The Persistence of Accruals and Investment in Operating and Investment Cycle

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Abstract

This paper investigates the relation between investment and accruals to disentangle earning-fixation hypothesis. We decompose total accruals into working capital accruals, long-term investment and non-transaction accruals to test whether the investment can explain the accruals anomalies and behavior in operating and investment cycle. We use the financial information of 135 firms listed on the Tehran Stock Exchange (TSE) from 2005 to 2011 through OLS approach and find that long-term investment and non-transaction accruals are able to predict subsequent net income and free cash flow. Whereas, working capital accruals do not have this ability. To predict subsequent ROA, the persistence of total accruals, Long-term investment and external financing decrease in longer operating cycle. Total accruals are more persistent and non-transaction accruals and external financing are less persistent in the longer investment cycle. Total accruals and external financing are inversely related to subsequent returns, implying that accruals anomalies as well as external financing anomalies exist in our sample. To predict future returns, the persistence of total accruals and working capital accruals decrease, however, the persistence of external financing and non-transaction accruals and long-term investment increase in longer operating cycle. Total accruals and non-transaction accruals are more persistent and working capital accruals and long-term investment are less persistent in longer investment cycle, but the persistence of external financing is not related to investment cycle.

Keywords: Accruals persistence, Accruals anomaly, External financing anomaly, Investment, Operating and investment cycle

1. Introduction

Relatively accurate predictions of future operating results, future cash flows in particular will lead to improved decision makings in operating, investing, and financing subjects. On the other hand, if operating cash flows could be properly predicted, investment decisions and allocating resources will be optimized. FASB (Financial Accounting Standards Board) has emphasized on the role of accruals in helping investors to predict future cash flow, but some researchers believe that the estimates of accruals are subjective (Dechow & Dichev, 2002). Hence, by defining accruals, corporate managers can render misleading information, which does not represent the company's future performance. Misanalysis of accruals causes differences in future stock returns with what it is expected to be. "Information about net income and its components, measured by the accrual concept, generally provides a better indication of current operating performance than does information about current cash receipts and payments"(FASB, 1978).

Earnings are the main source of information that evaluate the profitability of future cash flow and have been separated into two components: cash and accruals.

$$\text{Earnings= cash component + accrual component}$$

$$E_t = CF_t + \text{Accrual}_t$$

Accruals can be divided into two separate components:

1. *Discretionary accruals* are the components that managements can impose controls on it.
2. *Non-discretionary accruals* are the components that managements cannot impose controls on it.

Moreover, accruals can also be classified into two other categories:

1. *Current Accruals* that reflect the current short-term differences that affect the working capital account. Current accruals are defined as changes in current accounts, excluding accounts which are not reflected in measuring of interest.
2. *Non-current accruals* that derive from the difference between total accruals and current accruals. This item has long-term nature and does not affect working capital account.

Our primary goal is to test whether investment-related and non-transaction accruals differ in their predictive power for subsequent earnings. Using persistence of accruals to measure accrual reliability, we not only investigate one branch of two competing hypotheses for the accrual anomaly: investment/growth and persistence, but also study on whether accrual reliability and earning persistence are affected by the length of operating and investment cycle. Thus, we decompose total accruals (changes in a firm's net operating assets) into working-capital accruals (changes in non-cash net working capital), long-term investment accruals (representing new expenditures on long-term net operating assets), and an estimate of non-transaction accruals obtained from the Statement of Cash Flows. Our measure of non-transaction accruals is presumably imperfect, but we argue that the decomposition provides an effective way to isolate a component of accruals that is linked primarily to accounting, rather than investment decisions.

Our paper contributes to the accounting and finance literature in several ways. First, we show that by controlling current cash flows, total accruals and non-transaction accruals are negatively and long-term investment is positively related to subsequent net income, but working capital accruals do not. In addition, cash flows and total accruals have approximately same coefficient and this indicates that the persistence of operating cash flow and total accruals is nearly equal. Among the components of accruals, long-term investment is the most powerful predictor of future profits and the predictive power of non-transaction accruals is derived more from depreciation. Comparing three models of the first hypothesis, we find that decomposition of accruals into changes in working capital accruals, long-term investment and non-transaction accruals does not enhance the predictive power of accruals.

Second, our tests show that by controlling current cash flow, total accruals, long-term investment and non-transaction accruals are positively related to subsequent free cash flow. Also, our tests show that there is no relation between changes in working capital accruals and future free cash flow. In addition, among accruals components, non-transaction accruals have greater ability in predicting future free cash flow and the predictive power of that is derived from both other accruals and depreciation.

Moreover, Comparing three models of the second hypothesis, we find that decomposition of accruals to changes in working capital accruals, long-term investment and non-transaction accruals helps to enhance the predictive power of accruals.

Third, we documented that by controlling for current ROA, total accruals and stock issuance are negatively and changes in working capital accruals and long-term investment are positively related to subsequent return on assets and there is no relationship between non-transaction accruals and subsequent ROA. Furthermore, according to the analysis, we find a negative relationship between external financing and return on asset. The results indicate that the persistence of total accruals, long-term investment and external financing are negatively related to operating cycle. That is, the predictive power of total accruals, long-term investment and external financing will decrease in longer operating cycle. Moreover, the predictive ability of working capital accruals and non-transaction accruals are not linked up to operating cycle. Comparing models, we can conclude that among accruals and its components, total accruals are more persistent in longer operating cycles.

Next, we show that the persistence of total accruals is positively and the persistence of external financing is negatively related to investment cycle. The relationship between the persistence of changes in working capital accruals and investment cycle is rejected with 95% confidence. In other words, there is no relationship between the predictive power of changes in working capital accruals and investment cycle. In addition, the persistence of non-transaction accruals is negatively and that of long-term investment is positively related to investment cycle. It means that, the predictive power of non-transaction accruals decreases and the predictive power of long-term investment increases in longer investment cycle.

Fourth, we point out that by controlling for current ROA, total accruals and external financing have a negative relationship with future stock returns which shows accruals and external financing anomaly. In addition, higher persistence of external financing compared to (in comparison with) total accruals indicates higher predictive ability of external financing in longer operation cycle. Moreover, we find that there is a positive relationship between changes in working capital accruals, long-term investment and negative relationship between non-transaction accruals and subsequent stock return. The results show that the persistence of total accruals, working capital accruals and stock issuance is negatively related to operating cycle. In other words, the predictive power of total accruals, working capital accruals and stock issuance will diminish in longer operating cycle. The predictive power of long-term investment, non-transaction accruals and external financing will increase in longer operating cycle. Comparing models, we can conclude that among accruals, working capital accruals is the least persistent component of accruals in longer operating cycles.

