases where the accruing net operating income (accounting value added) exceeds the accruing free cash flow (cash value added), and thus the subsequent earnings growth is weak, investors who do not fully appreciate the related implications will tend to overvalue the firm. This type of behavior is attributed to a

naïve earnings-based valuation ignoring the firm's relative failure to generate cash flows more than its investment needs.

Therefore, the scholars believe that the normalized level of net operating assets – proxied as the difference between all operating assets and all operating liabilities reported on firms' balance sheet - should be an appropriate measure of the extent to which operating/reporting outcomes result in an excessive investor optimism. This definition of the normalized level on net operating assets could reveal a possible "balance sheet bloat", since net operating assets are created to represent a cumulative measure of the discrepancy between accounting value added (earnings) and cash value added (free cash flows). Furthermore, their choice of long-term net operating assets allows them to assess the full history of flows, which in turn can be a more representative return predictor than e.g. current-period operating accruals.

Their overall hypothesis is that a high level of net operating assets, scaled to control for firm size, indicates a lack of sustainability of recent earnings performance implying that if earnings management techniques are involved, the extended pattern of earnings management should reverse at some point. More Specifically, since the cumulative net operating income reflects firms' ability over time to generate value after covering all operating expenses, including depreciation and accordingly, the cumulative free cash flow reflects firms' ability over time to generate cash flow more than enough to cover capital expenditures then in cases where past free cash flow justifies positive weight, along with past earnings, in a rational forecast of the firm's future earnings, a positive discrepancy between the two implies that future earnings will decrease, and a negative discrepancy implies that earnings will boost. Naïve Investors depending their valuations solely on the information in past earnings will tend to revere a firm with high net operating assets for its strong earnings stream, without discounting properly for the firm's relative inability to create free cash flow.

It should be noted that, their research design and their hypothesis development allows for the possibility of earnings management, but does not require it. Their findings, deriving from their 1964-2002 sample, indicate that net operating assets can indeed reveal important information about the long-term sustainability of the firm's financial performance. Firms exhibitng high net operating assets normalized by beginning total assets (NOA)tend

to have high and growing earnings prior to the conditioning date, but their performance deteriorates after the conditioning date. In addition, since NOA has proved to be a strong and highly robust negative predictor of abnormal stock returns for at least three years after the conditioning date, the authors argue that market prices do not fully reveal the information contained in NOA in respect to future financial performance. Finally, they find evidence that NOA is a stronger and more persistent return predictor than flow components of NOA (namely operating accruals or the latest change in NOA), and this fact indicates that there is a cumulative effect on investor misperceptions of discrepancies between accounting and cash value added.

Lee et al (2005) have a twofold research goal: a) they wish to provide a rational setting according to which an optimal amount of managed earnings should be established and should be positively related to firm's performance and growth; their implied incentive is that managers engage in earnings manipulation to influence stock performance and more specifically, managers of firms with higher performance or growth potential, should exhibit greater incentives to overstate earnings, sustaining their good performance. b) to support their hypothesis robustness, they incorporate a battery of empirical tests on two data sets using different proxies for the amount of managed earnings. In respect to their first goal, they introduce a new definition of earnings quality, that is the proportion of true economic earnings in total reported earnings, offering a new perspective of earnings quality, which is more consistent with price responsiveness.

Thus, their definition and their model development indicates that earnings quality should increase with firms' reported earnings and decrease with firms' expected growth. In respect to their research goal, their first sample and larger sample consists of all firm years during 1988 to 2001 and the relevant proxy for the amount of managed earnings is discretionary accruals from Kang and Sivaramakrishnan's (1995) model. Their second and smaller sample consists of firms that restated their earnings after they were identified to exhibit accounting irregularities. Thus, their second proxy for the amount of managed earnings is the restated amount of earnings (reported earnings announced initially minus reported earnings restated) hand-collected from restatement announcements.

Their results indicate that firms exhibiting higher performance or expected earnings growth over-report earnings by a larger amount due to the fact that price responsiveness in

equilibrium increases with earnings performance or growth. Furthermore, their research design suggests that fully sweeping away the discretionary accruals related to performance or growth would results in estimation bias of the amount of managed earnings. The authors expect that earnings quality should be positively associated with reported earnings and negatively associated with expected growth and their explanation is that the price is convex in reported earnings. Throughout their two samples and their two proxies of earnings quality, their analysis clearly supports their expectations in respect to firms' performance. On the other hand, their evidence is inconclusive in respect to future earnings growth, since the results from the larger sample support their hypothesis whereas the results from their smaller sample are not statistically significant, probably attributed to the lack of test power.

Another study investigating whether the accrual anomaly is driven by growth rather than earnings persistence, is the one conducted by Zhang (2005). To assess his hypothesis, he incorporates variables that allow him to isolate growth information – elements encompassed in accruals, which should be fundamental and relatively free of accounting distortion. Furthermore, he employs three different approaches. However, his goal is not to treat earnings persistence and growth as mutually exclusive drivers for the accrual anomaly, rather to investigate whether growth is the dominant effect. more specifically, the author aims to investigate whether the accrual anomaly is attributable to the fundamental growth information encompassed in accruals as opposed to accounting distortion or managerial discretion.

His motivation comes from the acknowledgment that accruals are positively related to growth by the very nature of the accrual accounting mechanism[16]. His first approach involves the examination of the cross-sectional variation in the accrual anomaly. His underlying hypothesis is that accruals should be directly related to firms' fundamental

[16] That is, as stated by the author, that the usage of accrual accounting itself smoothes earnings by recognizing higher (lower) earnings than cash flows at the growth (maturity) stage, resulting in a positive correlation between accruals and growth. On the other hand, the usage of cash accounting requires that earnings should be equal to cash flows and thus accruals should be zero at any point of time, resulting in a zero correlation between accruals and growth. In particular, since accrual accounting methods measure accruals as changes in working capital and thus depending on the firms' business stage one could observe the following patterns: a) during expansions, firms enhance their production capacity and increase their inventory, resulting in a relatively augmented accrual earnings' component; b) during contractions, firms tend to liquidate their inventory at a discount, write off accounts receivable, and delay their payments on payables, resulting in a relatively compressed accrual component in earnings.

business and for that reason different industries shall exhibit differences in the power of growth information. More specifically, he believes that in industries such as manufacturers and retailers, there should be a high correlation between accruals and growth, whereas in industries such as service and consulting, there should be a low correlation with growth.

Anyhow, the accrual anomaly attributed to fundamental growth information should vary across industries in a predictable way, whilst earnings persistence should provide no explanatory power on the cross-sectional variation in the accrual anomaly. His second approach is to decompose accruals into growth-related and –unrelated components so as to assess the predictive power of each component. His underlying hypothesis here is that the predictive power for future stock returns should be stronger for the growth-related component, and thus the growth information encompassed in accruals should exhibit a first order effect on the accrual anomaly. Finally, his last approach serves the purpose of enhancing the robustness/generalization of his growth hypothesis at an industry level. His argument lies on the notion that fundamentals, within the same industry, tend to move together whereas transitory accrual estimation errors and managerial discretion are more likely to be firm-specific. Thus, to the degree that transitory accrual estimation errors can offset each other through aggregation, accruals at the industry level are more likely to represent fundamentals.

This framework refines prior literature, examining a relation between the accrual anomaly with other growth-related anomalies (the anomaly based on growth in net operating assets by Fairfield et al. (2003a) and the value-glamour anomaly by Desai et al. (2004)), in the sense that it directly assesses any linkage between the accrual anomaly and fundamental growth information encompassed in accruals. Furthermore, it offers insights on how accruals are fundamentally related to growth and more importantly that the growth information encompassed in accruals extends much beyond that reflected in current sales growth. Finally, its industry level analysis as well as the implication of his underlying hypothesis (that is, growth hypothesis) at an industry level could reveal how well-diversified (or not) accrual strategies are, which in turn could reveal another important perspective to limits to arbitrage on the accrual anomaly.

His empirical finding suggest that the accrual effect indeed fluctuates across industries in a predictable way and that the accruals' predictive power on future stock returns

essentially lies on firms' business models. His findings support his first hypothesis that in industries where there is a strong relation between accruals and growth information, there should be a strong accrual effect, while in industries where there is a weak relation between accruals and growth information, there should be a weak accrual effect and earnings persistence should have no predictive power on the cross-sectional variation in the accrual anomaly. Furthermore, his empirical results also support his second hypothesis that the growth-related component is a stronger return predictor than the growth-unrelated component. Finally, his overall results indicate that the accrual anomaly is largely attributable to the fundamental growth information encompassed in accruals, rather than to earnings persistence.

Richardson et al (2006) aim to provide insights on the competing drivers behind the observation of Sloan (1996) - the accrual component of earnings being less persistent that the cash flow component -, namely those of Xie (2001), Fairfiled et al (2003 a), Dechow and Dichev (2002) and Richardson et al. (2004)[17]. Their research design provides three key insights; First, using conservative accounting methods does not adhere to the lower persistence of the accrual component of earnings. Second, using aggressive accounting methods in combination with variation in investment growth rates can explain the lower persistence of the accrual components of earnings. Third, transitory accounting distortions deriving from estimation error in accruals can also explain the lower persistence of the accrual component of earnings. An interesting feature of their empirical analysis is that they decompose accruals into 'growth' and 'efficiency' components.

The growth component captures accruals deriving from increases in the level of operating activity, proxied by sales, whilst the efficiency component captures accruals deriving from reductions in the efficiency with which existing net operating assets are used. The scholars argue that accruals can increase either due to real investment growth (whereby more operating assets lead to increased production and sales), or due to a deterioration of efficiency (whereby more operating assets are required to produce the same level of production and sales). The growth components should be reflected in declining marginal

[17] Xie (2001) finds evidence that the lower persistence of the accrual component of earnings is due to the 'abnormal' component of accruals, and thus to managerial discretion. Fairfield, Whisenant and Yohn (2003a) argue that the lower persistence of the accrual component is due to conservative bias in accounting and/or the lower rate of economic profits that result from diminishing marginal returns from new investment opportunities. Dechow and Dichev (2002) and Richardson, Sloan, Soliman and Tuna (2004) report that the lower persistence of the accrual component of earnings is due to transitory estimation error in accruals.

returns to investment, whereas the efficiency components of accruals will increase either due to less efficient use of existing capital or due to accounting distortions. Furthermore, they enhance their research by investigating the predictive power of accruals with respect to SEC enforcement actions for alleged earnings manipulations. Their findings are more consistent to the explanation of transitory accrual estimation error driving the lower persistence of the accrual component of earnings. However, the accrual estimation error is at least partially attributable to managerial discretion. Their overall results indicate that the lower persistence of the accrual component of earnings is a direct manifestation of the decisive trade-off between relevance and reliability.

Wei and Xie (2007) investigate whether the accrual-based anomaly and the investment-based anomaly capture the same market-mispricing phenomenon. Their attempt is to establish a linkage between two lines of research: capital investments (and at some level the asset growth effect, since capital investments are often used to measure asset growth at least at its early formation) and accounting accruals (an effect widely examined and a still ongoing debate). More specifically then, their objectives are: a) to investigate whether accruals are associated with capital investments and b) whether the accrual and the investment anomalies capture the same underlying force or whether they are distinct from each other.

The authors provide rather simple and representative examples for their notion that accruals and capital expenditures can be associated in several ways; Firstly, since an increase in capital expenditures, financed by a sales growth for instance, is perceived to be an investment in working capital, and since current accruals reflect changes in working capital investments, therefore, one may observe a positive relation between capital expenditures and current accruals. This can be a rather representative example for the intuition that the two anomalies may be driven by the same increase in investments. A second example of their inter-reaction is that a positive relation between accruals and capital spending could be attributable to negative cash flow shocks. A third reason for this positive relation is accruals manipulation with purpose of avoiding a possible market scrutiny when managers choose to invest more than what is required by investment opportunities. In such instances, one could expect a positive relation between excessive capital expenditures and discretionary accruals, in addition to a positive relation between normal capital expenditures and normal accruals. That being said, the authors aim to

investigate whether the two anomalies are essentially one sole effect driven from the same underlying causes, or whether they are indeed two distinct effects.

Their findings suggest that there is a strong and positive relation between abnormal capital expenditures and discretionary current accruals. However, the same relationship does not stand for abnormal capital expenditures and not discretionary total accruals. In addition, firms exhibiting high discretionary current accruals or high abnormal capital investments tend to have significantly higher external financing. They also find evidence that firms that invest the most may manage their earnings and, possibly, overinvest. Their results further indicate that the investment effect is driven by the abnormal component of capital expenditures. Finally, although they conclude that the discretionary current accrual-based anomaly and the abnormal capital investment-based anomaly are two different effects, they find evidence of a strong abnormal capital investment effect conditional on the discretionary current accrual effect and a strong discretionary current accrual effect conditional on the abnormal capital investment effect.

In the same vein, another interesting study investigating in a somewhat more direct way a possible interaction between the asset growth effect and the accrual anomaly by considering the role of accounting manipulation in market's mispricing is the one conducted by Son and Zhou (2010). Their underlying hypothesis is that accounting manipulations are the fundamental driver of the accruals anomaly but do not have a determinant role in the asset growth anomaly. Their motivation comes from the notion that total accruals can be perceived as growth in short-term net operating assets, and thus it would be only logical to investigate whether and how the accruals anomaly and the asset growth anomaly are related. Furthermore, although prior literature concludes that accounting manipulations have an explanatory power over the accruals anomaly, prior studies on the asset growth effect do not view accounting manipulations as a determinant for the latter.

Following the methodology of Fairflield et al (2003), to ensure that they decrease the noise included in accounting data, they exclude from their U.S. 1973-2005 data sample all firm-year observations that can be influenced by one or more of the following instances: (1) they already report estimates of working capital components, or (2) managers make voluntary accounting changes that affect operating income or working capital accounts, or

(3) goodwill increases from year to year. The authors choose two measure reflecting the asset growth effect: a) growth in long-term net operating assets and b) excess capital expenditures. In addition, they also choose two measures reflecting the accrual effect: a) total accruals (TACC) calculated as growth in operating working capital accounts less current-period depreciation and amortization expense, deflated by average total assets and b) abnormal accruals (AACC) estimated by using an augmented modified Jones model that further controls for profitability and growth.

The authors find evidence that accounting manipulations, which are better captured when using AACC as a proxy for the accrual anomaly, can indeed drive the accruals anomaly. AACC has proved to outperform TACC, and be more independent of the asset growth effects. Finally, their analysis does not report any evidence suggesting that the accruals anomaly could be a manifestation of the asset growth anomaly and thus the conclude that they are two distinct effects.

Li and Sullivan (2011) revisit their initial study of the asset growth anomaly by investigating whether the accruals and asset growth anomalies can be attributed to higher arbitrage risks due to the lack of close substitutes. More specifically, they aim to examine the occurrence and behavior of these two anomalies in association with high IVOL, a measure suggested to best represent limits to arbitrage. Their paper contributes to the existing literature in the sense that in their effort to better explain the persistence of the accruals and the asset growth effects, their findings will also provide insights to differentiate whether these effects are driven by investor mispricing or from systematic market risk. If the anomaly under examination is attributable to systematic risk, then, according to the CAPM and the efficient market hypothesis, the excess returns can be treated as fair compensation to investors bearing the relevant risk. If the mispricing is due to an imperfection such as investor irrationality linked to the anomaly, then the excess returns should be treated as transitory excess returns, since investors at some point in time will realize their misevaluation and arbitrage away any excess return.

Their analysis indicates that the return pattern for both effects occurs largely among stocks exhibiting high IVOL, which in turn indicates that arbitrageurs have to deal with higher arbitrage risk deriving from a lack of close substitutes. Therefore, one could argue that both anomalies' persistence can be attributed to the difficulty to be arbitraged away (due

to the fact that the high arbitrage risks lead to high arbitrage costs). Their overall conclusion is that investors pursuing to exploit the accrual and asset growth effects must face the greater uncertainty in outcomes in the sense that in cases where the arbitrage risk is higher due to the lack of close substitutes, they may not be able to outperform the market on an after-cost basis even if there is an apparent notable mispricing and it persists over time.

Collins et al. (2012) motivated by McNichols' (2000) observation that there are puzzling effects of growth on discretionary accrual estimates, aim to investigate the impact of firm growth on earnings management detection research designs. Their contribution comes from the following findings: Firstly, by incorporating multiple partitioning variables (namely, stock splits, SEOs, stock acquisitions, equity-based compensation, and insider trading) used in prior research for the detection of earnings management, they aim to provide insights on how these variables are associated with firm growth measures and thus in turn, they aim to provide evidence on how average discretionary accrual estimates may fluctuate in these settings after controlling for firm growth. They find evidence that the resulting measurement error results in an over rejection of the null hypothesis of no earnings management in these setting. Secondly, by examining random samples including firms not identified to be earnings manipulators categorized by growth, they report a severe bias (high Type I error rates) in tests for earnings management on quarterly bases that do not adequately consider growth's impact, even in models that correct for accruals' noise reduction and timely loss recognition roles (Ball and Shivakumar, 2006) in samples over-represented by either high growth or low growth firms.

More specifically, they report that the traditional discretionary accrual measures deriving from the Jones or the modified-Jones models with ROA matching are highly misspecified in both high growth and low growth subsamples of firm-quarters. In addition, they find evidence models considering matching on sales growth introduces very little downward bias in discretionary accrual estimates in cases when firms engage in revenue manipulation and that the reversal methodology proposed by Dechow et al. (2012), with the purpose of having greater power than matching procedures in annual settings, does not enhance test power in quarterly settings, where the number of quarters over which reversals occur is less certain and the analysis is perplexed by seasonality. Finally, their simulations indicate that Jones-type model discretionary accrual estimates adjusted for accruals' noise reduction role and asymmetric timely loss recognition as well as and

matched on both performance (ROA) and sales growth (SG) results in well specified tests. From all the above mentioned, the scholars highlight the importance of adjusting for performance and firm growth as well as accruals‘ noise reduction role and for asymmetric timely loss recognition when testing for earnings management, particularly in settings where the partitioning variable can be associated with firm growth and in quarterly settings where seasonality is likely to affect the dynamics of the accrual process.

Hardouvelis et al (2012) examine the interaction-relation between the value/growth anomaly and a subcomponent of the asset growth anomaly, namely the external financing anomaly. More specifically, the scholars investigate whether market participants are essentially dealing with two distinct effects (or one) due to the presence of earnings management. Thus, their underlying null hypothesis is that both the value/growth and the external financing effects result from a common source, whereas their alternative hypothesis is that these two effects are attributed to separate sources, including engaging in earnings management. Their contribution to the existing literature is twofold: a) they incorporate in their analysis, measures of the net amount of cash generated by both equity and debt financing activities using a balance sheet approach, which in turn enables them to concurrently investigate the interactions of unified and individual financing transactions with value/growth indicators; b) their research design is established so as to allow the incorporation of particular accounting decompositions for variables reflecting either expectational errors or distress risk. In particular, their research design includes: a) variables encompassing various financial features with an economic significance, such as leverage and accruals, enable them to assess the cross-sectional returns’ patterns related to net external financing activities, value/growth indicators as well as their interactions; and b) their decomposition of accruals driven by growth and those driven by earnings management enables them to consider the occurrence of opportunistic earnings manipulation.

To accomplish the latter, the authors follow the methodology proposed by Richardson et al (2006), who decomposed accruals into a growth component, an efficiency component and an interaction component. The growth component represents accruals driven by sales growth. The efficiency component reflects accruals driven by earnings management or less efficient exploitation of existing capital and the interaction component reflects correlated changes between sales growth and accounting distortions. Hence, if the two effects are associated, the growth component should exhibit an explanatory power over

the stock returns related to external financing indicators, conditional on value/growth indicators. Furthermore, if the efficiency component also exhibits an explanatory power over those stock returns, one could suggest that there are partial distinctions between the effects. However, the scholars note that this decomposition is sensitive to misspecification bias.

Their overall findings support the notion that the two anomalies are distinct from each other probably due to opportunistic earnings manipulation on the part of issuing firms. More specifically, the observed stock return pattern of the value/growth effect is intensified only when repurchasers (or issuers) are considered. Furthermore, their results indicate that value repurchasers exhibit both low sales growth and high earnings quality, whereas growth issuers exhibit high sales growth and low earnings quality. Finally, the authors conclude that earnings quality has a predominant role on the predictability of stock returns, in subsequent periods of external financing activities, which in turn suggests that the external financing indicators can be incrementally informative to value/growth indicators for future returns.

CHAPTER 3

METHODOLOGICAL FRAMEWORK AND DATA DESCRIPTION

The present chapter consists of two parts. In the first part, using an integrated European stock market sample from 21 countries during the period 1988-2016, we directly assess whether the asset growth anomaly can be attributed to risk or mispricing. In the second part, we investigate whether the asset growth anomaly is driven by accounting-related factors or by growth-related factors, or both. However, since we incorporate cross-country analysis, we exclude from our sample 6 countries due to their limited number of observations. Thus, in the second part, we use firms from 15 European Union countries (plus Switzerland). Those countries are homogeneous in terms the status of the economy (i.e., classified mainly as advanced economies), legal tradition (i.e., classified mainly as code low countries), and accounting regimes (i.e., adopt IFRS since 2005). However, they share large variation in other characteristics capturing aspects of market efficiency, limits to arbitrage, corporate governance and earnings management, that enables us to develop hypotheses regarding the ability of the components of our asset growth decomposition to predict future returns, conditional on existing explanations of the asset growth anomaly.

3.1 Is the asset growth anomaly attributed to risk or mispricing?

3.1.1 Methodological framework

Following the consensus that investors overreact to changes in firms' future business prospects implied by asset expansions or contractions and thus, leading in an investors' systematic misvaluation, we recognize that using an indicator variable that is perceived to reveal signals of undervaluation and overvaluation, should aid to identify ex ante mispriced stocks with low and high asset growth rates. Following Bali et al. (2010), we employ net equity financing activities as an indicator variable, which according to the existing literature is an important predictor of stock returns in the cross-section.

We focus on the interactions of asset growth rate and net equity financing activities and on stock return predictability. An extensive body of literature documents a negative relation between equity financing activities and future stock returns, the so called “new issues puzzle”: activities issuing (purchasing) equity are associated with low (high) future returns. Some studies claim that the new issues puzzle reflects systematic security mispricing[18], while other studies argue that it reflects a rational premium for higher risk[19]. Analysis of the interactions of asset growth rate and net equity financing activiti**e**s is motivated by the fact that it could allow us to identify whether the asset growth effect is driven by mispricing or risk.

Extrapolating the argumentation in Bali et al. (2010), low asset growth purchasers - high asset growth issuers reveal congruence in the valuation signals. Thus, the conditional probability that each valuation signal is due to mispricing, rather than noise, is high. On the other hand, low asset growth issuers - high asset growth purchasers reveal incongruence in the valuation signals. In this case, the power of each signal to identify mispricing is mitigated as the disagreement between the signals implies that signal is more likely to be due to noise.

At a portfolio level, to support the notion that combining low-high asset growth and issue-repurchase indicators improves our ability to identify mispriced shares, we expect the following return patterns: low asset growth purchasers should significantly outperform high asset growth issuers, but low asset growth issuers should not significantly outperform high asset growth purchasers.

However, the above return patterns could also be generated if low-high asset growth and issue-repurchase indicators reflected relatively independent aspects of equity risk. For example, low-high asset growth indicators may rank firms based on their loadings on total asset growth risk factor, whereas issue/purchase indicators may rank firms on their loadings on a different risk factor.

[18] Loughran and Ritter (1995) among others, attribute the anomaly to managerial market timing, while Rangan (1998) and Teoh et al. (1998) to misunderstanding of opportunistic managerial behaviour.

[19] Eckbo et al. (2000) argue that the new issues puzzle represents compensation for higher distress risk, while Shivakumar (2000) rational correction for earnings management.

Further, in favor of mispricing we expect to find at the individual level of our empirical analysis (i.e., cross-sectional regressions) a negative and significant relation between total asset growth rate and subsequent returns only within the subsample, where the asset growth and the issue/purchase indicators point in the same direction (concurring signals). In the case of conflicting signals, the subsample where the signals are noisier, we expect the effects of both indicators on stock returns to weaken and possibly become insignificant.