Next, we show that the persistence of total accruals and non-transaction accruals are positively related to investment cycle. It means that, the predictive power of total accruals and non-transaction accruals increases in longer investment cycle. The relation between the persistence of annual changes in debt and external financing and investment cycle are rejected with 95% confidence. In other words, there is no relationship between the predictive power of annual changes in debt and external financing and investment cycle.

2. Prior literature and hypothesis development

2.1 Prior literature:

Traditionally, the accounting literature measures accruals as changes in working capital. Like investment in fixed assets, changes in working capital are an integral part of the firm's business growth and represent one form of investment. Investment in working capital should also be positively related to the outcomes of firms' investment activities (e.g., actual sales) if investment is, on average, optimal (Zhang, 2007).

Sloan focused on the relation between accruals and earnings and argued that investors are focusing on the total revenues of the company and they are unaware of the differential persistence of accruals and cash flows. In other words, Sloan shows that, controlling for total earnings, firms with higher accruals tend to have lower subsequent profits and he suggests that investors do not understand this relation (Lewellen & Resutek, 2013).

Fairfield, Whisenant, and Yohn (2003) Show that changes in long-term net operating assets have the predictive power similar to that of working-capital accruals, implying that a combined measure—the change in a firm's overall net operating assets—encompass the predictive ability of both short-term and long-term accruals. The interpretation of negative relation between the measure of external financing and future stock returns have been recorded in the finance literature of researchers such as Loughran and Ritter (2004); Daniel and Titman (2006). Bowen, Burgstahler, and Daley (1987) examine the incremental information content of accruals and cash. The results indicate that the information about cash flow has incremental information content of earnings. Also, the information about cash flow has incremental information content of both earnings and working capital and information on accruals (operating income and working capital), individually as well as together, has incremental information content of cash flows.

Fama and French (2006) and Wu, Zhang, and Zhang (2010) argue that investment responds to intellectual changes and affects the firm's cost of equity. A lower cost of equity should lead both to higher current investment and to lower future (expected) stock returns (Lewellen & Resutek, 2013).

2.1.1 Accruals Anomaly

The negative relationship between accruals and future stock return is called accrual anomaly in accounting and financing literature. The accrual anomaly is one of the strongest and most striking asset-pricing anomalies. Sloan (1996) finds that accruals, defined in his paper as the changes in net working capital minus depreciation, are negatively related to subsequent stock returns after controlling for a firm's size, beta, and other characteristics and concludes that stocks in the bottom accrual decile outperform those in the top accrual decile by roughly 10% annually. The concept of accruals anomaly is: investors estimate subsequent stock returns according to past information and when subsequent returns are declared, the amount of profits, regarding the reversal movement of accruals, will be lower or higher than investors' expectations and this leads to surprise investors. The interpretation of the accrual anomaly remains an important and ongoing challenge. Two competing explanations have been offered in the literature, one focusing on the link between accruals and earnings and the other focusing on the link between accruals and investment (Lewellen & Resutek, 2013).

In some cases, reactions to the information obtained from the stock market are not rational and cause abnormalities such as excessive increase or decrease in prices. Over-reaction or under-reaction occurs when Individuals with regard to the new information, determine the stock price greater or less than its fundamental value.

Ideally, financial consequences of business transactions and events are in one period and this causes reported accruals reach closer to the future cash flows. It means that operating cycle and investment cycle of the entity are very short. In this case, net cash received shows the performance of business and personal judgments will not have any place. But in real situations, business unit's cash received and paid occur in periods that business transactions and financial events are different from each other. In this case, not necessarily, earnings will equal to net cash received. So it can be expected that the persistence of accruals reported in the second case is lower than the first case and expected return of investment is low too. To predict future earnings, investors do not fully understand the persistence between accruals and cash flow so they give more weight to accruals than cash flows and gain lower returns. In this way, investors are caused to be very optimistic about future performance of companies with high accruals and pessimistic about low accruals companies; therefore the stock of companies mispriced illogically. In fact, investors focus on earnings clumsily and awkwardly and unable to fully identify accruals and cash flows. This interpretation is called "*earnings-fixation hypothesis*" (Sloan, 1996).

As in many studies have been shown, including Sloan (1996) and Xie (2001), low persistence of accruals is due to the poor quality of accounting information and it is because of the relation between accrual component of earnings and management estimates and predictions which reduces the reliability of information. One branch of the literature, continues Sloan, relates accruals to the earnings persistence. For example, Sloan (1996) documented that the relevance between total accruals and average returns is strongly correlated with discretionary accruals. Xie (2001) establishes a model showing that less reliable accruals lead to lower earnings persistence.

Another branch of the literature links accruals to the growth/investment features. S. A. Richardson, Sloan, Soliman, and Tuna (2005) state that the negative relation between accruals and future abnormal returns documented by Sloan (1996) is due mainly to inventory changes and assume that investors do not understand the provisional nature of growth. Furthermore, Thomas and Zhang (2001) focus on the link between accruals and investment. They decompose growth in net operating assets into accruals and growth in long-term net operating assets and find that both components of growth in net operating assets (accruals and growth in long-term net operating assets) have equivalent negative associations with one-year-ahead return on assets. They also find that the market appears to equivalently overvalue accruals and growth in long-term net operating assets relative to their association with one-year-ahead ROA.

Fairfield et al. (2003) state that when equity and debt are overvalued, firms choose to invest more and have high accruals to exploit the cheap financing provided by overoptimistic investors. This interpretation is consistent with the negative relation between external-financing measures and future stock returns documented in the finance literature.

Dechow and Dichev (2002) measure accruals as a function of past, current and future cash flows. The popular model of (Jones, 1991) measures accruals as a function of changes in earnings, and under this assumption working capital accounts such as accounts receivable is proportional to earnings and depreciation expenses is calculated directly from gross property and equipment.

Hirshleifer, Hou, Teoh, and Zhang (2004) show that net operating assets forecast long-term returns negatively and argue that investors are not able to discount earnings growth volatility. The majority of investment projects becomes profitable when the discount rate is reduced and as a result accruals increased. However, current returns should be increased as the stock prices rise due to lower discount rate. On the other hand, future returns should be reduced because of the lower discount rate. Thus, if investment is adjusted optimally to changes in the discount rate, accruals will relate positively to current returns and negatively to the future returns.

2.1.2 External financing anomaly

Firms need cash for operating and investing activities. This requires cash, preparing from financing activities and operation. The main objective of financing activities is to reduce cost of capital and increase the value of the company. Financial experts divided funding sources into two parts: internal resources and external resources. It's interior includes cash flows from operations, cash from sale of assets and retained earnings and exterior includes borrowings and issuance of stock. The negative relationship between external financing activities and future stock returns is discussed in accounting literature as the external financing anomaly. Two hypotheses have been proposed toward the impact of external financing on future stock returns: misevaluation of securities and over investment.

Although both above hypotheses predict a negative relationship between external financing and subsequent stock return, they have distinct predictions about the impact of the components of external financing.

1. According to the misevaluation hypothesis, the relation between stock issuance and subsequent return is much stronger than the relation between debt and future stock because stock prices are more sensitive to changes in firm value. Moreover, each component of debt has a distinct relation to future stock return. A greater relationship exists between long-term debt and future stock return because such liabilities are more sensitive to changes in firm value. Conversely, short-term debt has the least sensitivity to changes in firm value and has a weak relationship with subsequent stock return.
2. Over investment hypothesis, based on the increase in capital expenditure. According to this hypothesis, there is a direct relationship between external financing transactions and over investment decisions. It means that, the higher the amount of issuance, the greater the amount of investment so that sometimes this can lead to over investment.

Bradshaw, Richardson, and Sloan (2006) show that net financing activities negatively predict future stock return. They point out that the results are consistent with market timing hypothesis that proposed by Loughran and Ritter (2004). This hypothesis suggests negative relationship between net equity and future returns and explain that when shares encounter over (under) valuation, firms issue (redeem) stock to exploit this temporary mispricing. On the other hand Dechow, Richardson, and Sloan (2008) argue that the negative relation represents accrual anomaly that firms with higher accruals obtained lower yields. They suggest that the negative relation between future stock returns and financing is explained by earning management. This hypothesis argues that when firms decide to increase (decrease) in external financing, managements raise (reduce) their earnings through accruals for increasing (decreasing) income distribution.

2.1.3 Operating cycle and investment cycle

According to Dechow (1994), the operating cycle measures the average time elapsing between the disbursement of cash to produce a product and the receipt of cash from the sale of the product. In addition, he states that the operating cycle determines the amount of working capital, and firms with longer operating cycle require higher working capital in order to maintain their operational activities normal. So firms with longer operating cycle are expected to have higher working capital. Increasing in cash flows from operation reduces accruals and therefore any increase in operating cash flows (the firm's operating cycle becomes shorter), will cause reduction in the required firm's working capital. Hence, the operating cycle of the company has always been one of the most important factors to determine the amount of working capital and we cannot estimate the amount of firm's required working capital via operating income (Dechow, 1994).

To predict cash flows, specifying accruals are required. In addition to accruals, the quality of accruals is also affecting the firm's prediction of future cash flows. Since the quality of accruals reduces with the increase of errors in the predictions, the firm's ability to predict cash flows has also reduced. The low prediction errors are one of the important benchmarks of accrual's quality. Whenever a firm's operating cycle is short, due to the short distance between the creation time of accruals and maturities of these items, the predictability of mentioned items increase in proportion to firms with longer operating cycle. This increases the quality of accruals generated by companies with shorter operating cycle. Also, there may be a decrease in mispricing of accruals due to the high quality of that.

Chiu, Li, and Radhakrishnan (2013) state that in comparison with short investment cycles, long investment cycles will require firms to have better forecasting ability which in turn would make the working capital and non-current operating accruals more reliable. The persistence of total accruals decreases with operating cycle and increases with investment cycle. In addition, operating cycle is associated with less reliable working capital accruals, and investment cycle is associated with more reliable working capital and non-current operating accruals. Chiu et al. (2013) document that firms with shorter operating cycle or longer investment cycle have higher accruals anomaly, suggesting that investors fail to incorporate the impact of operating cycle and investment cycle on the persistence of accruals.

2.2 Hypothesis development:

As FASB (1978) has emphasized, the prediction of business unit performance can be useful in evaluating firm's securities. Information about enterprise earnings and its components measured by accrual accounting generally provides a better indication of enterprise performance than information about current cash received and paid. Investors, creditors and others often use reported earnings and information about the components of earnings for (a) evaluate management's performance, (b) estimate "earning power" or other amounts they perceive as "representative"

of long-term earning ability of an enterprise, (c) predict future earnings, or (d) assess the risk of investing in or lending to an enterprise (FASB, 1978).

As mentioned above, earnings are equal to operating cash flows plus accruals.

$E_t = CF_t + Accrual_t$

The goal, following Sloan (1996) and others, is to explore the differential predictive ability of accruals and cash flow, or equivalently, to test whether accruals help to predict a firms' future performance after controlling for current profits. So, we examine that whether different components of accruals have the predictive power of future earnings.

H_1: Working capital accruals, long-term investment and non-transaction accruals have the ability to predict future net income.

Without cash, it is hard to develop new products, make acquisitions, pay dividends and reduce debt. Free cash flow (FCF) represents the cash that a company can generate after reserving the money required to maintain or expand its asset base. Free cash flow is important because it allows a company to pursue opportunities that enhance shareholder value. Earnings can often be manipulated by accounting gimmicks, but it is difficult to falsify cash flow. For this reason, some investors believe that FCF gives a much clearer view of the ability to generate cash (and thus profits). For this reason, some investors believe that we can obtain more realistic results by focusing on FCF.

It is important to note that negative free cash flow is not bad itself. If free cash flow is negative, it could be a sign that a company is making large investments. If these investments earn a high return, the strategy is likely to pay off in the long run. Free cash flow adjusts earnings by adding depreciation and amortization and subtracting changes in working capital and capital expenditures (S. A. Richardson et al., 2005).

FCF= NI – Accruals

The above discussion leads to the following testable hypotheses:

H_2: Working capital accruals, long-term investment and non-transaction accruals have the ability to predict future free cash flows.

Esfahani and Ghasanfarymojarad (2013) show that there is a strong and significant relationship between debt ratio and return on assets among the companies listed on TSE and most industries especially based metals at the confidence level of 95%. In contrast, there is no strong and significant relationship between debt ratio and sales growth in the above-mentioned companies and in most industries.

Lewellen and Resutek (2013) mention that Investment expenditures—and accruals more generally—should relate to a firm's demand for external capital. They show that long-term investment and changes in net operating assets correlate with changes in a firm's debt (annual changes in debt) and with new equity issuance (Issues).

Sloan (1996) regresses one-year-ahead ROA on the accrual and cash flow components of current ROA and finds that accruals are less persistent than cash flows. Fairfield et al. (2003) argue that growing firms tend to have lower profitability resulting from diminishing marginal returns on increased investments and they find a negative relation between growth in net operating assets (NOA) and one-year-ahead return on assets (ROA). More importantly, they argue accruals are not only a component of profitability, but also a component of growth in NOA.

The underlying question is whether accruals or external financing has stronger predictive power for subsequent performance.