To investigate whether the asset growth anomaly can be attributable to mispricing, we also employ Piotroski and So's (2012) proposed market expectation errors approach that is based on the interactions between the asset growth rate and Piotroski's (2000) FSCORE. This approach provides a more general overview of how investors assess and interpret the information contained in reported accounting figures. Piotroski and So (2012) find that the difference in subsequent returns between value and growth firms (i.e., the value premium) in the U.S. stock market exists among firms with existent market expectation errors, i.e., among value firms with strong fundamentals and growth firms with weak fundamentals.

A mispricing-based explanation suggests optimistic (pessimistic) expectations about future performance for high (low) asset growth firms. Under this view, the asset growth effect captures price corrections arising from the reversal of these expectation errors. In other words, expectation errors should be concentrated among firms where fundamentals (as implied by FSCORE) differ from the expectations implied by total asset growth rate. Notably, the largest asset growth effect will occur where expectations implied by FSCORE are "incongruent" with expectations implied by the firms' total asset growth rate. On the other hand, under a risk-based explanation, the predictive ability of asset growth for future returns should not depend on the congruence of valuation signals and market expectation errors, since the higher returns of firms with low asset growth rates relative to firms with high asset growth rates simply constitute compensation for higher risk.

Thus, in favor of mispricing we expect to find that a negative and statistically significant relation between total asset growth and subsequent stock returns, only when we have congruence in the valuation signals and market expectation errors. In contrary, under a rational framework, the predictive ability of asset growth for future returns should not

depend neither on the congruence of valuation signals nor on market expectation errors, since the higher returns of firms with low asset growth rate relative to firms with high asset growth rate simply constitute compensation for higher risk.

Finally, in order to directly examine whether asset growth is a priced risk factor we employ the common two-stage cross-sectional regression (2SCSR) methodology (Gray and Johnson, 2011). If total asset growth is a priced risk factor, then its factor risk premium should be positive and statistically significant.

3.1.2 Data Description

Our data covers an integrated European stock market sample consisting of nonfinancial listed firms from 21 countries namely: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey and The United Kingdom. We collect all accounting data and monthly returns of common stock from Worldscope[20] and Datastream International for the period 1988 - 2016. Financial firms are excluded because the distinction between operating and financing activities is not clear for these firms. Following the methodology proposed by Ince and Porter (2006), we exclude firms with stock price return above 300% or less than 50%[21] that is reversed within one month to filter out suspicious stock returns. To mitigate the impact of outliers in accounting figures, we winsorize accounting variables at the 1% and 99% levels. Further, we restrict our sample to firm-year observations without missing data to compute our primary variables of interest (i.e total asset growth, net equity financing activities, size, and book-to market ratio). These criteria yield a final sample size of 60.944 firm-year observations[22].

Total Asset Growth (AG) is the asset growth measure proposed by Cooper et al. (2008), and is estimated as the annual percentage change in total assets (Worldscope data item

[20] We select common stocks that are listed on the major stock exchange (s) in each country. Furthermore, we include in our sample both active and inactive firms in order to avoid survivorship bias.
[21] Following the proposed methodology, if Rt or Rt-1 is greater than 300% and (1 + Rt)(1 + Rt-1) - 1 is less than 50%, both returns are discarded.
[22] Our sample is reduced further to 47.319 firm-year observations, when we incorporate F-SCORE's deletes.

02999). Net issuance (NEF) is net equity financing and is calculated as the difference between the annual change in total equity (Worldscope data item 03995 and 03426) and net income (Worldscope data item 01551), scaled by average total assets (Worldscope data item 02999) (Dechow et al., 2008, Papanastasopoulos, 2017). Firm's size (SZ) is its market equity measured as of June of each year. Book-to-market (BM) is the ratio of the financial year-end book value of equity (Worldscope data item 03501) to the market capitalization.

FSCORE is a composite measure of the firm's fundamental strength and is constructed following the methodology of Piotroski (2000). The measure is based on the sum of nine binary indicator variables that capture different aspects of the firm's financial strength (or weakness). If the underlying condition is true, the indicator variable gets the value of one, otherwise it gets zero. The nine conditions are: net income before extraordinary items is positive; cash flow from operations is positive; the annual change in return on assets (net income before extraordinary items divided by lagged total assets) is positive; cash flow from operations is greater than net income before extraordinary items; the annual change in leverage (long-term debt divided by total assets) is negative; the annual change in liquidity (current assets divided by current liabilities) is positive; the firm did not issue stocks; the annual change in gross margin (sales minus cost of goods sold divided by sales) is positive, and the annual change in turnover (sales divided by lagged total assets) is positive. High values on FSCORE (between 5 and 9) indicate strong fundamentals, whereas low values on FSCORE (between 0 and 4) indicate weak fundamentals.

The calculation of raw stock returns starts six months after the financial year-end. Stock returns are calculated using the return index provided by Datastream (item RI), which is defined as the theoretical growth in the value of a share-holding unit of equity at the closing price applicable on the ex-dividend date. The raw equity return for a firm at month j is calculated as: $r_j = RI_{j+1}/RI_j - 1$.

To calculate size adjusted returns, each year we form size benchmark portfolios by sorting stocks into quintiles (five equally weighted portfolios by market equity) on firm size. Then, the size adjusted return for a firm is the difference between its monthly raw return and the matching monthly return of the benchmark size portfolio to which the firm belongs. Monthly raw returns on the equal-weighted size portfolios are calculated for the subsequent twelve

months, and the portfolios are rebalanced each year. We also calculate one-year-ahead annual raw and size adjusted stock return using compounded 12-monthly returns.

In the timeseries regressions, we use Fama/French Factors for Developed Markets. To construct the SMB and HML factors, stocks are sorted into two market cap and three book-to-market equity (B/M) groups at the end of each June. Big stocks are those in the top 90% of June market cap, and small stocks are those in the bottom 10%. The B/M breakpoints are the 30th and 70th percentiles of B/M. The independent 2x3 sorts on size and B/M produce six value-weight portfolios, SG, SN, SV, BG, BN, and BV, where S and B indicate small or big and G, N, and V indicate growth (low B/M), neutral, and value (high B/M).

SMB is the equal-weight average of the returns on the three small stock portfolios minus the average of the returns on the three big stock portfolios:

SMB = 1/3 (Small Value + Small Neutral + Small Growth) – 1/3 (Big Value + Big Neutral + Big Growth).

HML is the equal-weight average of the returns for the two high B/M portfolios minus the average of the returns for the two low B/M portfolios:

HML = 1/2 (Small Value + Big Value) – 1/2 (Small Growth + Big Growth).

To construct WML the procedure is similar (i.e. independent 2x3 sorts on size and momentum) , however the size-momentum portfolios are formed monthly. For portfolios formed at the end of month t–1, the lagged momentum return is a stock's cumulative return for month t–12 to month t–2. The momentum breakpoints are the 30th and 70th percentiles of the lagged momentum returns. The independent 2x3 sorts on size and momentum produce six value-weight portfolios, SL, SN, SW, BL, BN, and BW, where S and B indicate small and big and L, N, and W indicate losers, neutral, and winners (bottom 30%, middle 40%, and top 30%).

WML is the equal-weight average of the returns for the two winner portfolios minus the average of the returns for the two loser portfolios:

WML = 1/2 (Small High + Big High) – 1/2 (Small Low + Big Low).

3.2 Is the asset growth anomaly attributed to accounting distortions

3.2.1 Methodological framework

Our objective in this paper is to discriminate between alternative explanations for the negative relation between asset growth and subsequent stock returns. In doing so, we decompose asset growth into a component that captures real investment growth and a component that captures accounting distortions and/or reduced efficiency. The logic of our decomposition is based on the work of Richardson et al. (2006). The starting point of the decomposition is the definition of asset growth (AG) as the percentage change in total assets (TA).

$$AG_t = TA_t - TA_{t-1}/TA_{t-1} = \Delta TA_t/TA_{t-1} \quad (1)$$

We next link investment growth (SG) with the percentage change in sales (SA) and accounting distortions and/or efficiency with the asset turnover ratio (ATR):

$$SG_t = (SA_t - SA_{t-1})/SA_{t-1} = \Delta SA_t/SA_{t-1} \quad (2)$$

$$ATR_t = SA_t/TA_t \quad (3)$$

Then applying some simple algebra, we arrive at the following decomposition of asset growth[23]:

$$AG_t = SG_t - (\Delta ATR_t/ATR_t) - SG_t * (\Delta ATR_t/ATR_t) \quad (4)$$

According to this algebraic identity, sales growth (asset efficiency) has a positive (negative) impact on asset growth. In particular, if asset efficiency remains unchanged, a growth in sales will lead to a proportional growth in assets. Put another way, if asset growth

[23] See the detailed proof of the decomposition at the Appendix A of the paper.

reflects real investment growth, then this growth should be linked with higher sales. In contrary, an asset growth with no change in sales, suggests that this growth is due to a decline in efficiency either because of accounting distortions or because of the less efficient use of existing capital.

The decomposition also contains an interaction term, to capture cases when sales growth and efficiency changes are correlated. A positive correlation between sales growth and changes in asset efficiency suggest economies of scale. A negative correlation between sales growth and changes in asset efficiency suggest diminishing marginal returns to new investment, since an increase in sales will lead to lower sales prices, which in turn will lead to a lower asset turnover (see Richardson et al. 2006).

To sum up, asset growth can be decomposed into a component that is attributable to growth in output and a component that is not attributable to growth in output. The effects of diminishing marginal returns to increased investment should be limited to the growth component. However, we cannot rule out the possibility that the growth component could be also consistent with the opportunistic use of managerial discretion to generate accounting distortions (e.g., managerial violation of sales) that temporarily inflate earnings.

The effects of temporary accounting distortions to manipulate earnings upwards (e.g., overstatement of inventory) and/or reduced efficiency should be mainly picked up by the efficiency component of asset growth. At the same time, we can unambiguously rule out any possibility that the efficiency component could pick up the effects of diminishing returns to scale. The effects of correlated changes diminishing returns to scale and accounting distortions should be captured by the interaction term between the growth component and the efficiency component.

Thus, the predictive ability of the growth component for future returns could be consistent with rationality (i.e., optimal investment suggested by either the q-theory and or the real options theory). At the same time, the predictive ability of the growth component for future returns could be also consistent with irrationality (i.e., misunderstanding of agency related overinvestment and earnings management, and extrapolation bias about future performance).

In contrary, the predictive ability of the efficiency component for future returns could be consistent only with mispricing. As discussed earlier, a possible channel of mispricing is via ignoring earnings management. Another channel is via a slow response of the market to adverse information about firm's business conditions contained in the efficiency component of asset growth.

We need to stress here that we cannot make risk-based assessments about the predictive ability of the efficiency component for future returns for at least two reasons. First, based on the existing literature (e.g., Francis et al. 2004; Kim and Qi, 2010) we expect a negative relation between accounting distortions and risk, which simply suggests a negative effect of the efficiency component on stock returns. Second, it is more likely to expect a negative relation between efficiency and risk, which also suggests a negative effect of the efficiency component on stock returns. However, based on our asset growth decomposition, the efficiency component has a negative impact on asset growth and thus, a positive impact on stock returns.

3.2.1.1 Methodological framework: Testable Hypotheses

In this section, we develop our hypotheses based on the explanations of the asset growth anomaly and our asset growth decomposition into a growth and an efficiency component, which can be linked in different ways with these explanations. We then empirically evaluate these hypotheses using the international data.

The first hypothesis is derived under the rational explanation, which can be linked only with the growth component that captures the effects of diminishing returns to scale. The effects of optimal investment on stock returns are expected to be more (less) pronounced, when stocks are more (less) correctly priced in the cross section of stock returns. Put another way, optimal investment suggested by either the q-theory or the real options theory requires a high degree of market efficiency. Market efficiency is positively related to market development and individualism and negatively related to political risk (e.g., Watanabe et al. 2013; Papanastasopoulos, 2014). This leads to the following hypothesis:

H1: Under the rational explanation of the asset growth anomaly, the sales growth effect on stock returns is expected to be stronger in countries with higher market development, lower political risk and higher individualism[24]*.*

The remaining hypotheses are derived under the mispricing explanation, which can be linked with both the growth component and the efficiency component. Indeed, if the asset growth anomaly is due to various forms of mispricing (e.g., agency related overinvestment; accounting distortions and/or reduced efficiency; errors in expectations), then it is expected to be more prevailing in countries with a low degree of market efficiency. This leads to the following two hypotheses:

H2: Under the mispricing explanation of the asset growth anomaly, the sales growth effect on stock returns is expected to be stronger in countries with lower market development, higher political risk and lower individualism.

H3: Under the mispricing explanation of the asset growth anomaly, the effect of accounting distortions and/or less efficient use of existing capital on stock returns is expected to be stronger in countries with lower market development, higher political risk and lower individualism.

De Long et al. (1990) and Shleifer and Vishny (1997), argue that arbitrage is costly and risky to implement, which may prevent arbitrageurs from trading on systematic misevaluation regularities to exploit them. Thus, if the asset growth anomaly is due to

[24] When considering the rational explanation as prescribed by q-theory, in isolation, one cannot discard the possibility that the asset growth effect on stocks returns should be stronger in countries with low market development due to higher investment frictions and weaker in countries with higher market development due to lower investment frictions. However, as claimed by Titman et al. (2013), a combined q-theory and market discipline story may lead to the opposite prediction. In particular, in countries with higher market development where market disciplines are stronger, managers are more likely to align their investment policies with their cost of equity so as to maximize the value of firm (as suggested by q-theory). In contrary, in countries with lower market development where market disciplines are weaker, firm executives may be more likely to align their investment policies to pursue other objectives (e.g., social objectives), which is not consistent with value maximization. Further, in cases with capital rationing the implications of investment frictions can be reversed. In such extreme cases, investments are determined by the availability of internal capital, since raising external capital is prohibitively costly. Thus, in cases with capital rationing, investment expenditures are independent of the expected return on a firm's stock and they should not have an impact on stock returns.

various forms of mispricing, then it is expected to be more pronounced in countries with severer barriers to arbitrage. We focus on three aspects of limits-to-arbitrage: investor sophistication, information uncertainty and trading frictions (e.g., Lam and Wei, 2011; Lipson et al. 2011). This leads to the following two hypotheses:

H4: Under the mispricing explanation of the asset growth anomaly, the sales growth effect on stock returns is expected to be stronger in countries lower trading volume, lower analyst activity and higher transaction costs.

H5: Under the mispricing explanation of the asset growth anomaly, the effect of accounting distortions and/or less efficient use of existing capital on stock returns is expected to be stronger in countries with lower trading volume, lower analyst activity and higher transaction costs.

As we discuss above, agency related overinvestment and earnings management constitute two prominent channels that generate systematic mispricing of asset growth. We need to stress here that, accounting distortions may not be mutually exclusive and probably could coexist with reduced efficiency. When existing capital is less efficiently used, for instance, firm executives may face mounting pressures to inflate earnings in order to meet analyst forecasts, thereby leading to higher growth in assets (see Chan et. al. 2006). Notably, these channels are associated with weaker corporate governance mechanisms and stronger rampancy of earnings manipulation practices (e.g., Titman et al. 2013; Watanabe et al. 2013; Papanastasopoulos, 2014). Thus, if the asset growth anomaly is driven from misunderstanding agency costs and/or quality of reported earnings, then the asset growth anomaly should be stronger in countries with weaker corporate governance and more room for accounting manipulation. This leads to the following two hypotheses:

H6: Under the mispricing explanation of the asset growth anomaly, the sales growth effect on stock returns is expected to be stronger in countries with lower investor protection, poorer accounting disclosure and greater managerial discretion over earnings.

H7: Under the mispricing explanation of the asset growth anomaly, the effect of accounting distortions and/or less efficient use of existing capital on stock returns is expected to be stronger in countries with lower investor protection, poorer accounting disclosure and greater managerial discretion over earnings.

In the first part of our analysis, where we examined whether the asset growth anomaly is attributable to mispricing or risk, we used an integrated European stock market sample of 21 countries. In the second part, we employ 15 EU countries (plus Switzerland). We excluded from our analysis Czech Republic, Hungary, Luxembourg, Poland and Turkey. As mentioned previously, in the second part of the analysis we employ cross-country analysis thus, we excluded from our initial sample six countries due to their limited number of observations. Furthermore, since, this is the first systematic attempt to investigate whether the asset growth effect is attributable to accounting distortions, we use the same European countries employed in similar studies for comparability reasons.

In this part, we first examine the occurrence of the asset growth anomaly in European stock markets using the reduced sample (21 EU countries for the 1st part vs. 16 EU countries for the 2nd part). In doing so, we control the robustness of our initial results. The analysis employs both regression- and portfolio-based results on future stock returns. Then, we move forward to examine the importance of total asset growth subcomponents (namely, the growth- and the accounting-based factors) behind the occurrence of the asset growth anomaly. Again, our empirical findings are based on both regression- and portfolio-based analysis.

Finally, we employ several country level factors linked to market efficiency, limits to arbitrage, corporate governance and earnings management, in order to assess the ability of the components of our asset growth decomposition to predict future returns, conditional on existing explanations of the asset growth anomaly.

3.2.2 Data Description

Our data covers an integrated European stock market sample consisting of nonfinancial listed firms from 16 countries namely: Austria, Belgium, Denmark, Finland, France,

Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. We collect all accounting data and monthly returns of common stock from Worldscope and Datastream International for the period 1988 - 2016.

To avoid survivorship bias, we select common stocks that are listed on the major stock exchange in each country, from both active and defunct research files of Datastream and Worldscope. Closed-end funds, trust, ADRs, REITs, units of beneficial interest and other financial institutions are excluded from the sample. We also exclude firm-year observations, with no valid data to calculate asset growth, asset growth components, market capitalization, and book-to-market ratio. To mitigate the impact of outliers, we winsorize all accounting variables at the 1% and 99% levels of their distribution. These criteria yield a final sample size of 79,003 firm-year observations.

Asset growth (AG, hereafter) is measured as the annual percentage change in total assets (Worldscope data item 02999). The asset growth component that captures real investment growth (SG, hereafter) is measured as the annual percentage change in sales (Worldscope data item 01001). The asset growth component that captures accounting distortions and/or reduced efficiency (ΔAT, hereafter) is measured as the annual change in asset turnover ratio (i.e., sales to total assets).

The size of a firms is (SZ, hereafter) is measured as the market capitalization (Worldscope data item 08001) at the end of June of each year. Book-to-market (BM, hereafter) is measured as the ratio of the financial year-end book value of equity (Worldscope data item 03501) to the market capitalization.

The calculation of raw stock returns starts six months after the financial year-end. Stock returns are calculated using the return index provided by Datastream (item RI), which is defined as the theoretical growth in the value of a share-holding unit of equity at the closing price applicable on the ex-dividend date. The raw equity return for a firm at month j is calculated as: $r_j = RI_{j+1}/RI_j - 1$. Following the methodology proposed by Ince and Porter (2006), we exclude firms with stock price returns above 300% or less than 50% that are reversed within one month, to filter out suspicious stock returns.

To calculate size-adjusted returns (SRET, hereafter), each year we form portfolios by sorting stocks into quintiles (five equally weighted portfolios) on firm size. Then, the size-adjusted return for a firm is the difference between its monthly raw return and the matching monthly return of the benchmark size portfolio to which the firm belongs. Monthly raw and size-adjusted returns are calculated for the subsequent twelve months and used in portfolio-level tests. For cross-sectional regressions, we also consider one-year-ahead annual size-adjusted stock returns using compounded 12-month buy-hold returns.

Data for country-level variables are from various publicly available sources. The first set of country-level factors is associated with market efficiency and more specifically with market development, political risk and individualism. We consider them, in order to empirically evaluate the predictions of the first three hypotheses (i.e., H1, H2 and H3) developed in our study. In this respect, we employ the annual market capitalization of publicly listed companies as a percentage of GDP (MKTCAP, hereafter) as a proxy for market development. Data for MKTCAP are available from 1975 to 2018 at the website of the World Bank (www.worldbank.org). For each country included in our sample, we consider the average of MKTCAP across time in order to obtain the country's overall indicator of market development. A higher value of MKTCAP indicates a higher level of market development and a higher degree of market efficiency.

Further, we consider the political risk index (PR, hereafter) from the International Country Risk Guide (ICRG), which is the time-series average of monthly estimates on political uncertainty such as government stability and bureaucracy quality. A higher value of PR indicates a lower level of political risk and a higher degree of market efficiency. We also include in our analysis, the individualism index (IDV, hereafter), which is based on cross-country psychological survey conducted by Geert Hofstede (1980, 2001) on IBM employees' attitudes towards their work and private lives. A higher value of IDV indicates a higher degree of market efficiency. Data for IDV are publicly available at the website of Hofstede Centre (http://geert-hofstede.com).

The second set of country-level factors is associated with limits to arbitrage and more specifically with investor sophistication, information uncertainty and trading frictions. We consider them, in order to empirically evaluate the predictions of the fourth and the fifth

hypothesis (i.e., H4 and H5) of the paper. As a proxy of investor sophistication, we consider trading volume (DVOL, hereafter) which is the stock dollar trading volume averaged across firms. A higher value of DVOL is associated with less severe barriers to arbitrage. Data for DVOL are taken from Watanabe et al. (2013).

As a proxy of information uncertainty, we consider analyst activity (ANALYST, hereafter). By extensively using and scrutinizing information from financial statements, analysts create pressure for corporate insiders firms to report financial information of higher quality (e.g., Lang et al. 2003; Fang, 2008). ANALYST is the first principal component of analyst forecast accuracy and the number of analysts following the firm. A higher value of ANALYST index is presumed to have a negative impact on information uncertainty and thus, is associated with less severe barriers to arbitrage. Data for ANALYST are taken from Isidro and Raonic (2012). As a proxy of transaction costs, we employ the trading frictions index (TCOST, hereafter) estimated by Chan et al. (2005) using data from Elkins-Sherry Co. The index is based on trading cost analysis for pension funds, investment managers, and brokerage houses. A higher value of TCOST indicates more severe limits to arbitrage.

The third set of country-level factors is associated with corporate governance and earnings manipulation. We consider them, in order to empirically evaluate the predictions of the final two hypotheses (i.e., H6 and H7) developed in our study. To capture corporate governance we focus on investor protection and accounting disclosure. We proxy investor protection, by using the business sophistication (BUSOPH) score (BUSOPH, hereafter) from the Global Competitiveness Index (World Economic Forum, 2007). BUSOPH reflects the quality of the country's business networks and supporting industries. The score varies from one to seven with higher values allocated to countries with a higher degree of economic development. Economic development and competition have a positive effect on firms' reporting quality and thus, a higher value of BUSOPH is associated with stronger investor protection. We also proxy investor protection, by considering an index of the quality of accounting standards (ACCT, hereafter). The accounting standards index (ACCT) is constructed by La Porta et al. (1998), based on the reporting or omission of 90 items from corporate annual reports. A higher value ACCT is associated with richer and more accurate accounting disclosure, and thus, with stronger investor protection.

Finally, we employ the earnings management score (EM, hereafter) estimated by Leuz et al. (2003), as a proxy of managerial discretion over earnings. The score is the average rank across the following four measures: the median and standard deviation of operating income and operating cash flows; the Spearman correlation between the change in accruals and the change operating cash flows; the median of the absolute value of accruals and the absolute value of operating cash flows; the number of firms reporting small profits divided by the number of firms reporting small losses, within a country. A higher value of EM indicates greater managerial discretion over earnings[25].

[25] We also employ in our analysis the updated earnings management scores provided by Leuz (2010) for the period 1990–1999 and for the period 1996–2005, and find qualitatively similar results.

CHAPTER 4

EMPIRICAL RESULTS

The present chapter, naturally, also consists of two parts. In the first part, we present our findings on whether the asset growth anomaly can be attributed to risk or mispricing. In the second part, we provide evidence on whether the asset growth anomaly is driven by accounting-related factors or by growth-related factors, or both.