A firm's operating cycle and investment cycle could have opposite effects on the noise-to-information ratio of accruals, suggested by two competing perspectives, namely, the matching perspective and the reliability perspective. From the matching perspective, cash flows of firms with longer operating cycle or investment cycle have more serious timing and matching problems, so accruals that are designed to mitigate those problems are likely to contain more investment/growth information and thus have better predictive ability for future profitability (Dechow, Kothari, & L Watts, 1998). Suppose a firm has an extremely short operating cycle, (e.g., just-in-time) with little accounts payables and receivables, so it's working capital accruals will be close to zero and uninformative about future profitability. On the contrary, the reliability perspective suggests that accruals will be less reliable and contain more measurement errors as a firm's operating cycle or investment cycle increases because managers will have more subjectivity in allocating cash flows over a longer period leading to estimation errors e.g.,(S. A. Richardson et al., 2005). For example, when the firm has a longer operating and investment cycle, managers will be more cautious in estimating uncollectibles and depreciation expenses.

Furthermore, companies that have a longer investment cycle are likely to need information on long-term growth so they can make informed investment decisions. As such, companies with longer investment cycle are likely to have better forecasts of long-term growth, which in turn enhances the reliability of the short-term accruals as well. This is highlighted using the supply chain example. Procter and Gamble, who supply to small mom-and-pop retailers need to invest in manufacturing facilities and thus are likely to have long investment cycles. As such, they need to have good forecasting ability to make their investment decisions. In the operations management literature, collaborative forecasting models and information sharing among members of the supply chain are examples that highlight this point – specifically, retailers are urged to provide demanded information to suppliers so that the savings arising from better quality of investment decisions made by the suppliers can be shared with the retailer (Chiu et al., 2013). This intuition relating investment cycle and operating cycle to the reliability of accruals is stated as the following hypothesis:

H_3: The predictive power of accruals on firms` performance is less than external financing. The persistence of total accruals relative to external financing decreases more in a longer operating cycle and investment cycle.

Butler, Cornaggia, Grullon, and Weston (2011) found that the net external financing is able to predict future stock returns and the relationship between them is negative; but the components of net external financing do not have this ability.

Rezaei, Kazemtabrizi, and Moshtaghin (2013) work on the Impact of external financing methods on firm's future return focusing on working capital and long-term accruals. The results from this study shows that under conditions of low levels of working capital accruals, external financing through the capital has a significant negative relationship with future stock returns. But the relationship between the financing activities through debt and future stock returns, in low and high levels of working capital accruals is not significant. Consequently, the financing activities through debt, have no effect on future stock returns.

S. Richardson and Sloan (2003) show that the relation between the measure of net external financing and future stock returns is stronger than has been documented in previous research. They focus on individual categories of financing transactions and find that the negative relation between external financing and future stock returns is more consistent with a combination of over-investment and aggressive accounting. Lewellen and Resutek (2013), consistent with the results of Fama and French (2008) but contrary to Dechow et al. (2008), show that accruals and external-financing have distinct predictive power for returns. In Fama-MacBeth regressions, accruals, net debt issuance, and net stock issuance are all significant predictors of returns when used in the same regression.

In terms of financing sources, firms are divided into two categories according to their financing policy: (1) internal financial funds (2) external financial funds. In former, companies use gained profit for financing. It means that instead of dividend distribution, they use profit for the company's operation in order to have higher returns. In contrast, external financing companies use debt and also issue securities (Titman & Grinblatt, 1998).

For evaluating the next hypothesis, we test whether the different types of accruals have predictive power for subsequent stock returns. Fairfield et al. (2003) and S. A. Richardson et al. (2005) find that changes in long-term net operating assets (LTNOA) help to predict future returns, but this paper tests whether this predictability comes from investment expenditures or non-transaction accruals.

Investors should consider the reduction in the future profitability level as a result of a shorter persistence of current accruals than cash flow items and negative associations between current accruals and abnormal future returns in the companies. In other words, although empirical evidence indicates that high accrual levels enhance the probability of reductions in future profitability, investors' expectations—reflected in stock prices—demonstrate that they did not use information about the persistence of accruals in their analyses.

H_4: Working capital accruals, long-term investment, non-transaction accruals and external financing have the ability to predict subsequent stock return. Accruals anomaly relative to external financing anomaly decrease more in longer operating cycle and investment cycle.

Accrual anomaly arises because investors do not value the differential persistence of accruals and cash flows (Koerniadi & Tourani-Rad, 2007). These investors tend to hold relatively large positions in low-accruals companies, and small positions in high-accruals companies. Given the seemingly simple exploitation strategy of the accruals anomaly — investing long in low-accruals companies and shorting high-accruals companies — one would expect that sophisticated investors will cause the anomaly to dissipate quickly and vanish ultimately. If accrual persistence is industry or firm-specific, depending on a firm's specific business model, then the persistence argument suggests a stronger accrual anomaly for industries/firms with less persistent accruals (Zhang, 2007).

3. Sample and Research Design

3.1 Sample Selection:

The present study is based on applied objective and its data are collected by ex-post factor approach (through the past information) and the method of data analysis is descriptive-correlative. The study sample includes companies listed on the Tehran Stock Exchange for a period of seven years (2005-2011). We exclude financial, investment institutions, banks, insurance firms, leasing and holding companies. Furthermore, the samples studied in this research have been selected according to the following criteria:

1- In order to increase comparability the end of companies' fiscal year should be on March 19.

2- The companies should not have changed their financial year during the study period.

3- Complete information of all studied companies should exist during seven years of the study period.

After determination of appropriate sample based on these conditions, to select a random sample of the target population, the initial sample was generated (202 firms). Finally, 56 firms in the sample were determined randomly at 95% confidence level. According to statistical theory bias in the estimated parameters gets lower with increasing sample size, so the number of firms, randomly selected from a target population, increased to 135 companies.

3.2 Variable definitions

Our empirical strategy in this paper based on the imperfect connection between accruals and investment. Thus, we attempt to isolate accruals that are not directly linked to current investment expenditures and to test whether these components have different implications for subsequent earnings, returns, cash flow and performance. Our analysis focuses on the study of Fairfield et al. (2003), S. A. Richardson et al. (2005), Dechow et al. (2008), Lewellen and Resutek (2013) and Chiu et al. (2013).

As mentioned before, earnings are equal to operating cash flows plus accruals.

$E_t = CF_t + Accrual_t$

Total accruals = change in net operating assets (ΔNOA)

So we can rewrite this formula as:

$$E_t = CF_t + \Delta NOA \quad (1)$$

NOA can be defined as non-cash assets minus non-debt liabilities, or the sum of non-cash net working capital (WC) and long-term net operating assets (LTNOA); the latter defined as long-term assets minus long-term operating liabilities. Thus, total accruals can be expressed as:

$$\Delta NOA = \Delta WC + \Delta LTNOA \quad (2)$$

Then we break each term in this equation into a component that reflects new investment expenditures and a component that reflects changes in the capitalized value of investments made in prior years.