4.1 Is the asset growth anomaly attributed to risk or mispricing?: Empirical evidence

4.1.1 Returns of asset growth strategies

In this section, we examine the existence of the well-documented asset growth phenomenon conditional to the firm's equity financing activities. We first document the baseline results for our sample and then further examine the sensitivity of our findings with respect to size segmented returns.

4.1.1.1 Baseline results

Our analysis begins at the portfolio level. Each June, we form portfolios by sorting stocks based on total asset growth, net issuance, and both variables. First, at the end of June of each year t stocks are allocated into quintiles (five equally weighted portfolios) based on annual asset growth rates and portfolios are formed from July of year t to June of year t+1. Monthly raw and size-adjusted returns on the equal-weighted portfolios are calculated for the subsequent twelve months, and the portfolios are rebalanced each year. A firm is classified as a low total asset growth firm if its total asset growth falls into the lowest-ranked quintile portfolio and as a high total asset growth firm if its total asset growth falls into the highest-ranked quintile portfolios. Then, at the end of June of each year t stocks are independently allocated into issuers and purchasers based on the sign of their corresponding NEF value. A firm is classified as a purchaser if its net issuance is negative

and as an issuer if its net issuance is positive. Companies with zero net issuance are exempt. We split each of the five asset growth portfolios into two NEF portfolios in order to form the interactive portfolios. One portfolio is generated for the negative NEF values (buyers) and the other for the positive NEF values (issuers).

Table 4.1.1.1:1 below presents average monthly raw and size-adjusted returns of the univariate and bivariate portfolios sorted on total asset growth and net equity financing activities.

Table 4.1.1.1:1 Univariate and bivariate portfolios

Portfolio	Raw Returns		Size adjusted returns		Characteristics			
	Mean	(t-Statistic)	Mean	(t-Statistic)	AG	NEF	SZ	BM
Panel A: Univariate portfolios								
Low AG	1.29%	(4.47)	0.22%	(2.83)	-0.16	-0.02	11.60	-0.60
High AG	0.65%	(2.14)	-0.36%	(-4.21)	0.79	0.13	12.01	-0.71
L - H AG	0.63%	(4.46)	0.58%	(4.20)				
Purchaser	1.15%	(4.59)	0.15%	(3.85)	0.05	-0.06	12.62	-0.72
Issuer	0.72%	(2.38)	-0.32%	(-4.78)	0.38	0.14	11.90	-0.59
P - I	0.43%	(4.13)	0.48%	(4.75)				
Panel B: Bivariate portfolios								
L. AG. P	1.29%	(4.52)	0.25%	(2.66)	-0.16	-0.10	11.92	-0.58
L. AG. I	1.12%	(3.35)	0.01%	(0.06)	-0.18	0.13	11.16	-0.81
H. AG. P	1.02%	(3.58)	0.02%	(0.20)	0.45	-0.05	12.50	-1.06
H. AG. I	0.46%	(1.42)	-0.57%	(-5.59)	0.93	0.22	11.79	-0.58
L. AG. P - H. AG. I	0.83%	(5.14)	0.83%	(5.19)				
L. AG. I - H. AG. P	0.10%	(0.50)	-0.01%	(-0.06)				

The table presents average monthly raw and size adjusted returns for univariate sorts based on total asset growth and net issuance as well as bivariate sorts based on both variables. L – H AG is the return difference between low asset growth firms and high asset growth firms. P – I is the return difference between firms classified as purchasers and issuers. L. AG. P – H. AG. I is the return difference between low asset growth firms that are also purchasers and high asset growth firms that are also issuers. L. AG. I – H. AG. P is the return difference between low asset growth firms that are also issuers and

high asset growth firms that are also purchasers. The t-statistic for the average monthly returns is given in parentheses. AG is total asset growth, NEF is net issuance, SZ is firm size measured as of June of each year and BM is the ratio of book equity to market equity.

First, univariate sorts in Panel A of Table 4.1.1.1:1 verify a statistically significant asset growth effect and a net issuance effect, both well documented in the existing literature. In raw returns, low asset growth firms outperform high asset growth firms by 0.63 percent per month or size-adjusted returns by 0.58 percent per month. Firms classified as purchasers are rewarded with higher subsequent returns, while firms identified as issuers are penalized with lower subsequent returns, resulting in a statistically significant raw return difference of 0.43% per month or 0.48% per month in size-adjusted returns.

Having established that European stock returns significantly vary with total asset growth and net issuance, using univariate sorts, we further the return predictability using bivariate sorts is further investigated in Table 4.1.1.1:1 in Panel B. Speicifcally, we examine the relation between total asset growth and subsequent stock returns depending on whether the firm purchases own stocks or issues new equity. L. AG. P – H. AG. I is the return difference between low asset growth firms that are also purchasers and high asset growth firms that are also issuers. L. AG. I – H. AG. P is the return difference between low asset growth firms that are also issuers and high asset growth firms that are also purchasers.

Bivariate sorts validate that the return difference between low-high asset growth firms differs according to their classification as issuers or purchasers. An investment strategy that takes a long position in low asset growth firms that purchase stocks and a short position in high asset growth firms that issue stocks is rewarded with a large and highly significant positive return difference of 0.83% per month both in raw returns and size adjusted returns. In contrast, an investment strategy that takes a long position in low asset growth firms that issue stocks and a short position in high asset growth firms that purchase stocks results to statistically insignificant returns. As we can observe from Panel B of Table 4.1.1.1:1, the superior returns of low asset growth relative to high asset growth firms are magnified when low asset growth purchasers - high asset growth issuers are considered. Thus, the enhancement of the total asset growth ratio with the information captured by net issuance seems to strongly influence the observed return differences.

According to the portfolio characteristics low asset growth firms are slightly smaller than high asset growth firms in terms of market equity (e.g., Fama and French, 1992). Firms that purchase stocks are slightly larger than firms that issue stocks (e.g., Hovakimian et al., 2001). In bivariate sorts, we can observe that firms belonging to the L.AG.P or L.AG.I portfolios have on average very similar total asset growth ratios, whereas firms belonging to the H.AG.P or H.AG.I portfolios exhibit large differences in total asset growth ratios. Thus, the high returns to the L. AG. P – H. AG. I strategy can be attributed to a wider spread in the total asset growth characteristic. Furthermore, we observe that high asset growth firms are on average issuers, whereas low asset growth firms are on average purchasers.

4.1.1.2 Size segmented results

Although we control for a possible size effect in average returns by forming size-adjusted returns, it is interesting to know whether our baseline findings hold across small and large firms. Thus, we divide our sample into two size groups and recreate the analysis from Table 4.1.1.1:1 for a segmented sample of small firms and a segmented sample of large firms. The returns are calculated on a size adjusted basis. A firm is identified as small if its June market equity is below the median and as large if its June market equity is above the median. Table 4.1.1.2:1 below reports average monthly size adjusted returns for univariate sorts based on total asset growth and net issuance (Panel A). Bivariate sorts based on total asset growth and net issuance are reported in Panel B of Table 4.1.1.2:1.

Table 4.1.1.2:1 Size-segments univariate and bivariate portfolios sorts based on total asset growth and net issuance.

Portfolio	**Small firms**		**Large firms**		**Full sample**	
	Mean	**(t-Statistic)**	**Mean**	**(t-Statistic)**	**Mean**	**(t-Statistic)**
Panel A: Univariate portfolios						
Low AG	0.30%	(3.00)	0.10%	(2.83)	0.22%	(2.83)
High AG	-0.47%	(-4.33)	-0.22%	(-4.21)	-0.36%	(-4.21)
L - H AG	0.77%	(4.55)	0.32%	(4.20)	0.58%	(4.20)
Purchaser	0.21%	(3.21)	0.11%	(3.15)	0.15%	(3.85)
Issuer	-0.33%	(-4.06)	-0.30%	(-4.51)	-0.32%	(-4.78)

P - I	0.54%	(4.04)	0.41%	(4.46)	0.48%	(4.75)
Panel B: Bivariate portfolios						
L. AG. P	0.35%	(2.54)	0.17%	(1.95)	0.25%	(2.66)
L. AG. I	0.08%	(0.42)	-0.26%	(-1.63)	0.01%	(0.06)
H. AG. P	0.12%	(0.71)	0.04%	(0.37)	0.02%	(0.20)
H. AG. I	-0.64%	(-4.87)	-0.44%	(-4.28)	-0.57%	(-5.59)
L. AG. P - H. AG. I	0.99%	(4.74)	0.83%	(3.83)	0.83%	(5.19)
L. AG. I - H. AG. P	-0.04%	(-0.15)	-0.01%	(-1.44)	-0.01%	(-0.06)

The table presents average monthly size adjusted returns of portfolios formed on univariate sorts based on total asset growth and net issuance as well as bivariate sorts based on both variables. The results are reported on the basis of small firms, large firms, and on a full sample level. Firms are assigned to small firms if their June market equity is below the median and to large firms otherwise. L – H AG is the return difference between low asset growth firms and high asset growth firms. P – I is the return difference between firms classified as purchasers and issuers. L. AG. P – H. AG. I is the return difference between low asset growth firms that are also purchasers and high asset growth firms that are also issuers. L. AG. I – H. AG. P is the return difference between low asset growth firms that are also issuers and high asset growth firms that are also purchasers. The t-statistic for the average monthly size adjusted returns is given in parentheses.

Contrary to the evidence of Fama and French (2008), the univariate portfolio sorts show that there is a robust low asset growth – high asset growth return difference among small firms as well as large firms in European stock markets. For the segmented sample of small firms, the size-adjusted monthly return difference is 0.77%. For the segmented sample of large firms, the size-adjusted monthly return difference is 0.32%. However, Cooper et al (2008) through their extensive tests, report evidence of a significant asset growth effect among all size segments. Low asset growth firms significantly outperform high asset growth firms in both size groups. Furthermore, new equity financing activities produce large and highly significant size adjusted hedge returns in all size groups (Fama French, 2008).

In the subsample of large firms, the return difference of a long-short investment strategy based on net equity financing activities is larger than the one produced by a long -short investment strategy based on total asset growth. Cooper et al (2008) provide evidence that the asset growth effect is particularly strong among small firms, whereas net issuance effect is strong among large firms.

The bivariate portfolio sorts document that our previous findings are not limited to small firms. The size-segmented results are qualitatively similar to the main evidence presented

in Panel B of Table 4.1.1.1:1. An investment strategy that goes long in low asset growth firms that are also purchasers and goes short in high asset growth firms that are also issuers (L. AG. P – H. AG. I) leads to large and highly significant size-adjusted return differences of 0.99% per month among small firms and 0.83% per month among large firms. However, low asset growth issuers do not outperform high asset growth purchasers in neither of the two size groups. The reported return differences on the L. AG. I – H. AG. P strategies are indifferent from zero.

Overall, our initial findings are robust across firm size. The low asset growth – high asset growth strategy in European stock markets, can be significantly enhanced by incorporating the information captured by equity financing activities, and works both in small and large cap firms.

4.1.2 Timeseries regressions

In this subsection, we examine whether the abnormal return differences reported in Table 4.1.1.1:1 can be explained by other documented return drivers. We employ the Fama-French (1993) three factor model and the Carhart (1997) four factor model. Therefore, we regress the monthly returns of the univariate portfolios (L.AG – H.AG and P-I) and the bivariate portfolios (L.AG.P – H.AG.I and L.AG.I – H.AG.P) on the Fama-French (1993) three factors, the market risk premium (MKT), the value factor (HML), and the size factor (SMB). We run the same timeseries regressions using the augmented four factor model of Carhart (1997), which includes a fourth factor capturing the momentum effect (UMD)[26].

Table 4.1.2:1 Three factor model and four-factor timeseries regressions, excess returns.

Panel A: Three factor Fama and French (1993) timeseries regressions			
	Intercept	**t-stat**	**R adj**
L.AG-H.AG	0.004	(2.76)	0.302
P-I	0.003	(2.80)	0.318
L. AG.P - H. AGr.I	0.006	(4.02)	0.312

[26] The risk factors for our European stocks sample are obtained by Kenneth R. French website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library

L. AG.I - H.AG.P	0.000	(0.05)	0.090
Panel B: Four factor Carhart (1997) timeseries regressions			
	Intercept	**t-stat**	**R adj**
L.AG-H.AG	0.005	(3.88)	0.293
P-I	0.004	(4.42)	0.266
L. AG.P - H. AG.I	0.007	(5.02)	0.304
L. AG.I - H.AG.P	0.000	(-0.21)	0.087

The table presents the results from the timeseries regressions of the Fama-French factors in Panel A and the Carhar four factors in Panel B. The L.AG–H.AG strategy takes a long position in low asset growth firms and a short position in high asset growth firms. The P-I strategy takes a long position in purchasers and a short position in issuers. The L.AG.P–H.AG.I strategy takes a long position in low asset growth firms that are also purchasers and a short position in high asset growth firms that are also issuers. The L.AG.I–H.AG.P strategy takes a long position in low asset growth firms that are also issuers and a short position in high asset growth firms that are also purchasers. The table shows the alpha estimates along with their t-stats and the respective R-adj. .,**,*** denotes statistical significance at the 10%, 5%, and 1% level respectively.*

As we can observe in Table 4.1.2.1:1, the two timeseries regressions give us similar results. We see that in all the panels the intercepts from the factor regressions are positive and significant when we regress monthly univariate portfolio returns on the other documented return drivers. The intercepts remain positive and statistically significant in the regressions where, our dependent variable is the monthly return differences of L.AG. P – H.AG. I portfolio. However, when we regress the monthly return differences of L.AG. I – H.AG. P on the other documented common risk factors, the intercepts are statistically indifferent from zero. Taken together, the results in Table 4.1.2.1:1 indicate that there might be a missing risk factor.

4.1.3 Is Asset Growth more consistent with a risk or a mispriced based explanation?

Although our findings are consistent with the hypothesis that combining low-high asset growth and issue-purchase indicators enhances our ability to recognize mispriced securities, they could also be created if relatively independent aspects of equity risk were represented by low-high asset growth and issue-purchase indicators. For example, low-high asset growth indicators may rank firms based on their loadings on the low/high asset

growth risk factor, whereas issue/purchase indicators may rank firms on their loadings on a different risk factor.

In this section, we investigate whether the return difference between low asset growth purchasers and high asset growth issuers due to risk or mispricing between low asset growth buyers and high asset growth issuers. To discern if the observed return trends are more compatible with a risk-based or mispricing-based explanation, we employ two separate approaches. First, we investigate explanations based on Piotroski and So's (2012) methodology of market expectation errors, that explicitly proxies for mispricing. Then, we also employ the methodological framework of Gray and Johnson (2011) that explicitly tests whether asset growth is a priced risk factor using the common two-stage cross-sectional regression (2SCSR) methodology.

4.1.3.1 Panel-level return predictability

Mimicking bivariate-type portfolios is a strong basis for initially investigating the manner in which average returns vary across the levels of the variable under investigation. On the other hand, if there is any individual stock information then this is "lost" through the process of aggregation. Following this intuition, we investigate the return-predictive power of total asset growth and net issuance at a panel level employing the OLS regression with clustered standard errors to account for the residual dependence created by the time effect and the firm effect[27]. The regressions are estimated for the full stock sample and separately for two subsamples that comprise only of stocks from the bivariate sorts forming the L.AG.P– H.AG.I and the L.AG.I–H.AG.P portfolios.

The stocks from the L. AG. P – H. AG. I portfolio should capture congruence in the valuation signals provided by the total asset growth ratio and the firm's equity financing activities with respect to undervaluation and overvaluation, whereas the stocks from the L. AG. I – H. AG. P portfolio should capture incongruence in the signals. For instance, a

[27]According to Petersen (2009), both OLS and the Fama-MacBeth standard errors are biased downward. He reports evidence that only clustered standard errors are unbiased as they account for the residual dependence created by the firm effect. Thus, we estimate the OLS regression with clustered s.e. on one-dimensional clustering – i.e. separately for a time effect and a firm effect-, as well as on two-dimensional clustering accounting for both a firm and a time effect. The results in all cases are qualitatively the same.

firm being classified as a low asset growth issuer indicates undervaluation based on total asset growth ratio but overvaluation based on the equity financing activity. Following the argumentation in Bali et al. (2010), under the mispricing-based explanation, the return-predictive power of total asset growth should be significant in the congruent subsample, but weak in the incongruent subsample, where the valuation signals are noisier. In contrast, under the risk-based explanation, the return-predictive power of total asset growth should not depend on the considered subsample, as the higher returns to low asset growth firms are generally a compensation of risk**.**

We estimate yearly panel data regressions, using OLS with clustered standard errors, of yearly raw returns on total asset growth (AG), net issuance (NEF), firm size (SZ) and book-to-market ratio (BM) as common control variables. The independent variables in the regressions are updated annually at the end of each June to predict yearly stock returns from July of the current year to June of the subsequent year (forward-looking returns). Table 4.1.3.1:1 documents average coefficient estimates. The reported regressions are estimated for the full stock sample ("All") and separately for two subsamples. The "Congruent" subsample consists only from firms of low asset growth that are also purchasers and high asset growth firms that are also issuers, whereas the "Incongruent" subsample consists only from firms of low asset growth that are also issuers and high asset growth firms that are also purchasers.

Table 4.1.3.1:1 Panel Regressions using OLS with clustered s.e.

	All	**Congruent**	**Incongruent**
AG	-0.080	-0.054	-0.153
	(-3.48)	(-2.94)	(-2.61)
NEF	-0.051	-0.159	0.048
	(-0.56)	(-2.18)	(0.33)
ln(SZ)	0.013	0.013	0.015
	(3.48)	(3.06)	(3.00)
ln(bm)	0.024	0.020	0.016
	(2.47)	(1.82)	(1.29)

The table presents average coefficient estimates derived from panel analysis using OLS regressions with clustered s.e., along with the relevant t-statistics, which are given in parentheses, of yearly raw returns on total asset growth (AG), net issuance (NEF), size

(SZ) and book-to-market (BM). The "All" sample consists of all stocks included in our sample. The "Congruent" subsample consists only from firms of low asset growth that are also purchasers and high asset growth firms that are also issuers, whereas the "Incongruent" subsample consists only from firms of low asset growth that are also issuers and high asset growth firms that are also purchasers.

First, AG exhibits a large negative coefficient, statistically significant in both subsamples, as well as in the full sample. As the explanatory power of AG is therefore independent from the sample considered, our results seem to be more compatible with a risk-based interpretation. Net issuance, unlike total asset growth, retains its forecasting capacity only in a congruent subsample. Our findings are in line with Cooper et al. (2008) who examine the interaction of the asset growth anomaly and equity issuance/ repurchase anomaly. Their results also suggest that the asset growth effect remains strong even after controlling for the effects of equity issuance or repurchases. The figures reported in Table 4.1.3.1:1 suggest that generally when there is any incongruence in the valuation signals provided by the two indicators (namely in the full sample and in the incongruent subsample) total asset growth provides a stronger effect than net issuance.

4.1.3.2 Market expectation errors

The next part of the methodology incorporates Piotroski and So's (2012) market expectation errors approach to explicitly address the mispriced-based explanation. We form bivariate sorts based on total asset growth and Piotroski's (2000) FSCORE and examine whether the information provided by FSCORE changes our results.

The total asset growth ratio in this respect serves as a measure of investor expectations about the future performance of the company. High asset growth firms signal positive expectations on the basis of reasonable argumentation, whereas low asset growth firms signal negative expectations for future results. The FSCORE indicator provides an independent overview of the firm's fundamental strength that derives from the firm's recent financial condition. High FSCORE values signal strong fundamentals (in terms of profitability, financial leverage/liquidity, and operational efficiency). Low FSCORE values signal weak fundamentals. Low asset growth companies should exhibit poor fundamentals, based on the above theoretical construct, while high asset growth companies should exhibit strong fundamentals. There are no market expectation errors when the market expectations indicated by overall asset growth and fundamental strength

match each other. Therefore, the superior returns of low asset growth relative to high asset growth firms are due to low asset growth firms' higher risks. On the other hand, expectation errors occur when fundamental strength (as implied by FSCORE) deviates from the expectations implied by total asset growth rates.[28] Under a mispricing hypothesis, the superior returns of low asset growth relative to high asset growth firm are driven by expectation errors, caused by low asset growth firms with strong fundamentals and high asset growth firms with weak fundamentals.

Piotroski and So (2012) provide U.S. evidence that when value firms with strong fundamentals and growth firms with weak fundamentals are considered (i.e, existence of market expectation errors), the value premium is significantly the largest. However, when value firms with weak fundamentals and growth firms with strong fundamentals are considered (i.e., absence of market expectation errors), there is no value premium in existence. Before we elaborate on mispricing-based arguments, we have to test whether Piotroski and So's (2012) market expectation errors approach also applies to the asset growth anomaly in European stock markets. Therefore, we replicate their main finding that return differences between low and high asset growth firms are the largest when market expectation errors exist.

In doing so, we form each June portfolios by sorting stocks based on total asset growth and FSCORE from the fiscal year ending in the previous calendar year. The portfolio formation on total asset growth is described in Section 3.1.2 "Data Description".

Within each total asset growth quintile, firms are further classified as either with weak fundamentals, if they have a FSCORE between zero and four, or as with strong fundamentals, if they have a FSCORE between five and nine. We use size adjusted monthly returns of the portfolios for the subsequent twelve months, and the portfolios are rebalanced each year.

Table 4.1.3.2:1 documents average monthly size adjusted returns for bivariate portfolios sorted on total asset growth and Piotroski's FSCORE. The column LAG – H.AG presents

[28] The market is assumed to underreact to changes in fundamental strength (Lakonishok et al., 1994).

the return difference between low asset growth firms and high asset growth firms. The column S-W presents the return difference between strong and weak firms, in each case conditional upon the second sorting variable. Existent market expectation errors are measured by taking a long position in low asset growth firms with strong fundamentals and a short position in high asset growth firms with weak fundamentals. No market expectation errors are measured by taking a long position in low asset growth firms with weak fundamentals and a short position in high asset growth firms with strong fundamentals.

Table 4.1.3.2:1 Market expectation errors size adjusted returns

	HAG	**LAG**	**LAG-HAG**
Weak	-0.65%	0.02%	0.67%
	(-4.32)	(0.10)	(3.31)
Strong	-0.23%	0.27%	0.50%
	(-2.77)	(3.44)	(3.69)
S-W	0.42%	0.26%	
	(2.73)	(1.61)	
Existent market expectation errors			0.92%
			(5.26)
No market expectation errors			0.20%
			(1.21)

The table presents average monthly size adjusted returns for bivariate portfolios sorted on total asset growth and Piotroski's FSCORE. The portfolios are formed each June by sorting all stocks included in the sample based on the two variables from the fiscal year ending in the previous calendar year. A firm is assigned to the weak fundamentals' group if its FSCORE is between zero and four. If its FSCORE is between five and nine it is assigned to strong fundamentals' group. LAG – HAG presents the return difference between low asset growth firms and high asset growth firms. S-W presents the return difference between strong and weak firms, in each case conditional upon the second sorting variable. Existent market expectation errors are measured by taking a long position in low asset growth firms with strong fundamentals and a short position in high asset growth firms with weak fundamentals. No market expectation errors are measured by taking a long position in low asset growth firms with weak fundamentals and a short position in high asset growth firms with strong fundamentals. The t-statistics are given in parentheses and they are adjusted for autocorrelation and heteroskedasticity based on the Newey-West methodology.

First, we observe significantly positive return differences between low asset growth and high asset growth firms (L.AG-H.AG) after controlling for fundamental strength. However, we find significantly positive return differences between strong and weak firms (S-W) only in case of high asset growth firms. If we extend our confidence level to 10%, we find significantly positive return differences between strong and weak firms (S-W) even in case of low asset growth firms. Thus, the information about future returns contained in the total asset growth ratio and Piotroski's FSCORE are not similar. In addition, we observe that the return difference between low asset growth and high asset growth firms is the largest when market expectation errors are in existence. The return difference is highly significant and has a magnitude of 0.92% per month in size-adjusted returns, whereas the return difference is effectively zero when there are no market expectation errors. Our findings are consistent with the argumentation of Piotroski and So's (2012) and therefore make the application of their market expectation errors approach suitable for examining the drivers behind the asset growth anomaly in the European stock markets.