Change in net operating assets = Change in working capital + Long-term investment + Non-transaction accruals

Notice that non-transaction accruals represent negative accruals, so their sum defines the negative of NTAcc.

$$InvAcc = \Delta LTNOA - NTAcc \quad (3)$$

The logic is that changes in a firm's long-term net operating assets reflect either net new investment made by the firm, such as acquisitions or purchases of plant and equipment, or changes in the capitalized value of investments made in prior years, which are reflected in NTAcc through items such as depreciation, deferred taxes, and asset write-downs. Therefore, the portion of ΔLTNOA remaining after taking out non-transaction accruals should provide a better measure of new investment than the total change (Lewellen & Resutek, 2013).

$$\Delta NOA = \Delta WC + InvAcc + NTAcc \quad (4)$$

Earnings adjusted for non-transaction accruals provide a measure of operating cash flow (CF) before working capital and long-term investment:

$$CF = NI - NTAcc, \quad (5)$$

The firm's free cash flow can then be defined in two equivalent ways.

First, following (Dechow et al., 2008), free cash flow can be expressed as the difference between net income and total accruals:

$$FCF = NI - \Delta NOA. \quad (6)$$

Second, subtracting NTAcc from both terms on the right-hand side of this equation, we can re-express FCF as:

$$FCF = CF - \Delta WC - InvAcc. \quad (7)$$

The research variables are summarized in table 1.

Table 1. Variable definitions

Variables	Definition
NI	Net income
CF	Operating cash flow before working capital investments (NI – NTAcc)
ROA	Operating income after depreciation/ Average of total assets in year t and year t+1
NOA	Net operating assets (total assets – cash – total liabilities + debt)
WC	Net working capital (current assets – cash – current liabilities + short-term debt)
FCF	Free cash flow (NI – dNOA)
dNOA	Annual change in NOA
dWC	Annual change in WC
dLTNOA	Annual change in LTNOA
NTAcc	+ Depreciation and Amortization (SCF account) + Deferred Taxes (SCF account) + Equity in Net Loss (of unconsolidated subsidiaries) + Loss on Sale of Property, Plant, and Equipment and Sale of Investments+ Funds from Operations–Other (including accruals related to special items) + Extraordinary Items and Discontinued Operations (SCF account – Income Statement account)
InvAcc	Long-term investment accruals (dLTNOA – NTAcc),
Depr	Depreciation and amortization accruals (negative of expense) from the SCF
OthAcc	NTAcc – Depr
Sales	Net revenue
dDebt	Change in total debt (short-term + long-term debt)
Issues	Change in shareholders' equity minus the change in retained earnings
ExtFin	(Increase in capital from cash and receivables+ Changes in long-term debt + short-term changes in financial liabilities) /Average total assets
RET	$P_{t-1:}$ Share price at the beginning of the fiscal year $P_{n:}$ The nominal value of the share $D_{t:}$ Gross dividend per share $N_{e:}$ Total equity increased by retained earnings or reserves $N_{c:}$ Total equity increased by cash $N_{t:}$ Number of shares before raising capital
Log Size	Natural logarithm of market value at the end of year t
OPC_DCL	Annual decile rank of firm's operating cycle-1/9
INC_DCL	An annual decile rank of firm's investment cycle-1/9
OPC	
INC	
NCOA	Total assets- Current assets- Investments
COA	Current assets- Cash and short-term investments

4. Empirical Results

4.1 Descriptive statistics

Table 2 reports summary statistics for the full sample. The statistics represent the average from 2005–2011 of the annual cross-sectional mean, standard deviation, minimum, and maximum for each of the variables.

Table 2. Descriptive Statistics

This table reports the time-series average of the annual cross-sectional mean, standard deviation (Std), 1st percentile (Min), and 99th percentile (Max) for the variables listed, all of which are winsorized annually at their 1st and 99th percentiles. The sample includes all nonfinancial firms on TSE that have data for total assets, net income, net operating assets, cash flow, and return information for an average of 135 firms per year and a total sample of 945 firm-years from fiscal year 2005 to 2011 and for seven years.

Variable	Description	Mean	Std	Min	Max
	Next year net income	0.015	0.970	-4.23	2.80
	Next year free cash flows	0.029	0.996	-3.22	3.49
	Next year stock return	0.0078	0.991	-4.001	2.81
	Next year return of assets	0.019	0.994	-2.25	4.41
	Net income	4.56	1.97	-5.64	7.10
	Operating cash flows	3.68	3.12	-6.26	6.85
	Changes in net operating assets	0.037	0.97	-2.94	2.75
	Changes in working capital	0.012	1.00	-2.84	2.94
	Long-term investment	0.019	0.96	-2.59	2.38
	Non-transaction accruals	0.008	0.37	-0.36	1.81
	External financing	0.40	1.722	-3.78	8.96
	Annual decile rank for OPCit, assigned for each firm every year	0.50	0.31	0.00	1.00
	annual decile rank for INCit, assigned for each firm every year	0.49	0.31	0.00	1.00
	Return of assets	0.93	0.58	-1.51	1.79
	Sales	0.016	1.02	-2.72	2.92
	Changes in debt	0.32	1.30	-0.99	8.94
	Share issuance	0.08	1.04	-3.16	4.43
	depreciation	0.002	1.01	-2.72	2.45
	Other accruals	0.006	1.03	-2.57	2.78
	Log Size	0.76	0.04	0.66	0.90

Table 2, provides descriptive statistics for all variables. To avoid the effect of outliers, we winsorize all variables at 1 percent and 99 percent. As shown in Table 1, accruals tend to be positive with a mean of 0.037. Moreover, the average operating cash flows (3.68) and net income (4.56) is positive too. Changes in working capital are the most volatile component of accruals, with a cross-sectional standard deviation equal to (1.00), but variation in non-transaction accruals (0.37) and long-term investment (0.96) is small in relation to typical earnings or cash flow. Changes in working capital average is 1.2% of assets and long-term investment average is 1.9% of assets and non-transaction accruals average is 0.8% of assets, implying that total accruals (dNOA) equals 3.7% of assets.

Table 3. Correlations

This table reports the time-series average of the annual cross-sectional correlations among the variables listed, all of which are winsorized annually at their 1st and 99th percentiles. (The variables are defined in Table 1.) The sample includes all nonfinancial firms on TSE with data for total assets, net income, net operating assets, cash flow, and return information for an average of 135 firms per year and a total sample of 945 firm-years from fiscal year 2005 to 2011 and for seven years.

Variables	NIt+1	FCFt+1	RETt+1	ROAt+1	TOTAcc	dWC	InvAcc	NTAcc	NI	CF	Sales	OthAcc	Depr	LogSize	dDebt	Issue	ExtFin	ROA	OPC_DCL	INC_DCL	PERS
Nit+1	1																				
FCFt+1	-0.16*	1																			
RETt+1	0.03	0.02	1																		
ROAt+1	-0.05	0.06	-0.01	1																	
TOTAcc	0.006	-0.009	-0.003	0.13*	1																
dWC	-0.01	-0.02	-0.005	0.12*	0.83*	1															
InvAcc	-0.05	-0.006	0.09*	0.06	0.11*	-0.13*	1														
NTAcc	0.08*	0.05	-0.02	0.03	0.41*	-0.007	0.04	1													
NI	-0.05	0.07*	0.35*	0.19*	-0.01	-0.06	0.16*	0.010	1												
CF	-0.009	-0.08*	-0.01	-0.03	-0.23*	-0.02	0.004	-0.45*	-0.005	1											
Sales	-0.04	0.01	0.03	0.26*	0.04	-0.003	0.14*	0.07*	0.30*	-0.03	1										
OthAcc	0.06	-0.01	0.04	-0.04	0.18*	0.02	-0.04	0.22*	0.007	-0.01	-0.10*	1									
Depr	-0.03	0.03	-0.05	0.05	-0.03	-0.02	0.05	0.14*	-0.003	-0.15*	0.13*	-0.93*	1								
LogSize	-0.02	-0.01	-0.04	0.02	-0.14*	-0.04	0.12*	-0.001	0.04	0.08*	0.18*	-0.51*	0.51*	1							
dDebt	-0.003	-0.01	0.002	-0.03	-0.02	0.02	0.05	0.03	-0.002	0.07*	0.01	-0.25*	0.27*	0.37*	1						
Issue	0.02	-0.05	0.04	0.12*	-0.003	0.029	-0.04	-0.02	0.03	0.03	0.006	-0.05	0.04	0.03	0.06	1					
ExtFin	0.009	-0.04	0.03	-0.10*	-0.01	0.03	0.01	0.01	0.01	-0.04	0.01	-0.23*	0.24*	0.30*	0.79*	0.65	1				
ROA	-0.03	-0.06*	0.09*	-0.05	-0.20*	-0.04	-0.02	-0.35*	0.01	0.41*	-0.04	0.14*	-0.27*	-0.04	-0.10*	0.02	-0.06	1			
OPC_DCL	0.009	0.09*	0.15*	0.10*	0.09*	0.04	0.17*	0.03	0.09*	0.007	0.10*	0.08*	-0.07*	-0.02	0.05	-0.09*	-0.01	0.03	1		
INC_DCL	0.009	-0.09*	-0.01	-0.03	-0.03	-0.01	-0.04	-0.05	-0.04	0.13*	-0.10*	0.03	-0.05	-0.004	-0.01	0.004	-0.01	0.09*	-0.03	1	
PERS	0.009	0.07*	0.01	0.04	0.34*	0.12*	0.01	0.48*	0.004	-0.99*	0.04	0.03	0.14*	-0.09*	0.07*	-0.03	0.03	-0.42*	0.002	-0.13*	1

*significant at the 5 percent level

The Spearman correlation coefficients (Table3) show that total accruals is highly correlated with working capital accruals (0.838) and non-transaction accruals (0.414). In addition, NTAcc is reasonably strongly correlated with cash flows (-0.451) and other accruals is highly correlated with depreciation (-0.934). LogSize is strongly inversely correlated with OthAcc (-0.511) and positively correlated with Depr (0.511). External financing is highly correlated with changes in debt (0.797). The persistence of total accruals (PERS) is negatively correlated with ROA (-0.426) and cash flow (-0.992) and positively correlated with NTAcc (0.486) and total accruals (0.341). Focusing on table 3, long-term investment tends to be positively correlated with total accruals (0.119) and negatively correlated with changes in working capital (-0.134), with the exception of non-transaction accruals. The table also shows that cash flow is positively correlated with investment cycle (0.131).

Subsequent ROA is positively correlated to total accruals (0.136), working capital accruals (0.122), and negatively related to external financing (-0.102). Also, external financing is positively correlated with depreciation (0.240) and Log Size (0.302) and negatively correlated with other accruals (-0.233). In addition, other accruals are positively correlated with total accruals (0.184) and non-transaction accruals (0.221), and inversely correlated with sales (-0.101). Moreover, depreciation is positively related to NTAcc (0.143), CF (0.153), changes in debt (0.276) and PERS (0.143). We also show that, PERS is positively correlated with NTAcc (0.486), ΔWC (0.126) and TOTAcc (0.341) and negatively correlated with investment cycle (-0.130). Operating cycle is also positively correlated with long-term investment (0.172).

4.1 Subsequent net income and free cash flow predictions

The goal, following Sloan (1996) and others, is to explore the differential predictive ability of accruals and cash flow, or equivalently, to test whether accruals help to predict a firm's future performance after controlling for current profits (Lewellen & Resutek, 2013).

Our results show that NTAcc is more negatively related to subsequent earnings (a slope of -0.18) than to subsequent cash flow. It means that, NTAcc predicts future cash flow much more strongly than it predicts future profits. Moreover, our results indicate that the predictive power of non-transaction accruals is due to both depreciation and other accruals.

Model 1 replicates the earnings predictability results in prior studies: earnings are persistent, but controlling for CF_t, higher accruals forecast lower subsequent profits. The slope on CF_t is -0.016, while the slope on $TOTAcc_t$ is -0.027 in the sample. The implication is that the cashflow component of earnings and the accrual component have roughly similar persistence. Our estimates contradict the slopes reported by S. A. Richardson et al. (2005) and Dechow et al. (2008). On the other hand, controlling for CF_t, higher accruals predicts higher future free cash flows. For predicting future free cash flows the slope on $TOTAcc_t$ is (0.05) that imply the predictive power of total accruals for future free cash flow is higher than the predictive power of total accruals for subsequent net income. We also find that the predictive power of sales (0.26) is significantly higher than accruals for subsequent future cash flows.

Model 2, shows that working-capital accruals (dWC) does not have any significant relation to subsequent net income. Long-term investment (InvAcc), and non-transaction accruals (NTAcc) contribute to the predictive power of total accruals, with slopes (1.08) and (-0.18) respectively. Thus, CF is the least persistent component of earnings. One the other side, the results of this test indicate that the predictive power of non-transaction accruals is mostly due to depreciation relative to other accruals. The contribution of the Model 2 is to test whether investment-related and non-transaction accruals have different implications for future net income. It also shows that, for predicting subsequent future cash flows, the slopes on InvAcc and NTAcc are (0.10) and (0.12) respectively, implying that the predictive power of accruals derive from long-term investment and non-transaction accruals and surprisingly dWC does not have any significant relationship with subsequent free cash flows. Further, Lewellen and Resutek (2013) mention that high dWC is associated with higher future sales (scaled by average total assets), so the decline in subsequent profits comes from higher costs, not lower sales.

Model 3 tests whether the predictive ability of depreciation is different from other non-transaction accruals.