Moving forward to our analysis, we replicate the panel regressions described in Table 4.1.3.1:1 taking into account the insights captured by the FSCORE analysis. In doing so, we further divide each sample of congruent and incongruent companies into two subgroups based on Piotroski and So's (2012) market expectation methodology. The "Existent Errors" subsample comprises only of low asset growth firms with strong fundamentals and high asset growth firms with weak fundamentals. The "No Error" subsample comprises only of low asset growth firms with weak fundamentals and high total asset growth firms with strong fundamentals. If there is a return difference between low asset growth purchasers and high asset growth issuers (L. AG. P – H. AG. I Investment strategy) that is driven by mispricing, we expect a significantly negative coefficient estimate on AG for the congruent group only, within the subsample of firms where market expectation errors are in existence.

We estimate yearly panel data regressions, using OLS with clustered standard errors, of yearly raw returns on total asset growth (AG), net issuance (NEF), firm size (SZ) and book-to-market ratio (BM) as common control variables. The independent variables in the regressions are updated annually at the end of each June to predict yearly stock returns from July of the current year to June of the subsequent year (forward-looking returns), and the results are presented in Table 4.1.3.2:2 below.

Table 4.1.3.2:2 Panel Regressions: mispricing - OLS with clustered s.e.

	Congruent		Incongruent	
	Existent errors	**No errors**	**Existent errors**	**No errors**
AG	-0.070	-0.053	-0.216	-0.174
	(-3.41)	(-3.45)	(-2.73)	(-2.23)
NEF	-0.282	-0.233	0.014	-0.097
	(-2.77)	(-2.54)	(0.07)	(-0.87)
ln(SZ)	0.012	0.012	0.015	0.013
	(3.14)	(2.44)	(2.93)	(2.55)
ln(BM)	0.040	0.035	0.014	0.010
	(2.57)	(2.97)	(1.05)	(0.37)

This table presents average coefficient estimates derived from OLS regressions with clustered s.e. along with the relevant t-statistics, which are given in parentheses. The "Congruent" subsample consists only from firms of low asset growth that are also purchasers and high asset growth firms that are also issuers, whereas the "Incongruent" subsample consists only from firms of low asset growth that are also issuers and high asset growth firms that are also purchasers. The regressions within these subsamples are estimated separately for firms with existent market expectation errors and for firms with no expectation errors. Firms with existent errors are low asset growth firms with strong fundamentals and high asset growth firms with weak fundamentals. Firms with no errors are low asset growth firms with weak fundamentals and high asset growth firms with strong fundamentals.

In accordance with our initial regression results in Table 4.1.3.1:1 we find that AG is negative and significant in all four subsamples, while NEF is significant only in the congruent subsample, regardless of market errors existence. An interesting observation is that in the Incongruent subsample, the average coefficient of AG is larger than the one reported in the Congruent subsample, where NEF is also statistically significant. The results suggest that the asset growth effect is more consistent with a rational explanation, and more profound when the evaluation signals captured by NEF are noisier.

Overall, our panel regressions suggest that the drivers behind the asset growth anomaly are likely to be consistent with rationality. First, total asset growth has a forecasting ability among low asset growth purchasers and high asset growth issuers, as well as among low asset growth issuers and high asset growth purchasers. Second, although total asset growth remains statistically significant both in the congruent and the incongruent

subsamples, its predictive ability is stronger where NEF is statistically insignificant and thus, the evaluations signals are noisier. Finally, testing for mispricing based on the market expectation errors approach by Piotroski and So (2012), we find that AG is independent both from the congruence of valuation signals and market expectation errors existence.

4.1.3.3 Testing for a risk-based explanation

In this subsection, we directly test whether asset growth is a priced risk factor using the common two-stage cross-sectional regression (2SCSR) methodology (Gray and Johnson, 2011). First, we employ time-series regressions to estimate factor betas on a set of test assets. Then, factor risk premiums are estimated using a cross-sectional regression. The significance of factor risk premiums indicates whether the proposed risk factors explain cross-sectional variation in returns. As mentioned above, if total asset growth is a priced risk factor then its factor risk premium, namely λ_4, is expected to be positive and statistically significant. Thus, in the first stage, we estimate time-series regressions to obtain factor betas using the common three-factor asset-pricing model augmented with an asset-growth factor:

$$R_{p,t} - R_{f,t} = a_p + \beta_{p,MRP}(R_{m,t} - R_{f,t}) + \beta_{p,SMB}SMB_t + \beta_{p,HML}HML_t + \beta_{p,AG}AGfactor_t + \varepsilon_{p,t}$$

Where $R_{m,t}$ and $R_{f,t}$ are the time t returns on the market portfolio and the risk-free asset, respectively. SMB and HML are Fama–French size and book-to-market factors. AGfactor is a factor-mimicking portfolio based on asset growth. Following the methodology proposed by Gray and Johnson (2011), AGfactor is constructed to be BM neutral. Specifically, first we assign stocks annually into three AG portfolios using the 30th and 70th percentiles as cutoffs. Then, independently, stocks are assigned to three BM portfolios using the 30th and 70th percentiles. Thus, we have nine portfolios cross-sorted on AG and BM. The AGfactor is constructed as the average return on the three low AG portfolios (namely, L.AG Low BM, L. AG Medium BM, L. AG High BM) less the average return on the three high AG portfolios(namely, H. AG Low BM, H. AG Medium BM, H. AG High BM). These portfolios are re-formed annually.

$R_{p,t}$, is the time t returns on test asset p. Two sets of test assets are examined. The first set of test assets is constructed by triplesorting stocks on firm size, book-to-market and asset growth. Using the 30th and 70th percentiles of each characteristic as the annual cutoffs, the 3 ×3 ×3 sorting procedure produces 27 portfolios designed to maximise the cross-section variation in asset growth. The second set of tests assets is constructed by triplesorting stocks on firm size, book-to-market and asset growth, using the previously mentioned procedure, plus a fourth sort on firms' equity financing activities. That is, we further allocate stocks into issuers and purchasers if NEF is positive or negative respectively. The 3 ×3 ×3 × 2 sorting procedure produces 54 portfolios designed to capture the information contained in equity financing activities as well. Monthly returns to the 27 size/BM/AG and 54 size/BM/AG/NEF are calculated for the period 1989–2016 (336 months).

In the second stage, we estimate a cross-sectional regression of the mean excess portfolio returns on the factor betas:

$$\bar{R}_p - \bar{R}_f = \lambda_0 + \lambda_1 \hat{\beta}_{p,MRP} + \lambda_2 \hat{\beta}_{p,SMB} + \lambda_3 \hat{\beta}_{p,HML} + \lambda_4 \hat{\beta}_{p,AG} + v_p$$

Where $\bar{R}_p - \bar{R}_f$ is the time-series mean excess return on test asset p over the sample and $\hat{\beta}_{p,}$ are the factor betas estimated in the first stage. The factor risk premiums are denoted by λ[29]. Under a risk-based explanation λ_4 is expected to be positive and statistically significant. Following the proposed methodology and since the independent variables in the second equation are the estimated factor betas from the first stage timeseries regressions, standard errors of the factor risk premiums are calculated using Shanken's (1992) correction.

Tables 4.1.3.3:1 and 4.1.3.3:2 report the intercepts and slopes from the first stage time-series regressions for the 27 size/BM/AG and 54 size/BM/AG/NEF test portfolios, respectively.

[29] We have to note although, that we replicated the above-mentioned analysis using also monthly time-series excess return on test asset p and the results are qualitatively the same.

Table 4.1.3.3:1 Timeseries intercepts and slopes on 27 size/BM/AG test portfolios.

In stage 1 of the 2SCSR, timeseries regression (2) estimates the intercepts and slopes for each test asset. This table reports the intercepts and slopes for 27 portfolios cross-sorted on firm size, book-to-market and asset growth. Parameters are estimated using monthly returns from 1989 to 2016 (336 months).

$$R_{p,t} - R_{f,t} = a_p + \beta_{p,MRP}(R_{m,t} - R_{f,t}) + \beta_{p,SMB}SMB_t + \beta_{p,HML}HML_t + \beta_{p,AG}AGfactor_t + \varepsilon_{p,t}$$

	Low Asset growth			**Medium Asset growth**			**High Asset growth**		
	Low BM	**Med**	**High BM**	**Low BM**	**Med**	**High BM**	**Low BM**	**Med**	**High BM**
Intercept									
Small	-0.2154	-0.2152	-0.2151	-0.2152	-0.2150	-0.2148	-0.2151	-0.2151	-0.2148
Med	-0.2160	-0.2161	-0.2159	-0.2161	-0.2160	-0.2160	-0.2163	-0.2163	-0.2158
Big	-0.2161	-0.2158	-0.2157	-0.2158	-0.2156	-0.2156	-0.2163	-0.2161	-0.2156
Slope on MRP									
Small	0.0124	0.0124	0.0124	0.0123	0.0123	0.0123	0.0124	0.0124	0.0125
Med	0.0126	0.0125	0.0125	0.0124	0.0124	0.0124	0.0125	0.0126	0.0125
Big	0.0127	0.0125	0.0126	0.0124	0.0123	0.0124	0.0126	0.0125	0.0126
Slope on SMB									
Small	0.0197	0.0196	0.0201	0.0193	0.0192	0.0194	0.0198	0.0195	0.0201
Med	0.0193	0.0194	0.0198	0.0189	0.0189	0.0193	0.0193	0.0193	0.0198
Big	0.0185	0.0185	0.0187	0.0182	0.0182	0.0184	0.0185	0.0184	0.0188
Slope on HML									
Small	-0.0092	-0.0080	-0.0083	-0.0087	-0.0080	-0.0081	-0.0090	-0.0083	-0.0084
Med	-0.0084	-0.0077	-0.0080	-0.0080	-0.0076	-0.0077	-0.0083	-0.0080	-0.0079
Big	-0.0087	-0.0079	-0.0081	-0.0081	-0.0075	-0.0077	-0.0085	-0.0081	-0.0079
Slope on Agfactor									
Small	1.8057	1.6884	1.9189	1.6069	1.5796	1.6571	1.3232	1.3414	1.2639
Med	1.8263	1.7538	1.7756	1.5649	1.5109	1.5965	1.3395	1.3599	1.3650
Big	2.0030	1.8262	1.9353	1.5896	1.5070	1.6277	1.2590	1.2792	1.3462

In Table 4.1.3.3:1, we can observe that for a given size/BM combination, the slope on AGfactor tends to decrease as we move from low asset growth stocks to high asset growth stocks (i.e., reading across each row). For example, the big size/low BM portfolio has betas on AGfactor of 2.0029, 1.5896 and 1.2589 for the low, medium and high AG groupings, respectively.

Table 4.1.3.3:2 Timeseries intercepts and slopes on 54 size/BM/AG/NEF test portfolios.

In stage 1 of the 2SCSR, timeseries regression (2) estimates the intercepts and slopes for each test asset. This table reports the intercepts and slopes for 54 portfolios cross-sorted on firm size, book-to-market, asset growth and net equity financing activities. Parameters are estimated using monthly returns from 1989 to 2016 (336 months).

$$R_{p,t} - R_{f,t} = a_p + \beta_{p,MRP}(R_{m,t} - R_{f,t}) + \beta_{p,SMB}SMB_t + \beta_{p,HML}HML_t + \beta_{p,AG}AGfactor_t + \varepsilon_{p,t}$$

	Low AG Purchasers			Low AG Issuers			Medium AG Purchasers			Medium AG Issuers			High AG Purchasers			High AG Issuers		
	BM			BM			BM			BM			BM			BM		
	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
Panel A																		
Intercept																		
Small	-0.2153	-0.2152	-0.2151	-0.2159	-0.2158	-0.2159	-0.2153	-0.2152	-0.2150	-0.2157	-0.2156	-0.2156	-0.2154	-0.2154	-0.2152	-0.2155	-0.2154	-0.2154
Med	-0.2156	-0.2156	-0.2156	-0.2161	-0.2161	-0.2160	-0.2157	-0.2157	-0.2157	-0.2161	-0.2160	-0.2159	-0.2159	-0.2159	-0.2157	-0.2160	-0.2160	-0.2158
Big	-0.2154	-0.2153	-0.2153	-0.2164	-0.2161	-0.2161	-0.2154	-0.2154	-0.2154	-0.2161	-0.2159	-0.2159	-0.2158	-0.2158	-0.2156	-0.2162	-0.2159	-0.2158
Slope on MRP																		
Small	0.0123	0.0123	0.0123	0.0126	0.0125	0.0126	0.0123	0.0123	0.0123	0.0125	0.0125	0.0125	0.0124	0.0124	0.0124	0.0125	0.0125	0.0126
Med	0.0124	0.0124	0.0124	0.0126	0.0126	0.0126	0.0124	0.0123	0.0123	0.0125	0.0125	0.0125	0.0124	0.0125	0.0124	0.0125	0.0126	0.0125
Big	0.0124	0.0124	0.0124	0.0127	0.0126	0.0127	0.0123	0.0123	0.0123	0.0125	0.0125	0.0126	0.0124	0.0125	0.0124	0.0126	0.0125	0.0126
Slope on SMB																		
Small	0.0192	0.0192	0.0192	0.0195	0.0195	0.0198	0.0191	0.0190	0.0190	0.0194	0.0193	0.0195	0.0193	0.0192	0.0193	0.0196	0.0194	0.0198
Med	0.0191	0.0191	0.0192	0.0193	0.0194	0.0197	0.0189	0.0188	0.0190	0.0192	0.0192	0.0194	0.0191	0.0191	0.0192	0.0193	0.0193	0.0197
Big	0.0187	0.0188	0.0187	0.0190	0.0190	0.0191	0.0186	0.0186	0.0186	0.0189	0.0189	0.0190	0.0189	0.0189	0.0189	0.0188	0.0188	0.0190
Slope on HML																		
Small	-0.0085	-0.0081	-0.0082	-0.0087	-0.0080	-0.0083	-0.0084	-0.0080	-0.0081	-0.0085	-0.0082	-0.0082	-0.0083	-0.0083	-0.0083	-0.0087	-0.0082	-0.0082
Med	-0.0081	-0.0079	-0.0080	-0.0084	-0.0081	-0.0081	-0.0080	-0.0078	-0.0079	-0.0082	-0.0080	-0.0081	-0.0082	-0.0081	-0.0081	-0.0083	-0.0081	-0.0080
Big	-0.0082	-0.0079	-0.0080	-0.0086	-0.0082	-0.0083	-0.0080	-0.0077	-0.0078	-0.0083	-0.0081	-0.0081	-0.0082	-0.0081	-0.0080	-0.0084	-0.0081	-0.0081
Slope on Agfactor																		
Small	1.7067	1.6624	1.7201	1.6488	1.5905	1.7134	1.6594	1.6209	1.6626	1.5215	1.5360	1.5588	1.5666	1.5605	1.5517	1.3562	1.3746	1.3226

Med	1.7234	1.6805	1.6704	1.6508	1.6311	1.6560	1.6555	1.6101	1.6099	1.4859	1.4844	1.5612	1.5594	1.5382	1.5294	1.3728	1.4161	1.4351
Big	1.7882	1.7278	1.7269	1.7281	1.6478	1.7334	1.6879	1.6231	1.6306	1.4734	1.4695	1.5630	1.5432	1.5225	1.5137	1.3244	1.3626	1.4348

Table 4.1.3.3:2 validates the results in Table 4.1.3.3:1. That is, for a given size/BM combination, the slope on AGfactor decreases as we move from low asset growth stocks to high asset growth stocks (i.e., reading across each row). However, issuers exhibit smaller slopes on AGfactor than purchasers. For example, the big size/low BM portfolio has betas on AGfactor of 1.7882, 1.6878 and 1.5432 for the low, medium and high AG purchasers' groupings. The big size/low BM portfolio exhibit betas on AGfactor of 1.7280, 1.4734 and 1.3243 for the low, medium and high AG issuers' groupings.

Table 4.1.3.3:3 presents the results of the 2SCSR. Table 4.1.3.3:3 Panel A reports the average stage 1 time-series estimates of factor betas for each set of test assets. As a base case, the common three-factor model is estimated (i.e., without the AGfactor).

Table 4.1.3.3:3 Two-stage cross-sectional regressions.

Panel A reports estimates from stage 1 time-series regression of monthly portfolio returns (in excess of the risk-free rate) on the three Fama–French factors and the AGfactor. The reported coefficients are the average estimate across the test assets. Two sets of test assets are examined: (i) 54 portfolios cross-sorted on Size, BM, AG and NEF. and (ii) 27 portfolios triple-sorted on Size, BM and AG. Panel B reports estimated coefficient from the stage 2 cross-sectional regression of the mean excess portfolio return on test portfolios on factor betas estimated in stage 1. Standard errors in stage 2 are calculated using the Shanken (1992) correction to reflect the fact that factor betas are estimated in stage 1 time-series regressions.

	Test assets: 54 Size/BM/AG/NEF portfolios				**Test assets: 27 Size/BM/AG portfolios**			
	Three-factor base case		**Three-factor plus AGfactor**		**Three-factor base case**		**Three-factor plus AGfactor**	
	Coefficient	**t-Statistic**	**Coefficient**	**t-Statistic**	**Coefficient**	**t-Statistic**	**Coefficient**	**t-Statistic**
Panel A: Stage 1 timeseries regression of portfolio returns on risk factors								
Intercept	-0.2134	-12.28***	-0.2157	-12.00***	-0.2134	-12.28***	-0.2157	-12.00***
MRP	0.0118	4.96***	0.0125	4.82***	0.0118	5.00***	0.0125	4.82***
SMB	0.0191	4.19***	0.0191	4.26***	0.0191	4.19***	0.0191	4.26***
HML	-0.0052	-0.90	-0.0082	-1.15	-0.0051	-0.90	-0.0082	-1.15
AGfactor			1.5760	0.78			1.5797	0.78
Adj R^2	11.11%		11.49%		11.11%		11.50%	
GRS test	6.20	(p<0.001)	6.18	(p<0.001)	4.22	(p<0.001)	4.25	(p<0.001)
Panel B: Stage 2 cross-sectional regression of returns on factor betas								

Intercept	-0.1854	-8.56***		-0.1885	-10.40***	-0.1871	-3.80***		-0.1957	-2.83***
βp, MRP	-2.3548	-10.43***		-2.2132	-10.85***	-2.2501	-4.81***		-1.7191	-3.32***
βp, SMB	0.3006	3.91***		0.2533	2.94***	0.3286	3.08***		0.2850	2.59***
βp, HML	0.2842	3.11***		0.0777	0.76	0.2796	2.79***		0.0221	0.20
βp, AG				0.0019	8.72***				0.0019	7.05***
Adj R^2	85.48%			88.64%		67.21%			80.39%	

* Statistical significance at 10% level.

** Statistical significance at 5% level.

*** Statistical significance at 1% level.

In all portfolio formations, the MRP and SMB variables have a major contemporaneous relationship with excess portfolio returns. Both in the 27 size / BM / AG and in the 54 size / BM / AG / NEF portfolios, the AGfactor and the HML remain statistically negligible, and the other beta factors remain relatively unchanged from the base case. For each set of test assets, the improvement in the three-factor base model with AGfactor indicates a small improvement in explanatory power.

While Table 4.1.3.3:3 Panel A suggests that returns on the test portfolios are related only to the MRP and SMB common risk factors, the models examined are still incomplete asset-pricing models. The intercepts exhibit the largest coefficient and t statistics. Furthermore, for each model examined, the GRS test statistic overwhelmingly rejects the null hypothesis that the intercepts in the stage 1 time-series regressions are jointly zero across all test portfolios (Gibbons et al., 1989). Augmenting the base three-factor model with AGfactor does not materially lower the GRS statistic. However, as noted by Core et al. (2008), the average coefficient of a given factor in time series regressions conveys the degree and nature of exposure of the test asset to the said factor.

Table 4.1.3.3:3 Panel B reports estimates of the factor risk premiums from the stage 2 cross-sectional regression. The three-factor base cases are presented first, followed by the augmented model with the AGfactor. The results are similar for each set of test assets. The loadings on MRP are negative and statistically significant. Insignificant and/or negative coefficients, however, are typical in tests that use realized returns such as

Petkova (2006) and Fama and French (1992). Thus, all portfolio formations exhibit significantly negative beta estimates in European stock markets. The SMB factor is positive and statistically significant. HML turns to be positive and statistically significant only in cases where the AG factor is not included. Once we augment, our base case three-factor model with the AG factor, the later overpowers HML.

The findings in Fama and French (2015) are close to this finding. In valuation theory, the authors argue that the value factor is a separate factor but find it redundant in the definition of average data returns. The investment CAPM, however, implies that the value premium is just a different expression of the investment effect. Thus, the value factor is redundant in the presence of the investment factor. Finally, of most interest, the loading on AGfactor is positive and statistically significant, suggesting that the asset growth is a priced risk factor. Further, augmenting the base case with AGfactor adds almost 3% to our ability to explain cross-sectional variation in asset returns.

4.2 Is the asset growth anomaly driven by accounting distortions?: Empirical evidence

4.2.1 Summary Statistics on Asset Growth and Asset Growth Components

Table 4.2.1:1 reports summary statistics for asset growth and asset growth components namely: the investment growth component (i.e., sales growth; SG) and the accounting distortions and/or efficiency component (i.e., change in asset turnover ratio; ΔAT) across countries. Starting with the low asset growth portfolio, AG exhibits negative values in all countries. With the exception of Denmark, Ireland, Norway, Sweden and the UK, where it is positive, SG is also negative. ΔAT is positive in ten countries and negative in six countries. In respect to the high asset growth portfolio, all countries exhibit positive AG and SG. With the exception of Netherlands, ΔAT is negative. The differences in AG and SG, between the lowest and the highest asset growth portfolios, are all negative and statistically significant at the 1% level. The differences in ΔAT, between the lowest and the highest asset growth portfolios, are almost all positive and statistically significant at the 1% level (Norway and Portugal constitute exceptions).

Overall, the results from Table 4.2.1:1 suggest that AG increases with SG, while AG decreases with ΔAT. This result is consistent with our decomposition of asset growth, with the positive (negative) effect on asset growth of the investment growth factor (accounting distortions and/or the efficiency factor).

Table 4.2.1:1 Summary Statistics on Asset Growth and Asset Growth Components Across Countries

	Low Asset Growth Portfolio			**High Asset Growth Portfolio**			**Hedge Asset Growth Portfolio (L-H)**		
Country	AG_t	SG_t	ΔAT_t	AG_t	SG_t	ΔAT_t	AG_t	SG_t	ΔAT_t
Austria	-0.133	-0.031	0.073	0.639	1.311	-0.215	-0.772***	-1.343***	0.288***
Belgium	-0.183	-0.043	0.134	0.677	0.687	-0.300	-0.860***	-0.730***	0.434***
Denmark	-0.172	-0.004	0.184	0.591	0.421	-0.232	-0.763***	-0.425***	0.416***
Finland	-0.160	-0.044	0.295	0.511	0.347	-0.028	-0.671***	-0.391***	0.323***
France	-0.155	-0.026	0.181	0.724	0.463	-0.228	-0.880***	-0.489***	0.408***
Germany	-0.186	-0.027	0.420	0.763	0.494	-0.070	-0.949***	-0.522***	0.491***
Greece	-0.138	-0.072	-0.190	0.640	0.384	-0.415	-0.777***	-0.457***	0.225***
Ireland	-0.149	0.003	-0.063	0.762	3.191	-0.215	-0.911***	-3.188***	0.152***
Italy	-0.149	-0.017	-0.236	0.627	0.912	-0.522	-0.776***	-0.929***	0.286***
Netherlands	-0.153	-0.022	0.562	0.698	0.424	0.175	-0.851***	-0.445***	0.387***
Norway	-0.227	0.169	-0.805	1.103	3.048	-0.957	-1.330***	-2.879***	0.151
Portugal	-0.130	-0.019	-0.243	0.498	0.361	-0.299	-0.629***	-0.380***	0.056
Spain	-0.137	-0.046	-0.251	0.587	0.705	-0.472	-0.725***	-0.751***	0.221***
Sweden	-0.226	0.065	0.201	0.910	0.997	-0.504	-1.135***	-0.932***	0.705***
Switzerland	-0.152	-0.034	0.032	0.524	0.405	-0.212	-0.675***	-0.440***	0.245***
United Kingdom	-0.219	0.160	0.227	0.998	0.872	-0.455	-1.217***	-0.712***	0.683***
Country Average (Equally – Weighted)	**-0.167**	**0.001**	**0.033**	**0.703**	**0.939**	**-0.309**	**-0.870*** **	**-0.938*** **	**0.342*** **
Country Average (Participation - Weighted)	**-0.212**	**0.029**	**0.178**	**0.921**	**0.874**	**-0.357**	**-1.133*** **	**-0.845*** **	**0.536*** **
All Countries	**-0.190**	**0.242**	**-0.437**	**0.784**	**1.589**	**-0.794**	**-0.974*** **	**-1.347*** **	**0.358*** **

*The table reports mean values of asset growth (AG), and asset growth components, namely: the investment growth component (i.e., sales growth; SG) and accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT) of portfolios formed on the magnitude of asset growth (AG) over the period 1989-2016. Each year, six months after financial year-end, stocks are allocated into equally weighted quintile portfolios based on asset growth, and time-series averages of characteristics are computed. The country-average portfolios are formed in two ways: a) by putting an equal weight on each country-specific portfolio (country average, equally weighted) and b) by putting weights based on the percentage participation of each country in the overall sample (country average, participation weighted). The all-countries portfolios are formed using the same procedure as the country-specific portfolios, with firms from all countries (i.e., pooled sample). ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

Table 4.2.1:2 reports the pair-wise correlations (Pearson) among AG, SG and ΔAT. Pair-wise correlations between AG and SG are all positive, while between AG and ΔAT are all negative. SG and ΔAT are positively correlated, suggesting

that firms with high sales growth tend to experience increases in asset turnover ratio. This result is consistent with economies of scale and indicates a potentially important function for the interaction term between the component of investment growth and accounting distortions and/or the component of performance.

Table 4.2.1:2 Pair-wise Correlations between Asset Growth and Asset Growth Components

Country	**AG/SG**	**AG/ΔAT**	**SG/ΔAT**
Austria	0.220***	-0.076***	0.097***
Belgium	0.500***	-0.251***	0.067***
Denmark	0.274***	-0.297***	0.080***
Finland	0.282***	-0.245***	0.119***
France	0.482***	-0.277***	0.103***
Germany	0.433***	-0.341***	0.071***
Greece	0.566***	-0.135***	0.250***
Ireland	0.198***	-0.283***	0.006***
Italy	0.237***	-0.237***	0.100***
Netherlands	0.546***	-0.242***	0.076***
Norway	0.291***	-0.090***	0.012***
Portugal	0.248***	-0.097***	0.112***
Spain	0.214***	-0.134***	0.066***
Sweden	0.270***	-0.338***	0.067***
Switzerland	0.255***	-0.188***	0.099***
United Kingdom	0.240***	-0.383***	0.059***
Country Average (Equally – Weighted)	**0.328*** **	**-0.226*** **	**0.087*** **
Country Average (Participation - Weighted)	**0.449*** **	**-0.358*** **	**0.109*** **
All Countries	**0.021*** **	**-0.060*** **	**0.001*** **

*The table reports pair-wise correlations (Pearson) between asset growth (AG), and asset growth components, namely: the investment growth component (i.e., sales growth; SG) and accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT). The country-averages are formed in two ways: a) by putting an equal weight on each country (country average, equally weighted) and b) by putting weights based on the percentage participation of each country in the overall sample (country average, participation weighted). The all-countries row is formed with firms from all countries (i.e., pooled sample). ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

4.2.2 Cross-Sectional Regressions of Abnormal Returns on Asset Growth

Before we elaborate on our asset growth decomposition, we examine the possible occurrence of the negative relation between asset growth and future stock returns in European capital markets. We estimate cross-sectional regressions, with the Ordinary Least Squares (OLS) approach and clustered standards errors at firm level and year level,[30] of one-year ahead annual size-adjusted returns on asset growth, after controlling for the natural logarithm of market capitalization and the natural logarithm of book-to-market ratio. Then, we report the resulting parameter coefficients. To be in line with prior literature, we expect a negative and statistically significant coefficient on AG, validating the negative effect of asset growth on subsequent stock returns. The estimation of the model takes the following form:

$$\mathrm{SRET}_{t+1} = \gamma_0 + \gamma_1 \mathrm{AG}_t + \gamma_2 \ln(\mathrm{SZ})_t + \gamma_3 \ln(\mathrm{BM})_t + u_{t+1}$$

In Table 4.2.2:1, we report separate coefficients for each country, averages of coefficients across countries, and coefficients for all countries combined. The country-averages of coefficients are formed in two ways: a) by putting an equal weight on each country-specific portfolio (country average, equally weighted) and b) by putting weights based on the percentage participation of each country in the overall sample (country average, participation weighted). Finland and Ireland also exhibit negative coefficients but statistically significant at the 10% level. Norway, Portugal and Spain have coefficients statistically indifferent from zero. The country-average coefficient is -0.066 using a simple average and – 0.081 when we use the participation weighted average of each country in the overall sample. When all countries are considered together, the coefficient is -0.064, which is closer to the simple country-average coefficient.

[30] According to Petersen (2009), both OLS and Fama-MacBeth (1973) standard errors are biased downward. Petersen (2009) reports evidence that only clustered standard errors are unbiased, as they account for the residual dependence created by the firm effect. Thus, we estimate the cross-sectional regression with the Ordinary Least Squares (OLS) approach and clustered standard errors on one-dimensional clustering (i.e., separately for a firm effect and a time effect), as well as on two-dimensional clustering (i.e., accounting for both a firm effect and a time effect). The results based on both one-dimensional and two-dimensional clustering are qualitatively similar.

Table 4.2.2:1 Regressions of Size Adjusted Returns on Asset Growth

Country	*Intercept*	*AG*	*ln (SZ)*	*ln (BM)*
Austria	-0.029	-0.060 ***	0.011	0.004
Belgium	0.003	-0.068***	0.007	-0.004
Denmark	0.123	-0.077***	0.001	-0.009
Finland	0.157	-0.078*	-0.002	-0.001
France	0.045	-0.053**	0.007	0.035***
Germany	0.143***	-0.075***	-0.003	0.005
Greece	0.379	-0.134***	-0.024	-0.037
Ireland	0.514	-0.134*	-0.027	-0.029
Italy	-0.041	-0.049***	0.011	0.051
Netherlands	0.059	-0.048***	0.006	0.030
Norway	0.162	-0.013	-0.002	0.013
Portugal	-0.200**	-0.033	0.024***	0.084***
Spain	0.225	-0.040	-0.008	0.012
Sweden	0.072	-0.061***	0.008	0.019
Switzerland	-0.081	-0.075***	0.019***	0.062***
United Kingdom	-0.093	-0.056***	0.020***	0.022***
Country Average (Equally – Weighted)	**0.090**	**-0.066*** **	**0.003*** **	**0.016**
Country Average (Participation - Weighted)	**0.075**	**-0.081*** **	**0.007*** **	**0.022*** **
All Countries	**0.018**	**-0.064*** **	**0.001*** **	**0.010*** **

*The table reports the results from the cross-sectional regressions of annualized size adjusted returns on asset growth, after controlling for size and book to market ratio. The annual cross-sectional regressions are estimated for the period 1989-2016 using OLS with clustered standard errors. We report separate coefficients for each country, averages of coefficients across countries and coefficients for all countries combined. The country-averages are formed in two ways: a) by putting an equal weight on each country-specific portfolio (country average, equally weighted) and b) by putting weights based on the percentage participation of each country in the overall sample (country average, participation weighted). The all-countries row is formed with firms from all countries (i.e., pooled sample). ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

4.2.3 Abnormal Returns on Portfolios Based on Asset Growth

We then investigate the stock price performance of portfolios based on the magnitude of asset growth. In Table 4.2.3:1, we report results for country-specific portfolios, country-average portfolios and portfolios, when all countries are considered together. Each year, six months after the financial year-end, within each country, stocks are allocated into equally weighted quintile portfolios based on asset growth. Then, we report time-series averages of one-year ahead monthly size-adjusted returns for the lowest portfolio, the highest portfolio and the hedge (i.e., a long position in the lowest quintile and a short position in the highest quintile) portfolio. The country-average portfolios are formed in two ways: a) by putting an equal weight on each country-specific portfolio (country average, equally weighted) and b) by putting weights based on the percentage participation of each

country in the overall sample (country average, participation weighted). The all-countries portfolios are formed using the same procedure as the country-specific portfolios, with firms from all countries (i.e., pooled sample).

Monthly size-adjusted hedge returns are found positive and statistically significant at the 1% level in 8 countries. The equally weighted country-average hedge return per month is 0.320%, while the participation weighted country-average hedge return per month is 0.486%. When we consider all countries in the same bucket, the hedge return rises up to 0.400% per month (4.800% per annum). Overall , our findings in Tables 4.2.2:1 and 4.2.3:1 confirm the presence in the European equity markets of a negative relationship between asset growth and stock returns.

Table 4.2.3:1 Stock Price Performance of Portfolios Based on Asset Growth

Country	**Low Asset Growth Portfolio**	**High Asset Growth Portfolio**	**Hedge Asset Growth Portfolio (L-H)**
Austria	0.263%	-0.300%***	0.563%***
Belgium	0.207%	-0.300%***	0.507%***
Denmark	0.063%	-0.300%***	0.363%***
Finland	-0.038%	0.020%	-0.059%
France	0.200%***	-0.300%***	0.500%***
Germany	0.080%	-0.400%***	0.480%***
Greece	0.164%	-0.082%	0.246%
Ireland	0.500%***	-0.600%***	1.100%***
Italy	-0.135%	-0.061%	-0.074%
Netherlands	-0.083%	-0.145%	0.062%
Norway	-0.269%	-0.014%	-0.255%
Portugal	-0.092%	-0.500%***	0.408%
Spain	-0.066%	-0.099%	0.033%
Sweden	-0.018%	-0.400%***	0.382%
Switzerland	0.113%	-0.200%***	0.313%***
United Kingdom	0.054%	-0.500%***	0.554%***
Country Average (Equally – Weighted)	**0.059%*** **	**-0.261%*** **	**0.320%*** **
Country Average (Participation - Weighted)	**0.089%*** **	**-0.397%*** **	**0.486%*** **
All Countries	**0.100%*** **	**-0.300%*** **	**0.400%*** **

The table reports future (one-year-ahead) monthly size adjusted returns of country-specific portfolios, country average portfolios and portfolios, when all countries are considered together. Country specific portfolios are formed on the magnitude of asset growth for the period 1989-2016. Each year, six months after the financial year-end, stocks are allocated into equally weighted quintile portfolios based on asset growth. Then, we report time-series averages of one-year ahead monthly size adjusted returns for the lowest portfolio, the highest portfolio and the hedge (i.e., a long position in the lowest quintile and a short position in the highest quintile) portfolio. The country-average portfolios are formed in two ways: a) by putting an equal weight on each country-specific portfolio (country average, equally weighted) and b) by putting weights based on the percentage participation of each country in the overall sample (country average,

*participation weighted). The all-countries portfolios are formed using the same procedure as the country-specific portfolios, with firms from all countries (i.e., pooled sample). ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

4.2.4 Cross-Sectional Regressions of Abnormal Returns on Asset Growth Components

The goal of this Ph.D thesis is to distinguish between alternative explanations of the adverse relationship between growth in assets and subsequent returns on stocks. In doing so, we decompose asset growth into a component capturing real growth in investment and a component capturing accounting distortions and/or decreased performance. We step forward in this section to explore the significance of these components in driving the anomaly of asset growth.

We estimate cross-sectional regressions, with the Ordinary Least Squares (OLS) approach and clustered standards errors at firm level and year level, of one-year ahead annual size-adjusted returns on asset growth components, after controlling for the natural logarithm of market capitalization and the natural logarithm of book-to-market ratio. Then, we report the resulting parameter coefficients.

Existing literature indicates a negative relationship between sales growth and subsequent stock returns with respect to the investment growth variable, due to either risk or mispricing. Furthermore, because the investment growth component is positively associated with asset growth, subsequent stock returns should be negatively associated with it. Thus, we expect a negative and statistically significant coefficient on SG. We may not make risk-based assumptions about its predictive capacity for future returns with respect to accounting distortions and/or the efficiency variable. At the same time, provided that accounting distortions and/or the efficiency variable is negatively associated with asset growth, subsequent stock returns should be positively associated with it. Thus, we expect a positive and statistically significant coefficient on ΔAT. The model estimated is as follows:

$$\mathrm{SRET}_{t+1} = \gamma_0 + \gamma_1 \mathrm{SG}_t - \gamma_2 \Delta\mathrm{AT}_t - \gamma_3(\mathrm{SG}_t * \Delta\mathrm{AT}_t) + \gamma_4 \ln(\mathrm{SZ})_t + \gamma_5 \ln(\mathrm{BM})_t + u_{t+1}$$

In Table 4.2.4:1, we report separate coefficients for each country, averages of coefficients across countries, and coefficients for all countries combined. The formation of the country-averages of coefficients has been described in Table 4.2.2:1. We observe that the coefficient on SG is negative and statistically significant at the 1% level for 6 out of 16 countries. For Finland, France and Switzerland the coefficient on SG is negative and statistically significant at the 10% level. The equally weighted country-average coefficient on SG is -0.034, while the participation weighted country-average is -0.050. Both coefficients are statistically significant at the 1% level. When all countries are considered together, the coefficient on SG is -0.058 and statistically significant at the 1% level.

The coefficient on ΔAT is positive and statistically significant at the 1% level in 11 out of 16 countries. The coefficient on ΔAT is statistically insignificant in Austria, Finland, Norway, Portugal and Spain. The equally weighted country-average coefficient on ΔAT is 0.046, while the participation weighted country-average is -0.060. Both coefficients are statistically significant at the 1% level. When all countries are considered together, the coefficient on ΔAT is -0.038 and statistically significant at the 1% level. Overall, regression results indicate that the asset growth anomaly is likely to be driven by both components.

Table 4.2.4:1 Regressions of Size Adjusted Returns on Asset Growth Components

Country	***Intercept***	***SG***	***ΔAT***	***SG * ΔAT***	***ln (SZ)***	***ln (BM)***
Austria	-0.055	-0.013	-0.009	0.013***	0.012	0.003
Belgium	-0.011	-0.045***	0.037***	0.042***	0.009	0.011
Denmark	0.118	-0.047***	0.071***	0.047***	0.001	0.020
Finland	0.143	-0.038*	0.027	-0.011	-0.001	0.006
France	0.011	-0.056*	0.069***	0.035***	0.011***	0.052***
Germany	0.124*	-0.054***	0.040***	0.024***	-0.002	0.020***
Greece	0.472	-0.107	0.096***	0.032	-0.030	-0.008
Ireland	0.467	-0.001	0.044***	0.008	-0.024	-0.003
Italy	-0.038	-0.015***	0.057***	0.030***	0.012	0.058*
Netherlands	-0.081	-0.046	0.074***	0.037	0.016***	0.053***
Norway	0.155	-0.001	0.006	0.008	-0.002	0.015
Portugal	-0.180	-0.034	0.072	0.017	0.025***	0.094***
Spain	0.212	-0.004	0.042	0.056	-0.006	0.019
Sweden	0.070	-0.023***	0.043***	0.018	0.008	0.028
Switzerland	-0.086	-0.033*	0.032***	0.009	0.020***	0.068***
United Kingdom	-0.108	-0.021***	0.035***	0.011*	0.021***	0.031***
Country Average (Equally – Weighted)	**0.076**	**-0.034*** **	**0.046*** **	**0.024*** **	**0.004**	**0.029**
Country Average	**0.058**	**-0.050*** **	**0.060*** **	**0.029*** **	**0.009**	**0.039**

(Participation - Weighted)						
All Countries	**0.113*** **	**-0.058*** **	**0.038*** **	**0.018*** **	**0.013**	**0.004**

*The table reports the coefficients from the cross-sectional regressions of annualized size adjusted returns on asset growth components, namely: the investment growth component (i.e., sales growth; SG) and accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT), after controlling for size and book-to-market ratio. The annual cross-sectional regressions are estimated for the period 1989-2016 using OLS with clustered standard errors. We report separate coefficients for each country, averages of coefficients across countries and coefficients for all countries combined . The country-averages are formed in two ways: a) by putting an equal weight on each country-specific portfolio (country average, equally weighted) and b) by putting weights based on the percentage participation of each country in the overall sample (country average, participation weighted). The all-countries row is formed with firms from all countries (i.e., pooled sample). ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

4.2.5 Abnormal Returns on Portfolios Based on Asset Growth Components

We also examine the stock price performance of portfolios based on the magnitude of asset growth components, namely: the investment growth component (i.e., sales growth; SG) and accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT). Specifically, for both components, we examine whether one-year ahead monthly size-adjusted returns can be earned from country-specific portfolios, country-average portfolios, and portfolios when all countries are considered together. The formation procedure of the portfolios is similar to that discussed in Table 4.2.3:1. In Table 4.2.5:1 we report results for the investment growth component, while in Table 4.2.5:2 for accounting distortions and/or the efficiency component.

As shown in Table 4.2.5:1, monthly size-adjusted returns earned from the hedge portfolio, based on the magnitude of the investment growth component, are positive and statistically significant at the 1% level in the following 6 countries. Statistically significant hedge returns vary from 0.337% up to 0.569% per month. In all other countries, hedge portfolios' abnormal returns are statistically insignificant. The country-average hedge monthly size-adjusted return is 0.148% based on equal weights for each country and increases up to 0.393% based on participation weighs of each country in the overall sample. When we consider all countries in the same bucket, the monthly hedge portfolio size-adjusted return is 0.373% per month (or 4.476% per annum).

Table 4.2.5:1 Stock Price Performance of Portfolios Based on the Investment Growth Component

Country	Low Investment Growth Portfolio	High Investment Growth Portfolio	Hedge Investment Growth Portfolio (L-H)
Austria	-0.011%	0.053%	-0.064%
Belgium	0.137%	-0.200%***	0.337%***
Denmark	-0.097%	-0.096%	-0.001%
Finland	-0.011%	-0.198%	0.187%
France	0.085%	-0.300%***	0.385%***
Germany	-0.014%	-0.400%***	0.386%***
Greece	-0.261%	-0.135%	-0.126%
Ireland	-0.177%	-0.029%	-0.148%
Italy	0.001%	-0.067%	0.068%
Netherlands	-0.036%	0.002%	-0.038%
Norway	0.125%	-0.145%	0.270%
Portugal	-0.116%	-0.202%	0.086%
Spain	-0.275%	0.147%	-0.422%
Sweden	0.069%	-0.400%***	0.469%***
Switzerland	0.013%	-0.400%***	0.413%***
United Kingdom	0.069%	-0.500%***	0.569%***
Country Average (Equally – Weighted)	**-0.031%*** **	**-0.179%*** **	**0.148%*** **
Country Average (Participation - Weighted)	**0.012%*** **	**-0.381%*** **	**0.393%*** **
All Countries	**0.073%**	**-0.300%*** **	**0.373%*** **

*Table 4.2.5:1 reports future (one-year-ahead) monthly size adjusted returns of country-specific portfolios, country average portfolios and portfolios, when all countries are considered together. Country specific portfolios are formed on the magnitude of the investment component of asset growth (i.e., sales growth; SG) for the period 1989-2016. Each year, six months after the financial year-end, stocks are allocated into equally weighted quintile portfolios based on the magnitude of the investment component of asset growth. Then, we report time-series averages of one-year ahead monthly size adjusted returns for the lowest portfolio, the highest portfolio and the hedge (i.e., a long position in the lowest quintile and a short position in the highest quintile) portfolio. The country-average portfolios are formed in two ways: a) by putting an equal weight on each country-specific portfolio (country average, equally weighted) and b) by putting weights based on the percentage participation of each country in the overall sample (country average, participation weighted). The all-countries portfolios are formed using the same procedure as the country-specific portfolios, with firms from all countries (i.e., pooled sample). ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

As shown in Table 4.2.5:2, the hedge portfolio formed on the magnitude of and accounting distortions and/or the efficiency component generate positive abnormal returns in the following 10 countries. Hedge abnormal returns vary 0.322% up to 0.900% per month and are all statistically significant at the 1% level. In all other countries, abnormal returns earned form the hedge portfolio are statistically insignificant. The country-average hedge monthly size-adjusted return is 0.470% based on equal weights for each country and

increases up to 0.629% based on participation weights of each country in the overall sample. When we consider all countries, the hedge portfolio earns a monthly size-adjusted return of about 0.490% per month (or 5.880% per annum). Overall, findings in Tables 4.2.5:1 and 4.2.5:2 confirm earlier regression results, that both components play a significant role in driving the asset growth effect on stock returns.

Table 4.2.5:2 Stock Price Performance of Portfolios based on Distortions and/or the Efficiency Component

Country	Low Distortions / Efficiency Portfolio	High Distortions / Efficiency Portfolio	Hedge Distortions / Efficiency Portfolio (H-L)
Austria	0.037%	0.032%	-0.005%
Belgium	-0.144%	0.178%	0.322%***
Denmark	-0.400%***	0.147%	0.547%***
Finland	-0.300%***	-0.020%	0.280%
France	-0.300%***	0.200%***	0.500%***
Germany	-0.300%***	0.300%***	0.600%***
Greece	-0.500%***	0.400%***	0.900%***
Ireland	-0.700%***	-0.030%	0.670%
Italy	-0.154%	0.181%	0.335%
Netherlands	-0.215%	0.200%	0.415%***
Norway	-0.300%***	0.400%***	0.700%***
Portugal	-0.274%	0.173%	0.447%
Spain	-0.103%	0.196%	0.299%
Sweden	-0.400%***	0.300%***	0.700%***
Switzerland	-0.200%***	0.200%***	0.400%***
United Kingdom	-0.300%***	0.100%***	0.400%***
Country Average (Equally – Weighted)	**-0.285%*** **	**0.185%*** **	**0.470%*** **
Country Average (Participation - Weighted)	**-0.372%*** **	**0.257%*** **	**0.629%*** **
All Countries	**-0.300%*** **	**0.190%*** **	**0.490%*** **

*Table 4.2.5:2 reports future (one-year-ahead) monthly size adjusted returns of country-specific portfolios, country average portfolios and portfolios when all countries are considered together. Country specific portfolios are formed on the magnitude of accounting distortions and/or the efficiency component of asset growth (i.e., change in asset turnover ratio; ΔAT) for the period 1989-2016. Each year, six months after the financial year-end, stocks are allocated into equally weighted quintile portfolios based on the magnitude of accounting distortions and/or the efficiency component of asset growth (i.e., change in asset turnover ratio; ΔAT). Then, we report time-series averages of one-year ahead monthly size adjusted returns for the lowest portfolio, the highest portfolio and the hedge (i.e., a long position in the lowest quintile and a short position in the highest quintile) portfolio. The country-average portfolios are formed in two ways: a) by putting an equal weight on each country-specific portfolio (country average, equally weighted) and b) by putting weights based on the percentage participation of each country in the overall sample (country average, participation weighted). The all-countries portfolios are formed using the same procedure as the country-specific portfolios, with firms from all countries (i.e., pooled sample). ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

4.2.6 Summary Statistics on Country-Level Characteristics

Table 4.2.6:1 provides summary statistics for the following country-level characteristics: total market capitalization of public listed firms over GDP index (MKTCAP), political risk rating index (PR), individualism index (IDV), trading volume index (DVOL), analyst activity index (ANALYST), trading cost index (TCOST), business sophistication index (BUSOPH), accounting quality index (ACCT), earnings management score (EM).