Table 4. Regressions of next-year earnings and next-year free cash flow on total accruals and components, 2005-2011

This table reports average slopes and R^2s from annual cross-sectional regressions. The estimation is based on OLS panel regression and fixed effects. Since we have heteroskedastic variance in models we use GLS approach. t-statistics, reported below the slope estimates, are based on the time-series variability of the estimates, incorporating a Newey-West correction with a Schwarz info criterion for possible autocorrelation in estimations. All variables are winsorized annually at their 1st and 99th percentiles. The sample includes all nonfinancial firms on TSE. Table 4 uses 135 nonfinancial firms per year and total sample of 945 firm-year observations for seven years from 2005-2011.The variables are defined in Table 1.

Variable	Coefficient (t-Statistic)		Variable	Coefficient (t-Statistic)	
	Dependent Variable ($Y_{i,t+1}$)			Dependent Variable ($Y_{i,t+1}$)	
	$NI_{i,t+1}$	$FCF_{i,t+1}$		$NI_{i,t+1}$	$FCF_{i,t+1}$
(1) $Y_{i,t+1} = \alpha_0 + \beta_1 CF_{i,t} + \beta_2 TotAcc_{i,t} + \beta_3 Sales_{i,t} + \varepsilon_{i,t}$			(2) $Y_{i,t+1} = \alpha_0 + \beta_1 CF_{i,t} + \beta_2 \Delta WC_{i,t} + \beta_3 InvAcc_{i,t} + \beta_4 NTAcc_{i,t} + \beta_5 Sales_{i,t} + \varepsilon_{i,t}$		
C	-0.6	-0.63	C	-2.44	-0.49
	(-2.9)	(-6.02)		(-6.46)	(-5.05)
CF	-0.01	-0.001	CF	-0.02	0.005
	(-6.18)	(-0.63)		(-6.74)	(4.46)
TOTAcc	-0.02	0.05	dWC	-0.013	0.01
	(-3.60)	(11.03)		(-0.65)	(1.63)
Sales	0.06	0.26	InvAcc	1.08	0.10
	(1.65)	(13.69)		(5.21)	(2.28)
R^2	0.87	0.86	NTAcc	-0.18	0.12
				(-2.42)	(0.51)
			Sales	0.12	0.21
				(2.75)	(12.44)
			R^2	0.85	0.93

(3) $Y_{i,t+1} = \alpha_0 + \beta_1 CF_{i,t} + \beta_2 \Delta WC_{i,t} + \beta_3 InvAcc_{i,t} + \beta_4 OthAcc_{i,t} + \beta_5 Depr_{i,t} + \beta_6 \text{Sales}_{i,t} + \varepsilon_{i,t}$		
C	-2.45	-0.42
	(-3.93)	(-2.89)
CF	-0.02	0.004
	(-6.08)	(1.88)
dWC	-0.013	0.01
	(-0.50)	(1.37)
InvAcc	1.13	1.07
	(4.35)	(2.45)
OthAcc	-0.07	0.06
	(-3.78)	(4.53)
Depr	-0.09	0.06
	(-4.60)	(5.08)
Sales	0.14	0.20
	(2.44)	(8.82)
R^2	0.84	0.92

4.2 External financing, Operating and investment cycles and accruals persistence

Table 5 reports four sets of regressions using the external-financing variables and operating and investment cycles. The table establishes a baseline relation between external financing, total accruals and a firm's subsequent performance, controlling for ROA_{t+1} to capture the basic persistence of earnings. Next, we add our full set of accrual components (dWC, InvAcc, NTAcc) to the regression, to test whether the accruals and external financing have distinct predictive power for future performance.

Table 5 shows that, controlling for current ROA, external financing is negatively related to a firm's subsequent performance with a slope of (-0. 97). One percentage point increase in external financing is associated with a (0.97) percentage drop in subsequent ROA. The slope on total accruals is (-0.08), implying that it negatively relates to subsequent performance. Our results show that the predictive ability of external financing is much stronger than accruals.

The second part shows that the dWC and InvAcc with slopes (0.16) and (0.25) respectively, have predictive power for subsequent performance and NTAcc and ΔDebt are insignificant in our regressions. From among accruals InvAcc has greater ability to predict subsequent performance and stock issuance is negatively related to subsequent performance with a slope (-0.07).

Table 5 presents our analysis of how operating and investment cycles affect the persistence of accruals. Consistent with results of S. A. Richardson et al. (2005), the coefficient on TOTAcc is significantly negative (-0.08), implying that the accruals component is less persistent than cash flow component. We consider the effect of operating cycles on total accruals. As the third hypothesis (H3) predicts, the interactions of total accruals and external financing with operating cycle are negative and significant with slopes (-0.05) and (-1.12), respectively. It suggests that, the predictive ability of external financing is much lower than total accruals in long operating cycles. The coefficient of ExtFin*OPC_DCL (-1.12) shows that the persistence of external financing is lower than TOTAcc*OPC_DCL (-0.05) in long operating cycle. The result of testing the components of accruals is described in the following.

The interaction of InvAcc*OPC_DCL is negative (-1.75). It means that the predictive ability of long-term investment is inversely related to operating cycle. The interaction of ΔWC*OPC_DCL and NTAcc*OPC_DCL and ΔDebt*OPC_DCL are insignificant. It means that the predictive ability of ΔWC, InvAcc and ΔDebt are not related to operating cycle. The positive relationship between the interaction of Issue*OPC_DCL (0.03) shows that the persistence of stock issuance increases in longer operating cycle. Thus, stock issuance is least persistent variable in long operating cycle. This result supports third hypothesis that firms with longer operating cycle should have less persistent accruals and those with longer investment cycle should have more persistent accruals, respectively.

The interaction of total accruals with investment cycle is positive and significant (0.04). It suggests that, the predictive ability of total accruals is higher in longer investment cycles. The coefficient of determination (R^2) of model 4 is 0.53. It means that TOTAcc×OPC_DCL becomes more significant than TOTAcc*INC_DCL (R^2=0.45).

On the other hand, the predictive ability of InvAcc increases (0.49) in longer investment cycle. The interactions of ΔWC*INC_DCL and NTAcc*INC_DCL are insignificant. It means that the persistence of changes in working capital and non-transaction accruals are not related to investment cycle. The interaction of ΔDebt*INC_DCL is positively (0.05) and Issue*INC_DCL is inversely related to subsequent performance (-0.06), implying that the persistence of ΔDebt increases and the persistence of stock issuance decreases in longer investment cycle. At the end, we should mention that the coefficient of determination (R^2) of model 7 is much higher than model 5. It means that the persistence of long-term investment is much more related to operating cycle than investment cycle.

In sum, our findings suggest firms with longer operating cycle are associated with more reliable stock issuance and less reliable long-term investment. On the other hand, we find that investment cycle is associated with higher reliability of long-term investment and lower reliability of none-transaction accruals.