Panel A reports univariate statistics (number of observations, mean, median, standard deviation, minimum, and maximum). MKTCAP ranges from 17.461 (Austria) to 139.849 (Switzerland) with a mean value around 51, a median value around 47, and a high standard deviation of about 29. PR ranges from 74.900 (for Greece) to 91.100 (for Finland). The mean value, median value and standard deviation of PR are about 83, 84 and 16, respectively. IDV ranges from 27.000 (for Portugal) to 89.000 (for the United Kingdom) with a mean value around 65, a median value around 70, and a high standard deviation of about 16.

Greece has the lowest trading volume (DVOL=144.450) and the highest level of transaction costs (TCOST=105.100), whereas the Netherlands has the highest trading volume (DVOL=1,465.460) and the lowest level of transaction costs (TCOST=24.500). The mean value, median value, and standard deviation of DVOL are 631.490, 509.340, and 450.080, respectively. The mean value, median value, and standard deviation of the TCOST are 41.687, 38.600, and 18.934, respectively. Analyst activity is more intense in Spain (ANALYST=0.580) and weaker in Greece (ANALYST=-0.130). ANALYST has a mean value, median value, and standard deviation equal to 0.069, 0.055, and 0.194, respectively.

Business sophistication is the lowest in Greece, with a value of 4.130 and the highest in Germany, with a value of 5.930. BUSOPH has a mean and median value around 5 and a standard deviation of about 0.51 (the second lowest standard deviation after ANALYST). Sweden exhibits the strongest accounting quality (ACCT=83.000), while Portugal exhibits the poorest accounting quality (ACCT=36.000). ACCT has a mean and median value around 64 and a standard deviation of about 11.49. Earnings management has a minimum value of 5.100 for Ireland and a maximum value of 28.300 for Greece. EM has a mean

value equal to 16.925, with a standard deviation of about 7.939. Overall, summary statistics suggest a substantial cross-country variation across the selected characteristics.

Panel B presents pair-wise correlations: Pearson (above diagonal) and Spearman (below diagonal) between country-level characteristics. MKTCAP is positively related to PR, IDV, DVOL and ACCT. Thus, markets with a higher degree of efficiency tend to have lower political risk, higher individualism, lower trading frictions and stronger accounting quality. PR is positively related to IDV and BUSOPH. These correlations suggest that countries with lower political risk are expected to have higher individualism and stronger investor protection (high BUSOPH). IDV is positively related to MKTCAP, PR, DVOL and ACCT while it is negatively related to ANALYST. Thus, countries with high individualism are more likely to have a high degree of market efficiency, low political risk, high trading volume and high quality of accounting standards.

DVOL has a positive correlation with MKTCAP, IDV and ACCT. DVOL is positively associated with ANALYST (only based on Pearson correlation). This implies, that stock market with high trading volume, the degree of market efficiency, individualism and accounting quality is also high. Results also reveal a positive (negative) correlation of ANALYST with DVOL (IDV and TCOST) based on Pearson correlation. Based on Spearman correlation it is also positively related to BUSOPH. TCOST is positively related to EM and negatively related to ANALYST (only based on Pearson correlation).

BUSOPH has a positive Pearson correlation with PR and a positive Spearman correlation with ANALYST. ACCT is positively correlated with MKTCAP, IDV and DVOL. In terms of Spearman correlation, ACCT also exhibits a positive relation with PR. Finally, EM is positively correlated only with TCOST and insignificantly correlated to all other country-level characteristics. Overall, the evidence presented in Panel B of Table 4.2.6:1 indicates significant correlations between some country-level characteristics.

Table 4.2.6:1 Summary Statistics on Country-Level Characteristics

Panel A: Univariate Statistics on Country-Level Characteristics									
Country	*MKTCAP*	*PR*	*IDV*	*DVOL*	*ANALYST*	*TCOST*	*BUSOPH*	*ACCT*	*EM*
Austria	17.461	86.800	55.000	215.460	-0.110	53.200	5.690	54.000	28.300
Belgium	46.016	81.300	75.000	255.260	-0.030	27.100	5.440	61.000	19.500
Denmark	29.211	86.500	74.000	228.230	-0.050	40.800	5.600	62.000	16.000
Finland	63.670	91.100	63.000	581.890	0.250	45.200	5.460	77.000	12.000
France	48.466	79.200	71.000	695.830	0.200	35.700	5.470	69.000	13.500
Germany	31.643	84.200	67.000	731.410	0.100	30.600	5.930	62.000	21.500
Greece	37.706	74.900	35.000	144.450	-0.130	105.100	4.130	55.000	28.300
Ireland	51.840		70.000	573.260	-0.110		5.070		5.100
Italy	45.688	76.800	76.000	894.830	0.070	41.000	4.910	62.000	24.800
Netherlands	66.599	88.000	80.000	1,465.460	0.340	24.500	5.540	64.000	16.500
Norway	39.506	86.500	69.000	445.420	-0.130	41.500	5.190	74.000	5.800
Portugal	23.075	81.300	27.000	326.260	0.050	35.700	4.370	36.000	25.100
Spain	47.896	76.300	51.000	1,464.740	0.580	39.200	4.810	64.000	18.600
Sweden	48.529	86.900	71.000	395.910	0.060	33.000	5.700	83.000	6.800
Switzerland	139.849	89.300	68.000	307.780	0.070	38.600	5.800	68.000	22.000
United Kingdom	86.299	82.900	89.000	1,377.720	-0.050	34.100	5.410	78.000	7.000
Obs	16	15	16	16	16	15	16	15	16
Mean	51.466	83.467	65.063	631.490	0.069	41.687	5.283	64.600	16.925
Median	46.956	84.200	69.500	509.340	0.055	38.600	5.450	64.000	17.550
Std. Dev.	29.074	5.013	16.068	450.080	0.194	18.934	0.509	11.488	7.939
Min.	17.461	74.900	27.000	144.450	-0.130	24.500	4.130	36.000	5.100
Max.	139.849	91.100	89.000	1,465.460	0.580	105.100	5.930	83.000	28.300

Panel B: Pair-wise Correlations among Country-Level Characteristics – Pearson (above diagonal) and Spearman (below diagonal)									
Variable	*MKTCAP*	*PR*	*IDV*	*DVOL*	*ANALYST*	*TCOST*	*BUSOPH*	*ACCT*	*EM*
MKTCAP	-	0.590***	0.640***	0.671***	0.280	0.263	0.230	0.850***	-0.060
PR	0.370	-	0.520***	0.261	0.080	0.354	0.593***	0.841	0.110
IDV	0.581***	0.721***	-	0.501***	-0.441***	0.201	-0.102	0.890***	0.020
DVOL	0.521***	0.253	0.552***	-	0.502***	0.252	0.001	0.460***	0.020
ANALYST	-0.210	-0.620	0.021	-0.241	-	-0.250***	0.900	-0.510	0.170
TCOST	0.390	0.401	0.153	0.160	-0.201	-	-0.031	0.382	0.470***
BUSOPH	-0.060	-0.231	0.320	-0.180	0.420***	-0.161	-	-0.150	0.180
ACCT	0.572***	0.674***	0.653***	0.613***	0.162	0.371	0.341	-	-0.201
EM	0.170	0.220	-0.010	0.091	0.001	0.580***	0.090	0.031	-

*Table 4.2.6:1 reports univariate statistics on (number of observations, mean, median, standard deviation, minimum and maximum) and pair wise correlations between (Pearson above diagonal, and Spearman below diagonal) selected country-characteristics [total market capitalization of public listed firms over GDP index (MKTCAP), political risk rating index (PR), individualism index (IDV), trading volume index (DVOL), analyst activity index (ANALYST), trading costs index (TCOST), index for business sophistication (BUSOPH), accounting quality index (ACCT), earnings management score (EM)]. Panel A presents univariate statistics, while Panel B pair wise correlations. Country-level characteristics are defined in Appendix B. ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

4.2.7 Regressions of Size Adjusted Returns on Asset Growth Components, Conditional on Country-Level Characteristics

This section addresses testing cross-country hypotheses on fundamental factors related to the extent of our asset growth components, namely our investment component and accounting distortions and/or our stock returns efficiency component (i.e. H1 to H7). We estimate cross-sectional regressions, with the Ordinary Least Squares (OLS) approach and clustered standards errors at firm level and year level, of one-year ahead annual size-adjusted returns on asset growth components, after controlling for the natural logarithm of market capitalization and the natural logarithm of book-to-market ratio. Then, we report the resulting parameter coefficients.

The regression procedure is as follows. First, countries are classified into 3 groups based on the level of each characteristic: a low group (bottom 25%), a medium group (middle 50%), and a high group (top 25%). For example, we sort all economies in ascending order based on their MKTCAP and put them in the low, medium, or high group accordingly. The cutoff point for each group takes into consideration the actual cutoff value of the index and the number of countries in each group. We apply the same grouping method for the all country-level characteristics: total market capitalization of public listed firms over GDP index (MKTCAP), political risk rating index (PR), individualism index (IDV), trading volume index (DVOL), analyst activity index (ANALYST), trading costs index (TCOST), index for business sophistication (BUSOPH), accounting quality index (ACCT), earnings management score (EM). Summary statistics of country-level characteristics are presented in in Section 4.2.6.

Then, for each of these groups, we regress one-year ahead annual size adjusted returns on asset growth components, the interaction term and after controlling for the natural logarithm of market capitalization and the natural logarithm of book-to-market ratio. The annual cross-sectional regressions are estimated for the period 1989-2016 using the Ordinary Least Squares (OLS) approach and clustered standards errors at firm level and year level. As mentioned previously, the model estimated is as follows:

$$\mathrm{SRET}_{t+1} = \gamma_0 + \gamma_1 \mathrm{SG}_t - \gamma_2 \Delta \mathrm{AT}_t - \gamma_3 (\mathrm{SG}_t * \Delta \mathrm{AT}_t) + \gamma_4 \ln(\mathrm{SZ})_t + \gamma_5 \ln(\mathrm{BM})_t + u_{t+1}$$

Table 4.2.7:1 reports the coefficients from cross-sectional regressions within the low and high group, as well as the difference in the coefficients between the groups. Panel A reports results based on market efficiency proxies. The coefficients on both the investment growth factor and the accounting distortions and/or efficiency factor are statistically significant at the 1% level within all MKTCAP groupings. SG is negatively related to subsequent stock returns, whereas ΔAT is positively related to subsequent stock returns. The negative coefficient on SG is found significantly larger at the 1% level within the high MKTCAP group. However, there is no significant difference in the ΔAT coefficient between the low and high MKTCAP groups.

SG's coefficient is negative within all PR groupings, but statistically significant only on the high group (at the 1% level). The difference in the SG coefficient between the low and high PR group is statistically insignificant. ΔAT's coefficient is positive and statistically significant at the 1% level within all PR groupings. A formal test of the difference in the ΔAT coefficient between the low and high PR groups, suggests that the slope of ΔAT is significantly more positive for the low group than for the high group at the 1% level. The coefficient on SG is statistically significant and negative within both the low IDV group (at the 5% level) and the high IDV group (at the 1% level). However, the difference in the SG coefficient between the low and high IVD group is statistically insignificant. The coefficient on ΔAT is positive and statistically significant at the 1% level within all IDV groupings. A formal test of the difference in the ΔAT coefficient between the low and high IDV groups is statistically significant at the 1% level.

In summary, our evidence in Panel A of Table 4.2.7:1 shows that the negative influence of real investment growth on stock returns is greater in countries with higher equity market efficiency, while the positive effect of accounting distortions and/or successful use of existing capital on stock retuns is greater in countries with higher political risk and lower individualism. These findings appear to be consistent with H2 and H3 hypothesis but contradict H1 hypothesis.

Panel B reports results based on limits-to-arbitrage proxies. We observe a negative and statistically significant at the 1% level coefficient on SG at the high DVOL group, while it turns to be statistically insignifcant at the low DVOL group. Between the high and the low DVOL groups, the negative difference in the SG coefficient is statistically significant at the

1% level. ΔAT is positively related to subsequent stock returns both in the high and low DVOL group. ΔAT exhibits significantly larger coefficient loading at the 1% level in the low DVOL group.

In ANALYST grouping, we observe a negative and statistically significant SG coefficient at the 1% level only at the low group. ΔAT is positively related to subsequent stock returns both within the high and low ANALYST group. The negative (positive) slope on SG (ΔAT) on stock returns is more profound at the high (low) ANALYST cluster. The coefficient on SG (ΔAT) is significantly negative (positive) across both groups of transaction costs. However, the coefficient on SG is significantly more negative at the low TCOST group, whereas the coefficient on ΔAT is significantly more positive at the high TCOST group.

Overall, our results on Table 4.2.7:1 of Panel B indicate that arbitration activities do not substantially mitigate the impact of investment growth on stock returns, which contradicts H4 hypothesis. At the same time, arbitration barriers tend to have a major influence on the cross-country disparity in return predictability due to accounting distortions and/or reduced efficiency, which is consistent with H5 hypothesis.

In respect to misunderstanding agency costs and/or the quality of reported earnings, our findings suggest the following. Within BUSOPH groupings, we observe a negative and statistically significant at the 1% level coefficient on SG is in the high group and at the 5% level in the low group. The difference in the SG coefficient between the low and the high BUSOPH groups is statistically insignificant. ΔAT is positively related to subsequent stock returns, at the 1% level, both in the high and low BUSOPH group. ΔAT component exhibits larger coefficient loading at the 1% level in the low BUSOPH group.

For ACCT groupings, SG carries a negative and statistically significant at the 1% level coefficient at the high group. In the low group, SG is statistically significant at the 5% level. The difference in the SG coefficient between the low and the high ACCT groups is statistically indistinguishable from zero. ΔAT is positively related to subsequent stock returns both in the high and low ACCT group. The latter component exhibits larger coefficient loading in the low ACCT group at the 1% level.

Finally, for EM groupings, SG's coefficient is negative and statistically significant at the 1% level within the low EM group. Within the high EM group, the respective coefficient is statistically indistinguishable from zero. ΔAT is positively related to subsequent stock returns at the 1% level both within the high and low EM group. A formal test of the difference in SG (ΔAT) coefficients, suggests that the slope of SG (ΔAT) is significantly more negative (positive) at the 10% level (at the 1% level) within the low (high) EM group.

Taken together, our results in Panel C of Table 4.2.7:1 seem to suggest that in countries with weaker managerial discretion over earnings, the negative impact of real investment growth on stock returns is more pronounced. At the same time, in countries with weaker investor security, worse accounting disclosure and greater managerial control over earnings, the positive effect of accounting distortions and/or less efficient use of existing capital on stock returns is more pronounced. These findings are inconsistent with the predictions of the H6 hypothesis, but in line with the predictions of H7 hypothesis.

Table 4.2.7:1 Regressions of Size Adjusted Returns on Asset Growth Components, conditional on Country-Level Characteristics

Panel A: Regressions of size adjusted returns on asset growth components, namely: the investment growth component (i.e., sales growth; SG) and the accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT), conditional on market capitalization index, political risk rating and individualism index

MKTCAP	***Intercept***	***SG***	***ΔAT***	***SG * ΔAT***	***ln (SZ)***	***ln (BM)***
Low Group	0.105**	-0.032***	0.047***	0.025**	0.001	0.022***
High Group	-0.063	-0.052***	0.040***	0.015**	0.017***	0.032***
Diff (H-L)	-0.168***	-0.020***	-0.007	-0.010***	0.016***	0.010***
PR	***Intercept***	***SG***	***ΔAT***	***SG * ΔAT***	***ln (SZ)***	***ln (BM)***
Low Group	0.059	-0.053	0.079***	0.082***	0.006	0.042***
High Group	0.081	-0.052***	0.045***	0.012	0.005	0.032***
Diff (H-L)	0.022	0.001	-0.034***	-0.070***	0.001	-0.010
IDV	***Intercept***	***SG***	***ΔAT***	***SG * ΔAT***	***ln (SZ)***	***ln (BM)***
Low Group	0.205	-0.030**	0.076***	0.052***	-0.007	0.012
High Group	-0.069	-0.035***	0.042***	0.017***	0.017***	0.028***
Diff (H-L)	-0.274***	-0.005	-0.034***	-0.035***	0.024***	0.016***

Panel B: Regressions of size adjusted returns on asset growth components, namely: the investment growth component (i.e., sales growth; SG) and the accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT), conditional on trading volume index, analyst activity index and transactions cost index

DVOL	***Intercept***	***SG***	***ΔAT***	***SG * ΔAT***	***ln (SZ)***	***ln (BM)***
Low Group	0.178	-0.020	0.073***	0.054**	-0.006	0.010
High Group	-0.055	-0.034***	0.043***	0.017***	0.016***	0.030***
Diff (H-L)	-0.233***	-0.014***	-0.030***	-0.037***	0.020***	0.020***
ANALYST	***Intercept***	***SG***	***ΔAT***	***SG * ΔAT***	***ln (SZ)***	***ln (BM)***
Low Group	0.236	-0.032***	0.084***	0.061***	-0.008	0.014
High Group	0.033	-0.057	0.063***	0.030*	0.009***	0.044***
Diff (H-L)	-0.203**	-0.025***	-0.021***	-0.031***	0.017***	0.030***
TCOST	***Intercept***	***SG***	***ΔAT***	***SG * ΔAT***	***ln (SZ)***	***ln (BM)***
Low Group	0.101*	-0.054***	0.045***	0.027***	0.001	0.023***
High Group	0.183	-0.024*	0.076***	0.078*	-0.005	0.015
Diff (H-L)	0.082	0.030***	0.031***	0.051***	-0.006***	-0.008***

Panel C: Regressions of size adjusted returns on asset growth components, the investment growth component (i.e., sales growth; SG) and the accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT), conditional on business sophistication index, accounting quality index and earnings management score

BUSOPH	***Intercept***	***SG***	***ΔAT***	***SG * ΔAT***	***ln (SZ)***	***ln (BM)***
Low Group	0.173	-0.035**	0.092***	0.077***	-0.004	0.024
High Group	0.091*	-0.044***	0.041***	0.022***	0.003	0.026***
Diff (H-L)	-0.082	-0.009	-0.051***	-0.055***	0.007***	0.002
ACCT	***Intercept***	***SG***	***ΔAT***	***SG * ΔAT***	***ln (SZ)***	***ln (BM)***
Low Group	0.183	-0.025**	0.074***	0.038**	-0.006	0.012
High Group	-0.025	-0.027***	0.037***	0.011	0.015***	0.026***
Diff (H-L)	-0.208***	-0.002	-0.037***	-0.027***	0.021***	0.014***
EM	***Intercept***	***SG***	***ΔAT***	***SG * ΔAT***	***ln (SZ)***	***ln (BM)***
Low Group	-0.034	-0.023***	0.038***	0.010	0.016***	0.028***
High Group	0.159	-0.018	0.075***	0.029*	-0.004	0.021
Diff (H-L)	0.193***	0.005*	0.037***	0.019***	-0.020***	-0.007**

*The table reports the coefficients from the cross-sectional regressions of annualized size adjusted returns on asset growth components, namely: the investment growth component (i.e., sales growth; SG) and accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT), after controlling for size and book-to-market ratio, and conditional on country-level characteristics [total market capitalization of public listed firms over GDP index (MKTCAP), political risk rating index (PR), individualism index (IDV), trading volume index (DVOL), analyst activity index (ANALYST), trading costs index (TCOST), index for business sophistication (BUSOPH), accounting quality index (ACCT), earnings management score (EM)]. The annual cross-sectional regressions are estimated for the period 1989-2016 using OLS with clustered standard errors. Panel A presents results for the market capitalization index, the political risk rating and individualism index. Panel B reports results for the trading volume index, the analyst activity index and the transactions cost index. Panel C reports results for the business sophistication score, the accounting quality index and earnings management score. Country-level characteristics are defined in the Appendix B. ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

4.2.8 Investment Growth Effect on Stock Returns, Conditional on Country-Level Characteristics

In this section, we provide empirical evidence from stock price performance of portfolios based on the magnitude of the investment growth component and the accounting distortions and/or efficiency component, conditional on country-level characteristics. The portfolio formation procedure is as follows. First, countries are classified into 3 groups based on the level of each characteristic: a low group (bottom 25%), a medium group (middle 50%), and a high group (top 25%). Then, within each of these groups, we report the country-average one year ahead monthly size adjusted returns on the lowest, highest and hedge portfolio based on the magnitude of each asset growth component.

Table 4.2.8:1 reports evidence from stock price performance of portfolios based on the magnitude of the investment growth component. Results on Panel A of Table 4.2.8.1 are based on grouping countries by market efficiency proxies. The effect of the investment growth component on stock returns increases with each of these proxies. For instance, the size-adjusted monthly hedge returns on the investment growth portfolio in the low and high market capitalization index groups are 0.330% and 0.499% respectively, both statistically significant at the 1% level. The difference in hedge returns between the high and low market capitalization index groups is 0.169% per month but statistically insignificant.

Similar results are observed when political risk or individualism is used as a proxy of market efficiency. Hedge portfolios on the investment growth component earn positive and statistically significant, at the 1% level, abnormal returns only in groups of countries with low political risk and high individualism. The difference in hedge abnormal returns between the low and high political risk groups is 0.258% per month, but statistically indifferent from zero. However, the difference in hedge abnormal returns between the high and low individualism groups is 0.584% per month (roughly 6.5% per annum) and statistically significant at the 1% level.

Results on Panel B of Table 4.2.8:1 are based on grouping countries classified by limits to arbitrage proxies. The effect of investment growth component on stock returns decreases with the level of analyst activity and the level of transaction costs but increases with the level of trading volume. For example, the size-adjusted monthly returns of hedge

portfolios on SG in countries with low and high trading volume are 0.137% and 0.464% respectively. The corresponding difference in hedge returns is equal to 0.327% and statistically significant at the 5% level. The size-adjusted monthly returns of hedge portfolios on SG in countries with low and high analyst activity (transactions cost) are 0.056% (0.337%) and 0.245% (0.129%) respectively. The corresponding variation in hedge returns is found statistically insignificant.

Results on Panel C of Table 4.2.8:1 are based on groupings by proxies of corporate governance and earnings management. The effect of SG component on stock returns increases with the quality of corporate governance and decreases with the level of accounting manipulation. For instance, the average size-adjusted monthly hedge returns on the investment growth portfolio in countries with low and high business sophistication (quality of accounting standards) groups are -0.055% (-0.055%) and 0.341% (0.543%) respectively but, statistically significant only in the high group at 1% level. The corresponding difference in hedge returns between the low and the high BUSOPH group is equal to 0.396%, while between the low and the high ACCT group is equal to 0.488%. Both differences are statistically significant.

The country-average investment-hedge portfolio return in countries with low earnings management score (EM) is statistically significant at 1% level (0.570%), whereas in countries with high earnings management score is statistically insignificant. The corresponding variation in hedge returns is equal to -0.636% and statistically significant at the 1% level.

Overall, the results from Table 4.2.8:1, suggest that the investment growth component has a more negative effect on stock returns in countries with higher market efficiency, lower trading frictions, stronger corporate governance and less earnings manipulation by firm executives.

Table 4.2.8:1 Stock Price Performance of Portfolios Based on the Investment Growth Component, conditional on Country-Level Characteristics

Panel A: Stock price performance on the investment growth component (i.e., sales growth; SG), conditional on market capitalization index, political risk rating and individualism index			
MKTCAP	**Low Investment Growth Portfolio**	**High Investment Growth Portfolio**	**Hedge Investment Growth Portfolio (L-H)**
Low Group	-0.013%	-0.343%***	0.330%***
High Group	0.085%	-0.414%	0.499%***
Diff (H-L)	0.330%***	0.499%***	0.169%
PR	**Low Investment Growth Portfolio**	**High Investment Growth Portfolio**	**Hedge Investment Growth Portfolio (L-H)**
Low Group	-0.007%	-0.213%***	0.143%
High Group	0.100%	-0.301%***	0.401%***
Diff (H-L)	0.143%	0.401%***	0.258%
IDV	**Low Investment Growth Portfolio**	**High Investment Growth Portfolio**	**Hedge Investment Growth Portfolio (L-H)**
Low Group	-0.156%	-0.055%	-0.101%
High Group	0.072%	-0.411%***	0.483%***
Diff (H-L)	-0.101%	0.483% ***	0.584%***

Panel B: Stock price performance on the investment growth component (i.e., sales growth; SG), conditional on trading volume index, analyst activity index and transactions cost index			
DVOL	**Low Investment Growth Portfolio**	**High Investment Growth Portfolio**	**Hedge Investment Growth Portfolio (L-H)**
Low Group	-0.017%	-0.154%*	0.137%
High Group	0.068%	-0.396%***	0.464%***
Diff (H-L)	0.137%	0.464%***	0.327%**
ANALYST	**Low Investment Growth Portfolio**	**High Investment Growth Portfolio**	**Hedge Investment Growth Portfolio (L-H)**
Low Group	-0.043%	-0.099%	0.056%
High Group	0.023%	-0.222%***	0.245%
Diff (H-L)	0.056%	0.245%	0.189%
TCOST	**Low Investment Growth Portfolio**	**High Investment Growth Portfolio**	**Hedge Investment Growth Portfolio (L-H)**
Low Group	0.024%	-0.313%***	0.337%***
High Group	0.004%	-0.125%	0.129%
Diff (H-L)	0.337%***	0.129%	-0.208%

Panel C: Stock price performance on the investment growth component (i.e., sales growth; SG), conditional on business sophistication index, accounting quality index and earnings management score			
BUSOPH	**Low Investment Growth Portfolio**	**High Investment Growth Portfolio**	**Hedge Investment Growth Portfolio (L-H)**
Low Group	-0.120%	-0.065%	-0.055%
High Group	0.004%	-0.337%***	0.341%***

Diff (H-L)	-0.055%	0.341%***	0.396%**
ACCT	**Low Investment Growth Portfolio**	**High Investment Growth Portfolio**	**Hedge Investment Growth Portfolio (L-H)**
Low Group	-0.051%	-0.106%	0.055%
High Group	0.039%	-0.504%***	0.543%***
Diff (H-L)	0.055%	0.543%***	0.488%***
EM	**Low Investment Growth Portfolio**	**High Investment Growth Portfolio**	**Hedge Investment Growth Portfolio (L-H)**
Low Group	0.055%	-0.515%***	0.570%***
High Group	-0.111%	-0.045%	-0.066%
Diff (H-L)	0.570%***	-0.066%	-0.636%***

*Table 4.2.8:1 reports future (one-year-ahead) monthly size adjusted returns of portfolios formed on the magnitude of the investment growth component (i.e., sales growth; SG) for the period 1989-2016, conditional on country-level characteristics [total market capitalization of public listed firms over GDP index (MKTCAP), political risk rating index (PR), individualism index (IDV), trading volume index (DVOL), analyst activity index (ANALYST), trading costs index (TCOST), index for business sophistication (BUSOPH), accounting quality index (ACCT), earnings management score (EM)]. First, countries are classified into 3 groups based on the level of each characteristic: a low group (bottom 25%), a medium group (middle 50%), and a high group (top 25%). Then, for each of these groups, we report the country-average size adjusted returns on the lowest quintile-portfolio, the highest quintile-portfolio, and the hedge-portfolio based on the magnitude of the investment growth component (i.e., sales growth; SG). Panel A presents results for the market capitalization index, the political risk rating and individualism index. Panel B reports results for the trading volume index, the analyst activity index and the transactions cost index. Panel C reports results for the business sophistication score, the accounting quality index and earnings management score. Country-level characteristics are defined in the Appendix B. ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

4.2.9 Accounting Distortions Effect on Stock Returns, Conditional on Country-Level Characteristics

Next, we provide additional evidence on the cross-country hypotheses about fundamental factors associated with the magnitude of the effect of accounting distortions and/or less efficient use of existing capital on stock returns (i.e. H3, H5 and H7). In particular, we investigate the magnitude of forward looking monthly size adjusted returns earned from portfolios on the magnitude of the accounting distortions' component of asset growth for the period 1989-2016, conditional on country-level characteristics [total market capitalization of public listed firms over GDP score (MKTCAP), political risk rating index (PR), individualism index (IDV), trading volume index (DVOL), analyst activity index (ANALYST), trading costs index (TCOST), score for business sophistication (BUSOPH), accounting quality index (ACCT), earnings management score (EM)].

The portfolio formation procedure is as follows. First, countries are classified into 3 groups based on the level of each characteristic: a low group (bottom 25%), a medium group (middle 50%), and a high group (top 25%). Then, for each of these groups, we report the

country-average size adjusted return on the lowest accounting distortions quintile-portfolio, the highest accounting distortions quintile-portfolio, and the accounting distortions hedge-portfolio. The results are presented for the low group, the high group and the difference between the high and the low group of each one of the country level characteristics, employed.

Table 4.2.9:1 presents evidence from stock price performance of portfolios based on the magnitude of the accounting distortions and/or efficiency component. Results on Panel A are based on grouping countries by equity market efficiency proxies.

The effect of accounting distortions and/or less efficient use of existing capital on stock returns decreases with the level of equity-market development and increases with the level of political risk. For instance, the average size-adjusted monthly returns on hedge portfolio, based on the magnitude of the accounting distortions and/or efficiency component, in the low and high market capitalization index groups are 0.582% and 0.472% respectively, both statistically significant at 1% level. Similar results are obtained for PR groups. However, in IDV groups we observe the opposite pattern. Hedge portfolios on the accounting distortions and/or efficiency component, earn 0.519% monthly size adjusted returns in the group with low individualism, and 0.533% per month in the group with high individualism. Both hedge returns are statistically significant at 1% level.

Results on Panel B are based on group of countries classified by limits to arbitrage proxies. The size-adjusted monthly hedge returns on the accounting distortions and/or efficiency component in the low and high trading volume index (analyst activity index) groups are equal to 0.521% (0.976%) and 0.444% (0.455%) respectively, all statistically significant at 1% level. The size-adjusted monthly returns on the accounting distortions hedge portfolio in the low and high transaction cost index groups are 0.538% and 0.625% respectively, and statistically significant at 1% level.

Results on Panel C are based on group of countries classified by corporate governance and earnings management proxies. The findings suggest that the accounting distortions and/or efficiency component has a stronger effect on stocks returns in countries with lower business sophistication, lower quality of accounting standards and higher tendency to manage earnings. For instance, the size-adjusted monthly returns on the accounting

distortions hedge portfolio in the low and high business sophistication index (the accounting quality index) groups are 0.655% (0.571%) and 0.492% (0.534%) respectively, all statistically significant at 1% level. The hedge return on accounting distortions in countries with low level of earnings management is 0.543% and in countries with high level of earnings management score group is 0.593%. Both hedge returns are significant at 1% level.

Overall, the results from Table 4.2.9:1, suggest that the accounting distortions and/or efficiency component has a more positive effect on stock returns in countries lower market efficiency, higher trading frictions, weaker corporate governance and more earnings manipulation by firm executives.

Table 4.2.9:1 Stock Price Performance of Portfolios Based on the Distortions and/or Efficiency Component, conditional on Country-Level Characteristics

Panel A: Stock price performance on the accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT), conditional on market capitalization index, political risk rating and individualism index			
MKTCAP	**Low Distortions / Efficiency Portfolio**	**High Distortions / Efficiency Portfolio**	**Hedge Distortions / Efficiency Portfolio (H-L)**
Low Group	-0.334%***	0.248%***	0.582%***
High Group	-0.304%***	0.168%***	0.472%***
Diff (H-L)	0.582%***	0.472%***	-0.110%
PR	**Low Distortions / Efficiency Portfolio**	**High Distortions / Efficiency Portfolio**	**Hedge Distortions / Efficiency Portfolio (H-L)**
Low Group	-0.273%***	0.299%***	0.572%***
High Group	-0.293%***	0.222%***	0.515%***
Diff (H-L)	0.572%***	0.515%***	-0.057%
IDV	**Low Distortions / Efficiency Portfolio**	**High Distortions / Efficiency Portfolio**	**Hedge Distortions / Efficiency Portfolio (H-L)**
Low Group	-0.293%***	0.226%***	0.519%***
High Group	-0.308%***	0.225%***	0.533%***
Diff (H-L)	0.519%***	0.533%***	0.014%

Panel B: Stock price performance on the accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT), conditional on trading volume index, analyst activity index and transactions cost index			
DVOL	**Low Distortions / Efficiency Portfolio**	**High Distortions / Efficiency Portfolio**	**Hedge Distortions / Efficiency Portfolio (H-L)**
Low Group	-0.303%***	0.218%***	0.521%***
High Group	-0.276%***	0.168%***	0.444%***
Diff (H-L)	0.521%***	0.444%***	-0.077%
ANALYST	**Low Distortions / Efficiency Portfolio**	**High Distortions / Efficiency Portfolio**	**Hedge Distortions / Efficiency Portfolio (H-L)**
Low Group	-0.509%	0.467%***	0.976%***
High Group	-0.249%***	0.206%***	0.455%***
Diff (H-L)	0.976%***	0.455%***	-0.521%***
TCOST	**Low Distortions / Efficiency Portfolio**	**High Distortions / Efficiency Portfolio**	**Hedge Distortions / Efficiency Portfolio (H-L)**
Low Group	-0.278%***	0.260%***	0.538%***
High Group	-0.387%***	0.238%***	0.625%***
Diff (H-L)	0.538%***	0.625%***	0.087%

Panel C: Stock price performance on the accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT), conditional on business sophistication index, accounting quality index and earnings management score			
BUSOPH	**Low Distortions / Efficiency Portfolio**	**High Distortions / Efficiency Portfolio**	**Hedge Distortions / Efficiency Portfolio (H-L)**
Low Group	-0.318%	0,337%***	0.655%***
High Group	-0,278%***	0.214%***	0.492%***
Diff (H-L)	0.655%***	0.492%***	-0.163%
ACCT	**Low Distortions / Efficiency Portfolio**	**High Distortions / Efficiency Portfolio**	**Hedge Distortions / Efficiency Portfolio (H-L)**
Low Group	-0.333%***	0.238%***	0.571%***
High Group	-0.364%***	0.170%***	0.534%***
Diff (H-L)	0.571%***	0.534%***	-0.037%
EM	**Low Distortions / Efficiency Portfolio**	**High Distortions / Efficiency Portfolio**	**Hedge Distortions / Efficiency Portfolio (H-L)**
Low Group	-0.382%***	0.161%***	0.543%***
High Group	-0.298%***	0.295%***	0.593%***
Diff (H-L)	0.543%***	0.593%***	0.05%

Table 4.2.9:1 reports future (one-year-ahead) monthly size adjusted returns of portfolios formed on the magnitude of accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT) for the period 1989-2016, conditional on country- characteristics [total market capitalization of public listed firms over GDP index (MKTCAP), political risk rating index (PR), individualism index (IDV), trading volume index (DVOL), analyst activity index (ANALYST), trading costs index (TCOST), index for business sophistication (BUSOPH), accounting quality index

*(ACCT), earnings management score (EM)]. First, countries are classified into 3 groups based on the level of each characteristic: a low group (bottom 25%), a medium group (middle 50%), and a high group (top 25%). Then, for each of these groups, we report the country-average size adjusted returns on the lowest quintile-portfolio, the highest quintile-portfolio, and the hedge-portfolio based on the magnitude of accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT). Panel A presents results for the market capitalization index, the political risk rating and individualism index. Panel B reports results for the trading volume index, the analyst activity index and the transactions cost index. Panel C reports results for the business sophistication score, the accounting quality index and earnings management score. Country-level characteristics are defined in the Appendix B. ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

4.2.10 Do both components drive the anomaly, or one subsumes / dominates the other?

As we have stressed, a question that naturally arises is whether the two components of asset growth act as substitute or complementary mechanisms in driving the asset growth anomaly in European stock markets. To this end, we form portfolios based on the magnitude of the investment component of asset growth conditional on the accounting distortions and/or the efficiency component of asset growth. More specifically, each year, six months after financial year-end, stocks are first allocated into equally weighted quintile portfolios based on the efficiency component of asset growth and subsequently allocated into equally weighted quintile portfolios based on the investment component of asset growth. We then combine all sub-portfolios on the investment component of asset growth of quintile rank 1, rank 2 etc., and report time-series averages of one-year-ahead size adjusted returns for each of these sub-quintiles.

Table 4.2.10:1 reports the empirical results. The investment-hedge portfolio generates positive and statistically significant monthly size adjusted returns. Interestingly, after controlling for accounting distortions, the effect of the growth component on stock returns is even more important (0.396 as compared to 0.373% from Table 4.2.5:1 - last row where all countries included).

Table 4.2.10:1 Stock Price Performance of Portfolios based on the Investment Growth Component, conditional on Distortions and/or the Efficiency Component

	Low Investment Growth Portfolio	High Investment Growth Portfolio	Hedge Investment Growth Portfolio (L-H)
$SRET_{t+1}$	0.122%***	-0.274%***	0.396%***

Table 4.2.10:1 reports future (one-year-ahead) monthly size adjusted returns of portfolios formed on the investment growth component (i.e., sales growth; SG), conditional on accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT), over the period 1989-2016. Each year, six months after financial year end, stocks are first allocated into equally weighted quintile portfolios based on accounting distortions and/or the efficiency

*component (i.e., change in asset turnover ratio; ΔAT) and subsequently allocated into equally weighted quintile portfolios based on the investment growth component (i.e., sales growth; SG). We then combine all sub-portfolios on the investment growth component of quintile rank 1, rank 2 etc., and report time-series averages of one-year-ahead size adjusted returns for each of these sub-quintiles. ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

We perform the same analysis for the accounting distortions and/or the efficiency component conditional on the investment component of asset growth. More specifically, each year six months after financial year end, stocks are first allocated into equally weighted quintile portfolios based on the investment component of asset growth and subsequently allocated into equally weighted quintile portfolios based on accounting distortions and/or the efficiency component of asset growth. We then combine all sub-portfolios on accounting distortions and/or the efficiency component of asset growth of quintile rank 1, rank 2 etc., and report time-series averages of one-year-ahead size adjusted returns for each of these sub-quintiles.

The results are reported in Table 4.2.10:2. Once more, we can observe the same change in stock return patterns as with the investment component of asset growth. After controlling for growth, the effect of the efficiency component on stock returns turns out to be even more important (0.519% as compared to 0.490% from Table 4.2.5:2 - last row where all countries included).

Table 4.2.10:2 Stock Price Performance of Portfolios based on Distortions and/or the Efficiency Component, conditional on the Investment Growth Component

	Low Distortions / Efficiency Portfolio	**High Distortions / Efficiency Portfolio**	**Hedge Distortions / Efficiency Portfolio (H-L)**
$SRET_{t+1}$	-0.321%***	0.198%***	0.519%***

*The table reports future (one-year-ahead) monthly size adjusted returns of portfolios formed on accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT), conditional on the investment growth component (i.e., sales growth; SG), over the period 1989-2016. Each year, six months after financial year end, stocks are first allocated into equally weighted quintile portfolios based on the investment growth component (i.e., sales growth; SG) and subsequently allocated into equally weighted quintile portfolios based on accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT). We then combine all sub-portfolios on accounting distortions and/or the efficiency component (i.e., change in asset turnover ratio; ΔAT)of quintile rank 1, rank 2 etc., and report time-series averages of one-year-ahead size adjusted returns for each of these sub-quintiles. ***, **, * represents statistical significance at 1%, 5%, and 10% level, respectively.*

Altogether, the results clearly suggest that the investment growth and the accounting distortions components act as complements in driving the asset growth effect on future stock returns in European stock markets. In other words, both growth- and accounting-

based explanations seem to contribute to the negative relation relationship between total asset growth and subsequent stock returns.

CHAPTER 5

CONCLUSIONS

The objective of this Ph.D thesis is to distinguish between potentially competing explanations behind the existence of the asset growth anomaly in international (e.g., European) equity markets. The empirical research is divided into two different approaches with the same goal. In the first part, we directly address whether the asset growth effect can be attributed to a risk based or a mispricing based explanation, using three different methodologies.

The results from the first part analysis showed that an investment strategy based on a long position on firms with low asset growth and a short position on firms with high asset growth earns a positive return of almost 7.5% per annum. The results are robust even when we consider country-level analysis and size segments. The performance of the extreme asset growth portfolios varies significantly with the information contained in the firm's equity financing activities. In particular, high returns of low asset growth firms are due to asset growth purchasers, while low returns of firm with high asset growth are due to high asset growth issuers.

At an individual level of analysis (i.e., cross sectional regressions), we find a negative and significant relation between asset growth and the subsequent stock returns, regardless whether asset growth and issue/purchase indicators point in the same direction (i.e., congruent signals) or in the opposite direction (i.e., conflicting signals). As argued by Bali et al. (2010), these findings are more likely to be reconciled with rationality. Further, low asset growth firms' overperformance is not driven by expectation errors. Similar results are obtained when asset growth and issue/purchase indicators point out either in the same direction or in the opposite direction. As argued by Piotroski and So's (2012) these results based on the market expectation errors approach cannot be attributed to mispricing.

Finally, we directly examined whether asset growth could be a priced risk factor. Using a 2SCSR approach, loadings on an asset growth risk factor were found positive and statistically significant. The inclusion of an asset growth risk factor in asset pricing models adds importantly in explaining the cross sectional dispersion in stock returns. Overall, the results suggest that the asset growth anomaly is more likely to be driven by a risk-based explanation rather than market inefficiency.

Our findings are in line with Titman et al. (2013) and Watanabe et al. (2013), who document that the asset growth effect on stock returns generalizes outside the U.S. Although their results als favor a risk-based explanation, one should consider that their empirical research design does not focus on discriminating between behavioral and rational driving forces of the asset growth anomaly, but rather on identifying certain country-level factors that are linked with the possible occurrence of the anomaly in an international setting.

In the second part of the analysis, we decompose total asset growth into a component that captures real investment growth (i.e., sales growth) and a component that captures accounting distortions and/or efficient use of existing capital (i.e., change in the asset turnover ratio).

Based on cross-sectional regressions of one year ahead size-adjusted returns against asset growth in 16 developed European countries, we find that that the slope of asset growth is negative in 13 countries. The effect seems to be absent only in Norway, Portugal and Spain. In 8 out of 13 countries that the anomaly occurs, a hedge trading strategy based on the magnitude of asset growth earns significant one-year-ahead size-adjusted returns. Thus, the well-documented global asset growth anomaly (e.g., Titman et al. 2013; Watanabe et al. 2013), has not been decayed over time in European equity markets.

Cross-sectional regression based on our asset growth decomposition, generate a negative slope on the investment growth component in 9 European equity markets and a positive slope on the accounting distortions and/or efficiency component in 11 European equity markets. Both components seem to drive the asset growth anomaly in Belgium, Denmark, France, Germany, Italy, Sweden, Switzerland and the United Kingdom. The

occurrence of the anomaly in Finland seems to be affected only by the investment growth component, while in Greece, Ireland, and Netherlands it seems to be affected only by the accounting distortions and/or efficiency component.

Portfolio results portray an economic summary of the contributing role of both components with respect to the occurrence and the magnitude of the asset growth effect on stock returns in Europe. A hedge trading strategy based either on the investment growth component or on the accounting distortions and/or efficiency component earns significant one-year ahead risk-adjusted returns in Belgium, France, Sweden, Switzerland and the United Kingdom. Additionally, the hedge portfolio on the accounting distortions and/or efficiency component earns significant one-year ahead risk-adjusted returns in Denmark, Greece, Norway and Netherlands. When an integrated sample from the 16 European equity markets is employed, a positive and significant abnormal return for both the growth component and the efficiency component is revealed.

Further, the results indicate large cross-country variation on the magnitude of returns generated from both components of asset growth and in various factors associated with market efficiency, barriers to arbitrage, corporate governance and earnings management. Each of these country-level factors, a priori, can be linked differently to the effect of the investment growth component and the accounting distortions (and/or efficiency) component on stock returns, conditional on existing explanations of the asset growth anomaly.

Based on cross sectional regressions, the effect of the investment growth component on stock returns, is more profound in stock markets with higher development, higher trading volume, higher analyst activity and lower transaction costs. Notably, earnings management appears to have a negative impact on return predictability attributable to this component. On the contrary, the effect of the accounting distortions and/or efficiency component is more profound in stock markets with higher political risk, lower individualism, lower business sophistication, lower quality of accounting standards, greater managerial discretion over earnings and in stock markets with lower trading volume and higher level of transaction costs. Portfolio results, conditional on country-level characteristics, outline the economic significance of the findings from cross-sectional regressions. Finally, the

results suggest that both components play complementary roles in driving the asset growth anomaly in European stock markets.

The empirical evidence presented in the thesis has several implications to the existing literature. First, the evidence reveal that there is no decline of the asset growth anomaly in European stock markets after the anomaly is publicized, contrary to the existing evidence in the U.S. stock market regarding other accounting-based anomalies such as the accrual anomaly (e.g., Greene et al. 2011) and the post-announcement drift (e.g., Johnson and Schwartz, 2001).

Second, the evidence indicates that accounting distortions and/or less efficient use of existing capital play an important role in driving the asset growth anomaly, factors that have been generally overlooked either in the U.S. stock market or in foreign stock markets by previous studies.

Third, the results indicate that the portion of the growth-attributable anomaly is more likely to be consistent with an optimal investment effect as prescribed either by q-theory of real investment frictions or by the theory of real options. On the other hand, the portion of the anomaly due to accounting and or less successful usage of existing resources is more likely to be consistent with ignorance of the results of mischief in administrative bookkeeping and/or detrimental shifts in the efficiency with which existing assets are used. This finding supports why there is still an ongoing debate behind the drivers of the asset growth effect.

Fourth, from an investment perspective we provide evidence that asset growth strategies can be enhanced by taking into account the firm's equity financing activities.

Overall, the present Ph.D thesis highly reinforces the importance for future research to develop richer theories and additional empirical analysis in order to get a deeper understanding of the asset growth anomaly. Since total asset growth has a component driven by rationality and a component driven by mispricing, a clear avenue might be a detailed investigation of the effects of specific asset growth categories (e.g., cash, inventory, account receivables, fixed assets) on stock returns that could shed additional light on the role of investment growth and accounting distortions.

Furthermore, an interesting direction for future research would be to examine whether asset growth effect holds at different stages in the firm's life cycle. Finally, by incorporating Richardson et al.'s (2006) decomposition on total accruals, we also provide an interesting direction for future research to reexamine the relationship between the accruals anomaly and the asset growth anomaly[31].

[31] There are studies suggesting the asset growth anomaly is fundamentally tied to the accrual anomaly conditional upon the variable used to measure firms' growth (among others, Fairfield et al.,2003; Wei and Xie, 2008; Zhang, 2007; Wu et al., 2010; O'Donovan, 2018;)

APPENDIX A

Panel A

150 market anomalies sorted on chronological order:

Description	Author(s)	Year	Journal
CAPM beta squared	Fama and MacBeth	1973	Journal of Political Economy
Earnings-to-Price Ratio	Basu	1977	Journal of Finance
Book to market	Stattman	1980	The Chicago MBA
Size	Banz	1981	Journal of Financial Economics
Earnings Surprise	Foster, Olsen and Shevliln	1984	The Accounting Review
Momentum-Reversal	De Bondt and Thaler	1985	Journal of Finance
Long-run reversal	De Bondt and Thaler	1985	Journal of Finance
January Effect	Keims	1985	Journal of Financial Economics
Bid-ask spread	Amihud and Mendelsohn	1986	Journal of Financial Economics
Weekend Effect	Smirlock and Starks	1986	Journal of Financial Economics
Market leverage	Bhandari	1988	Journal of Financial Economics
Short term reversal	Jegedeesh	1989	Journal of Finance
Initial Public Offerings	Ritter	1991	Journal of Finance
Change in depreciation to gross PPE	Holthausen Larcker	1992	Journal of Accounting and Economics
Momentum (12 month)	Jegadeesh and Titman	1993	Journal of Finance
Momentum (6 month)	Jegadeesh and Titman	1993	Journal of Finance
Spinoffs	Cusatis et al.	1993	Journal of Financial Economics
Cash flow to market	Lakonishok, Scheifer, and Vishny	1994	Journal of Finance
Revenue Growth Rank	Lakonishok, Scheifer, and Vishny	1994	Journal of Finance

Turn of the Month Effect	Agrawal and Tandon	1994	Journal of International Money and Finance
Exchange Switch	Dharan Ikenberry	1995	Journal of Finance
Public Seasoned Equity Offerings	Loughran Ritter	1995	Journal of Finance
Dividend Initiation	Michaely et al.	1995	Journal of Finance
Dividend Omission	Michaely et al.	1995	Journal of Finance
Share repurchases	Ikenberry et al.	1995	Journal of Financial Economics
Accruals	Sloan	1996	The Accounting Review
Sales-to-price	Barbee, Mukherji, and Raines	1996	Financial Analysts' Journal
Earnings announcement return	Chan, Jegadeesh, and Lakonishok	1996	Journal of Finance
Earnings forecast revisions	Chan, Jegadeesh, and Lakonishok	1996	Journal of Finance
Long-term EPS forecast	La Porta	1996	Journal of Finance
net income / book equity	Haugen and Baker	1996	Journal of Financial Economics
Cash-flow variance	Haugen and Baker	1996	Journal of Financial Economics
Volume to market equity	Haugen and Baker	1996	Journal of Financial Economics
Volume Trend	Haugen and Baker	1996	Journal of Financial Economics
Change in capital investment, industry adjusted	Abarbanell and Bushee	1998	The Accounting Review
Gross Margin growth over sales growth	Abarbanell and Bushee	1998	The Accounting Review
Sales growth over inventory growth	Abarbanell and Bushee	1998	The Accounting Review
Sales growth over overhead growth	Abarbanell and Bushee	1998	The Accounting Review
Dividend Yield	Naranjo et al.	1998	Journal of Finance
Past trading volume	Brennan, Chordia, and Subrahmanyam	1998	Journal of Financial Economics
O Score	Dichev	1998	Journal of Financial Economics
Altman Z-Score	Dichev	1998	Journal of Financial Economics
Share Volume	Datar, Naik, and Radcliffe	1998	Journal of Financial Markets

Industry Momentum	Grinblatt Moskowitz	1999	Journal of Financial Economics
Debt Issuance	Spiess Affleck-Graves	1999	Journal of Financial Economics
Piotroski F-score	Piotroski	2000	The Accounting Review
Momentum and Volume	Lee Swaminathan	2000	Journal of Finance
Earnings Forecast	Elgers, Lo, and Pfeiffer	2001	The Accounting Review
Abnormal Accruals	Xie	2001	The Accounting Review
Consensus Recommendation	Barber, Lehavy, McNichols, and Trueman	2001	Journal of Finance
Down forecast EPS	Barber, Lehavy, McNichols, and Trueman	2001	Journal of Finance
Up Forecast	Barber, Lehavy, McNichols, and Trueman	2001	Journal of Finance
Advertising Expense	Chan, Lakonishok, and Sougiannis	2001	Journal of Finance
R&D over market cap	Chan, Lakonishok, and Sougiannis	2001	Journal of Finance
Credit Rating Downgrade	Dichev Piotroski	2001	Journal of Finance
Turnover volatility	Chordia, Subrahmanyam, and Anshuman	2001	Journal of Financial Economics
Volume Variance	Chordia, Subrahmanyam, and Anshuman	2001	Journal of Financial Economics
Short Interest	Dechow, Hutton, Meulbroek, and Sloan	2001	Journal of Financial Economics
Kaplan Zingales index	Lamont, Polk, and Saa-Requejo	2001	Review of Financial Studies
EPS Forecast Dispersion	Diether et al.	2002	Journal of Finance
Breadth of ownership	Chen Hong Stein	2002	Journal of Financial Economics
Amihud's illiquidity	Amihud	2002	Journal of Financial Markets
Inventory Growth	Thomas and Zhang	2002	Review of Accounting Studies
Growth in Long term net operating assets	Fairfield, Whisenant and Yohn	2003	The Accounting Review

Governance Index	Gompers, Ishii and Metrick	2003	Quarterly Journal of Economics
Excluded Expenses	Doyle et al.	2003	Review of Accounting Studies
Order backlog	Rajgopal, Shevlin and Venkatachalam	2003	Review of Accounting Studies
Operating Cash flows to price	Desai, Rajgopal, and Benkatachalam	2004	The Accounting Review
Taxable income to income	Lev and Nissim	2004	The Accounting Review
Net Operating Assets	Hirschleifer, Hou Teoh, and Zhang	2004	Journal of Accounting and Economics
Unexpected R&D increase	Eberhart et al.	2004	Journal of Finance
52 week high	George and Hwang	2004	Journal of Finance
Change in recommendation	Jegadeesh et al.	2004	Journal of Finance
Firm Age - Momentum	Zhang	2004	Journal of Finance
Investment	Titman, Wei, and Xie	2004	Journal of Financial and Quantitative Analysis
Change in Forecast and Accrual	Barth and Hutton	2004	Review of Accounting Studies
Book-to-market and accruals	Bartov and Kim	2004	Review of Quantitative Finance and Accounting
Change in equity to assets	Richardson, Sloan Soliman and Tuna	2005	Journal of Accounting and Economics
Change in current operating assets	Richardson, Sloan Soliman and Tuna	2005	Journal of Accounting and Economics
Change in current operating liabilities	Richardson, Sloan Soliman and Tuna	2005	Journal of Accounting and Economics
Change in financial liabilities	Richardson, Sloan Soliman and Tuna	2005	Journal of Accounting and Economics
Change in long-term investment	Richardson, Sloan Soliman and Tuna	2005	Journal of Accounting and Economics
Institutional ownership interactions with anomalies	Nagel	2005	Journal of Finance
Institutional Ownership for stocks with high short interest	Asquith, Pathak, and Ritter	2005	Journal of Financial Economics
Mohanram G-score	Mohanram	2005	Review of Accounting Studies

Price delay	Hou and Moskowitz	2005	Review of Financial Studies
Net debt financing	Bradshaw, Richardson, and Sloan	2006	Journal of Accounting and Economics
Net equity financing	Bradshaw, Richardson, and Sloan	2006	Journal of Accounting and Economics
Net external financing	Bradshaw, Richardson, and Sloan	2006	Journal of Accounting and Economics
IPO and no R&D spending	Gou, Lev, and Shi	2006	Journal of Business, Finance and Accounting
Change in capex (two years)	Anderson and Garcia-Feijoo	2006	Journal of Finance
Idiosyncratic risk	Ang, Hodrick, Xing, and Zhang	2006	Journal of Finance
Intangible return	Daniel and Titman	2006	Journal of Finance
Share issuance (5 year)	Daniel and Titman	2006	Journal of Finance
Pension Funding Status	Franzoni and Martin	2006	Journal of Finance
Industry concentration (Herfindahl)	Hou and Robinson	2006	Journal of Finance
operating profits / book equity	Fama and French	2006	Journal of Financial Economics
Revenue Surprise	Jegadeesh and Livnat	2006	Journal of Financial Economics
Days with zero trades	Liu	2006	Journal of Financial Economics
Momentum and LT Reversal	Chan and Kot	2006	Journal of Investment Management
Enterprise component of BM	Penman, Richardson, and Tuna	2007	Journal of Accounting Research
Leverage component of BM	Penman, Richardson, and Tuna	2007	Journal of Accounting Research
Net debt to price	Penman, Richardson, and Tuna	2007	Journal of Accounting Research
Junk Stock Momentum	Avramov, Chordia, Jostova, and Philipov	2007	Journal of Finance
Net Payout Yield	Boudoukh, Michaely, Richardson, and Roberts	2007	Journal of Finance

Payout Yield	Boudoukh, Michaely, Richardson, and Roberts	2007	Journal of Finance
Earnings surprise of big firms	Hou	2007	Review of Financial Studies
Industry return of big firms	Hou	2007	Review of Financial Studies
Asset Turnover	Soliman	2008	The Accounting Review
Change in Asset Turnover	Soliman	2008	The Accounting Review
Change in Noncurrent Operating Assets	Soliman	2008	The Accounting Review
Change in Net Working Capital	Soliman	2008	The Accounting Review
Change in Profit Margin	Soliman	2008	The Accounting Review
Profit Margin	Soliman	2008	The Accounting Review
Failure probability	Campbell, Hilscher, and Szilagyi	2008	Journal of Finance
Asset Growth	Cooper, Gulen and Schill	2008	Journal of Finance
Share issuance (1 year)	Pontiff and Woodgate	2008	Journal of Finance
Return Seasonality	Heston and Sadka	2008	Journal of Financial Economics
Decline in Analyst Coverage	Scherbina	2008	Review of Finance
Composite debt issuance	Lyandres, Sun and Zhang	2008	Review of Financial Studies
Earnings Consistency	Alwathainani	2009	British Accounting Review
Tangibility	Hahn and Lee	2009	Journal of Finance
Sin Stock (selection criteria)	Hong Kacperczyk	2009	Journal of Financial Economics
Efficient frontier index	Nguyen Swanson	2009	Journal of Financial and Quantitative Analysis
earnings / assets	Balakrishnan, Bartov, and Faurel	2010	Journal of Accounting and Economics
Maximum return over month	Bali, Cakici, and Whitelaw	2010	Journal of Finance
Volatility smirk	Xing Zhang Zhao	2010	Journal of Financial and Quantitative Analysis

Sustainable Growth	Lockwood Prombutr	2010	Journal of Financial Research
Operating Leverage	Novy-Marx	2010	Review of Finance
Real estate holdings	Tuzel	2010	Review of Financial Studies
Percent Operating Accruals	Hafzalla, Lundholm, and Van Winkle	2011	The Accounting Review
Percent Total Accruals	Hafzalla, Lundholm, and Van Winkle	2011	The Accounting Review
Real dirty surplus	Landsman et al.	2011	The Accounting Review
Change in Taxes	Thomas and Zhang	2011	Journal of Accounting Research
Slope of smile	Yan	2011	Journal of Financial Economics
Enterprise Multiple	Loughran and Wellman	2011	Journal of Financial and Quantitative Analysis
Deferred Revenue	Prakash and Sinha	2012	Contemporary Accounting Research
Conglomerate return	Cohen and Lou	2012	Journal of Financial Economics
Option Volume relative to recent average	Johnson So	2012	Journal of Financial Economics
Option Volume to Stock Volume	Johnson So	2012	Journal of Financial Economics
Intermediate Momentum	Novy-Marx	2012	Journal of Financial Economics
Cash to assets	Palazzo	2012	Journal of Financial Economics
Number of consecutive earnings increases	Loh Warachka	2012	Management Science
Organizational Capital	Eisfeldt and Papanikolaou	2013	Journal of Finance
Dividends	Hartzmark Salomon	2013	Journal of Financial Economics
gross profits / total assets	Novy-Marx	2013	Journal of Financial Economics
Employment growth	Belo, Lin, and Bazdresch	2014	Journal of Political Economy
Tail risk beta	Kelly and Jiang	2014	Review of Financial Studies
Growth in advertising expenses	Lou	2014	Review of Financial Studies
Cash-based operating profitability	Ball, Gerakos, Linnainmaa, and Nikolaev	2016	Journal of Financial Economics

Convertible debt indicator	Valta	2016	Journal of Financial and Quantitative Analysis

Source: https://en.wikipedia.org/wiki/Market_anomaly

Panel B

Market anomalies (part 2), publications per year:

Market anomaly sorted by year	Count (publications)
1973	**1**
CAPM beta squared	1
1977	**1**
Earnings-to-Price Ratio	1
1980	**1**
Book to market	1
1981	**1**
Size	1
1984	**1**
Earnings Surprise	1
1985	**3**
January Effect	1
Long-run reversal	1
Momentum-Reversal	1
1986	**2**
Bid-ask spread	1
Weekend Effect	1
1988	**1**
Market leverage	1
1989	**1**
Short term reversal	1
1991	**1**
Initial Public Offerings	1
1992	**1**
Change in depreciation to gross PPE	1
1993	**3**
Momentum (12 month)	1
Momentum (6 month)	1
Spinoffs	1
1994	**3**
Cash flow to market	1
Revenue Growth Rank	1
Turn of the Month Effect	1
1995	**5**
Dividend Initiation	1
Dividend Omission	1
Exchange Switch	1
Public Seasoned Equity Offerings	1
Share repurchases	1
1996	**9**
Accruals	1

Cash-flow variance	1
Earnings announcement return	1
Earnings forecast revisions	1
Long-term EPS forecast	1
net income / book equity	1
Sales-to-price	1
Volume to market equity	1
Volume Trend	1
1998	**9**
Altman Z-Score	1
Change in capital investment, industry adjusted	1
Dividend Yield	1
Gross Margin growth over sales growth	1
O Score	1
Past trading volume	1
Sales growth over inventory growth	1
Sales growth over overhead growth	1
Share Volume	1
1999	**2**
Debt Issuance	1
Industry Momentum	1
2000	**2**
Momentum and Volume	1
Piotroski F-score	1
2001	**12**
Abnormal Accruals	1
Advertising Expense	1
Consensus Recommendation	1
Credit Rating Downgrade	1
Down forecast EPS	1
Earnings Forecast	1
Kaplan Zingales index	1
R&D over market cap	1
Short Interest	1
Turnover volatility	1
Up Forecast	1
Volume Variance	1
2002	**4**
Amihud's illiquidity	1
Breadth of ownership	1
EPS Forecast Dispersion	1
Inventory Growth	1
2003	**4**
Excluded Expenses	1
Governance Index	1
Growth in Long term net operating assets	1

Order backlog	1
2004	**10**
52 week high	1
Book-to-market and accruals	1
Change in Forecast and Accrual	1
Change in recommendation	1
Firm Age - Momentum	1
Investment	1
Net Operating Assets	1
Operating Cash flows to price	1
Taxable income to income	1
Unexpected R&D increase	1
2005	**9**
Change in current operating assets	1
Change in current operating liabilities	1
Change in equity to assets	1
Change in financial liabilities	1
Change in long-term investment	1
Institutional Ownership for stocks with high short interest	1
Institutional ownership interactions with anomalies	1
Mohanram G-score	1
Price delay	1
2006	**14**
Change in capex (two years)	1
Days with zero trades	1
Idiosyncratic risk	1
Industry concentration (Herfindahl)	1
Intangible return	1
IPO and no R&D spending	1
Momentum and LT Reversal	1
Net debt financing	1
Net equity financing	1
Net external financing	1
operating profits / book equity	1
Pension Funding Status	1
Revenue Surprise	1
Share issuance (5 year)	1
2007	**8**
Earnings surprise of big firms	1
Enterprise component of BM	1
Industry return of big firms	1
Junk Stock Momentum	1
Leverage component of BM	1
Net debt to price	1
Net Payout Yield	1
Payout Yield	1

2008	**12**
Asset Growth	1
Asset Turnover	1
Change in Asset Turnover	1
Change in Net Working Capital	1
Change in Noncurrent Operating Assets	1
Change in Profit Margin	1
Composite debt issuance	1
Decline in Analyst Coverage	1
Failure probability	1
Profit Margin	1
Return Seasonality	1
Share issuance (1 year)	1
2009	**4**
Earnings Consistency	1
Efficient frontier index	1
Sin Stock (selection criteria)	1
Tangibility	1
2010	**6**
earnings / assets	1
Maximum return over month	1
Operating Leverage	1
Real estate holdings	1
Sustainable Growth	1
Volatility smirk	1
2011	**6**
Change in Taxes	1
Enterprise Multiple	1
Percent Operating Accruals	1
Percent Total Accruals	1
Real dirty surplus	1
Slope of smile	1
2012	**7**
Cash to assets	1
Conglomerate return	1
Deferred Revenue	1
Intermediate Momentum	1
Number of consecutive earnings increases	1
Option Volume relative to recent average	1
Option Volume to Stock Volume	1
2013	**3**
Dividends	1
gross profits / total assets	1
Organizational Capital	1
2014	**3**
Employment growth	1

Growth in advertising expenses	1
Tail risk beta	1
2016	**2**
Cash-based operating profitability	1
Convertible debt indicator	1
TOTAL	**151**

Panel C

Market anomalies (part 3), publications per subject:

Subject	Year
52 week high	2004
Abnormal Accruals	2001
Accruals	1996
Advertising Expense	2001
Altman Z-Score	1998
Amihud's illiquidity	2002
Asset Growth	2008
Asset Turnover	2008
Bid-ask spread	1986
Book to market	1980
Book-to-market and accruals	2004
Breadth of ownership	2002
CAPM beta squared	1973
Cash flow to market	1994
Cash to assets	2012
Cash-based operating profitability	2016
Cash-flow variance	1996
Change in Asset Turnover	2008
Change in capex (two years)	2006
Change in capital investment, industry adjusted	1998
Change in current operating assets	2005
Change in current operating liabilities	2005
Change in depreciation to gross PPE	1992
Change in equity to assets	2005
Change in financial liabilities	2005
Change in Forecast and Accrual	2004
Change in long-term investment	2005
Change in Net Working Capital	2008
Change in Noncurrent Operating Assets	2008
Change in Profit Margin	2008
Change in recommendation	2004
Change in Taxes	2011
Composite debt issuance	2008
Conglomerate return	2012
Consensus Recommendation	2001
Convertible debt indicator	2016
Credit Rating Downgrade	2001
Days with zero trades	2006
Debt Issuance	1999
Decline in Analyst Coverage	2008
Deferred Revenue	2012
Dividend Initiation	1995
Dividend Omission	1995

Dividend Yield	1998
Dividends	2013
Down forecast EPS	2001
earnings / assets	2010
Earnings announcement return	1996
Earnings Consistency	2009
Earnings Forecast	2001
Earnings forecast revisions	1996
Earnings Surprise	1984
Earnings surprise of big firms	2007
Earnings-to-Price Ratio	1977
Efficient frontier index	2009
Employment growth	2014
Enterprise component of BM	2007
Enterprise Multiple	2011
EPS Forecast Dispersion	2002
Exchange Switch	1995
Excluded Expenses	2003
Failure probability	2008
Firm Age - Momentum	2004
Governance Index	2003
Gross Margin growth over sales growth	1998
gross profits / total assets	2013
Growth in advertising expenses	2014
Growth in Long term net operating assets	2003
Idiosyncratic risk	2006
Industry concentration (Herfindahl)	2006
Industry Momentum	1999
Industry return of big firms	2007
Initial Public Offerings	1991
Institutional Ownership for stocks with high short interest	2005
Institutional ownership interactions with anomalies	2005
Intangible return	2006
Intermediate Momentum	2012
Inventory Growth	2002
Investment	2004
IPO and no R&D spending	2006
January Effect	1985
Junk Stock Momentum	2007
Kaplan Zingales index	2001
Leverage component of BM	2007
Long-run reversal	1985
Long-term EPS forecast	1996
Market leverage	1988
Maximum return over month	2010

Mohanram G-score	2005
Momentum (12 month)	1993
Momentum (6 month)	1993
Momentum and LT Reversal	2006
Momentum and Volume	2000
Momentum-Reversal	1985
Net debt financing	2006
Net debt to price	2007
Net equity financing	2006
Net external financing	2006
net income / book equity	1996
Net Operating Assets	2004
Net Payout Yield	2007
Number of consecutive earnings increases	2012
O Score	1998
Operating Cash flows to price	2004
Operating Leverage	2010
operating profits / book equity	2006
Option Volume relative to recent average	2012
Option Volume to Stock Volume	2012
Order backlog	2003
Organizational Capital	2013
Past trading volume	1998
Payout Yield	2007
Pension Funding Status	2006
Percent Operating Accruals	2011
Percent Total Accruals	2011
Piotroski F-score	2000
Price delay	2005
Profit Margin	2008
Public Seasoned Equity Offerings	1995
R&D over market cap	2001
Real dirty surplus	2011
Real estate holdings	2010
Return Seasonality	2008
Revenue Growth Rank	1994
Revenue Surprise	2006
Sales growth over inventory growth	1998
Sales growth over overhead growth	1998
Sales-to-price	1996
Share issuance (1 year)	2008
Share issuance (5 year)	2006
Share repurchases	1995
Share Volume	1998
Short Interest	2001
Short term reversal	1989

Sin Stock (selection criteria)	2009
Size	1981
Slope of smile	2011
Spinoffs	1993
Sustainable Growth	2010
Tail risk beta	2014
Tangibility	2009
Taxable income to income	2004
Turn of the Month Effect	1994
Turnover volatility	2001
Unexpected R&D increase	2004
Up Forecast	2001
Volatility smirk	2010
Volume to market equity	1996
Volume Trend	1996
Volume Variance	2001
Weekend Effect	1986

APPENDIX B

Proof for growth and efficiency decomposition

Total Asset Growth (Cooper et al 2008) = $\frac{\Delta TAsst}{TAss_{t-1}}$

$$=\Delta Sales_t/Sales_{t-1} - \Delta AT_t/AT_t - (\Delta Sales_t/Sales_{t-1}) * (\Delta AT_t/AT_t)$$

Sales Growth — Change in Efficiency — Interaction

$$\frac{S_t - S_{t-1}}{S_{t-1}} \times \frac{\frac{S_t}{TA_t} - \frac{S_{t-1}}{TA_{t-1}}}{\frac{S_t}{TA_t}} - \frac{S_t - S_{t-1}}{S_{t-1}} \times \frac{\frac{S_t}{TA_t} - \frac{S_{t-1}}{TA_{t-1}}}{\frac{S_t}{TA_t}}$$

$$= \frac{S_t - S_{t-1}}{S_{t-1}} - \left[\frac{\frac{S_t}{TA_t}}{\frac{S_t}{TA_t}} - \frac{\frac{S_{t-1}}{TA_{t-1}}}{\frac{S_t}{TA_t}}\right] - \frac{S_t - S_{t-1}}{S_{t-1}} \times \left[\frac{\frac{S_t}{TA_t}}{\frac{S_t}{TA_t}} - \frac{\frac{S_{t-1}}{TA_{t-1}}}{\frac{S_t}{TA_t}}\right]$$

$$= \frac{S_t - S_{t-1}}{S_{t-1}} - 1 + \frac{\frac{S_{t-1}}{TA_{t-1}}}{\frac{S_t}{TA_t}} - \frac{S_t - S_{t-1}}{S_{t-1}} \times \left[1 - \frac{\frac{S_{t-1}}{TA_{t-1}}}{\frac{S_t}{TA_t}}\right]$$

$$= \frac{S_t - S_{t-1}}{S_{t-1}} - 1 + \frac{\frac{S_{t-1}}{TA_{t-1}}}{\frac{S_t}{TA_t}} - \frac{S_t - S_{t-1}}{S_{t-1}} + \frac{S_t - S_{t-1}}{S_{t-1}} \times \frac{\frac{S_{t-1}}{TA_{t-1}}}{\frac{S_t}{TA_t}}$$

$$= -1 + \frac{S_{t-1}}{TA_{t-1}} \times \frac{TA_t}{S_t} + \frac{S_t - S_{t-1}}{S_{t-1}} \times \frac{S_{t-1}}{TA_{t-1}} \times \frac{TA_t}{S_t}$$

$$= -1 + \frac{S_{t-1}}{TA_{t-1}} \times \frac{TA_t}{S_t} \times \frac{S_{t-1}}{TA_{t-1}} + \frac{S_t - S_{t-1}}{S_{t-1}} \times \frac{S_{t-1}}{TA_{t-1}} \times \frac{TA_t}{S_t}$$

$$= -1 + \frac{S_{t-1} \times TA_t \times S_{t-1}}{TA_{t-1}S_tS_{t-1}} + \frac{S_tS_{t-1}TA_t}{TA_{t-1}S_tS_{t-1}} - \frac{S_{t-1}S_{t-1}TA_t}{TA_{t-1}S_tS_{t-1}}$$

$$= -1 + \frac{S_{t-1}S_{t-1}TA_t}{TA_{t-1}S_tS_{t-1}} + \frac{S_tS_{t-1}TA_t}{TA_{t-1}S_tS_{t-1}} - \frac{S_{t-1}S_{t-1}TA_t}{TA_{t-1}S_tS_{t-1}}$$

$$= -1 + \frac{S_tS_{t-1}TA_t}{TA_{t-1}S_tS_{t-1}}$$

$$= -1 + \frac{TA_t}{TA_{t-1}}$$

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