Table 5 shows that investment-related accruals have strong predictive power for subsequent earnings and non-transaction accruals do not have any relation to that. We now test whether this predictive power extends to stock returns (Table 6). Fairfield et al. (2003) and S. A. Richardson et al. (2005) find that changes in long-term net operating assets help to predict returns, but neither paper tests whether this predictability comes from investment expenditures, non-transaction accruals, or both (Lewellen & Resutek, 2013). Our central thesis is that non-transaction accruals should not predict returns if investment explains the accrual anomaly, as proposed by Fairfield et al. (2003) and Wu et al. (2010).

Table 5. Persistence regressions: Accruals vs. external financing, 2005-2011 Regressions of subsequent ROA on total accruals and accrual components

This table reports average slopes and R^2s from annual cross-sectional regressions. The estimation is based on OLS panel regression and fixed effects. Since we have heteroskedastic variance in models we use GLS approach. All variables are winsorized annually at their 1st and 99th percentiles. The sample includes all nonfinancial firms on TSE. t-statistics, reported below the slope estimates, are based on the time-series variability of the estimates, incorporating a Newey-West correction with Schwarz info criterion for possible autocorrelation in estimations. The sample includes all nonfinancial firms on TSE. Table 5 uses 945 firm-year observations from 2005-2011. OPC_DCLit is the annual decile rank for OPCit, assigned for each firm every year. Specifically, every year, we assign a decile-based rank to OPCit from one to ten. Then we transform this rank by subtracting one and dividing by nine such that the decile ranks range from o to 1. Similarly, INC_DCLit is the annual decile rank for INCit, assigned for each firm every year. OPCit is the three-year average of operating cycle, which is defined as the average of the operating cycles of year t, t-1 and t-2. Operating cycle is defined as 360×COAit /SALEit. INCit is the three-year average of investment cycle, which is defined as the average of the investment cycles of year t, t-1 and t-2. Investment cycle is defined as 360×NCOAit /SALEit. All other variables are defined as in Table 1.

Variable	Coefficient (t-Statistic)	Variable	Coefficient (t-Statistic)
(4) $ROA_{i,t+1} = \alpha_0 + \beta_1 ROA_{i,t} + \beta_2 TotAcc_{i,t} + \beta_3 ExtFin_{i,t} + \beta_4 TotAcc_{i,t} * OPC\_DCL_{i,t} + \beta_5 ExtFin_{i,t} * OPC\_DCL_{i,t} + \beta_6 OPC\_DCL_{i,t} + \varepsilon_{i,t}$		(5) $ROA_{i,t+1} = \alpha_0 + \beta_1 ROA_{i,t} + \beta_2 \Delta WC_{i,t} + \beta_3 InvAcc_{i,t} + \beta_4 NTAcc_{i,t} + \beta_5 \Delta Debt_{i,t} + \beta_6 Issue + \beta_7 \Delta WC_{i,t} * OPC\_DCL_{i,t} + \beta_8 InvAcc_{i,t} * OPC\_DCL_{i,t} + \beta_9 NTAcc_{i,t} * OPC\_DCL_{i,t} + \beta_{10} \Delta Debt_{i,t} * OPC\_DCL_{i,t} + \beta_{11} Issue * OPC\_DCL + \beta_{12} OPC\_DCL_{i,t} + \varepsilon_{i,t}$		
C	0.48	C	0.80
	(6.54)		(2.89)
ROA	-0.43	ROA	-0.44
	(-5.81)		(-4.33)
TOTAcc	-0.08	dWC	0.16
	(-2.85)		(3.35)
ExtFin	-0.97	InvAcc	0.25
	(-4.67)		(3.00)
TOTAcc*OPC_DCL	-0.05	NTAcc	-0.24
	(-2.87)		(-1.88)
EXTFIN*OPC_DCL	-1.12	ΔDebt	-0.001
	(-7.34)		(-0.27)
OPC_DCL	0.32	Issue	-0.07
	(5.45)		(-2.79)
R^2	0.53	dWC*OPC_DCL	-0.03
			(-0.90)
		InvAcc*OPC_DCL	-1.75
			(-10.24)
		NTAcc*OPC_DCL	-0.03
			(-0.37)
		ΔDebt*OPC_DCL	-0.0003
			(-0.04)
		Issue*OPC_DCL	0.03
			(5.48)
		OPC_DCL	2.42
			(8.10)
		R^2	0.50

(6)
$$ROA_{i,t+1} = \alpha_0 + \beta_1 ROA_{i,t} + \beta_2 TotAcc_{i,t} + \beta_3 ExtFin_{i,t} + \beta_4 TotAcc_{i,t} * INC\_DCL_{i,t} + \beta_5 ExtFin_{i,t} * INC\_DCL_{i,t} + \beta_6 INC\_DCL_{i,t} + \varepsilon_{i,t}$$

(7)
$$ROA_{i,t+1} = \alpha_0 + \beta_1 ROA_{i,t} + \beta_2 \Delta WC_{i,t} + \beta_3 InvAcc_{i,t} + \beta_4 NTAcc_{i,t} + \beta_5 \Delta Debt_{i,t} + \beta_6 Issue + \beta_7 \Delta WC_{i,t} * INC\_DCL_{i,t} + \beta_8 InvAcc_{i,t} * INC\_DCL_{i,t} + \beta_9 NTAcc_{i,t} * INC\_DCL_{i,t} + \beta_{10} \Delta Debt_{i,t} * INC\_DCL_{i,t} + \beta_{11} Issue * INC\_DCL + \beta_{12} INC\_DCL_{i,t} + \varepsilon_{i,t}$$

C	0.47	C	-0.29
	(5.48)		(-3.54)
ROA	-0.39	ROA	-0.44
	(-4.04)		(-4.09)
TOTAcc	-0.10	dWC	0.20
	(-2.00)		(2.67)
ExtFin	-1.16	InvAcc	0.49
	(-4.54)		(2.59)
TOTAcc*INC_DCL	0.04	NTAcc	-0.15
	(11.12)		(-1.57)
ExtFin*INC_DCL	-0.35	ΔDebt	-0.02
	(-3.85)		(-10.63)
INC_DCL	0.02	Issue	-0.07
	(0.91)		(-3.04)
R^2	0.45	dWC*INC_DCL	0.0008
			(0.03)
		InvAcc*INC_DCL	0.21
			(4.70)
		NTAcc*INC_DCL	-0.11
			(-20.63)
		ΔDebt*INC_DCL	0.05
			(8.92)
		Issue*INC_DCL	-0.06
			(-5.45)
		INC_DCL	0.26
			(0.50)
		R^2	0.63

Table 6 shows that total accruals have strong predictive power for subsequent returns after controlling for a firm's size. The slope on TOTAcc is (-0.30) when size is included in the regressions. S. A. Richardson et al. (2005) find a monthly slope of (-2.50) on dWC and (-2.26) on changes in long-term net operating assets. We find that working-capital accruals, long-term investment expenditures, and non-transaction accruals all contribute to the predictive power of TOTAcc, with slopes (0.20), (0.12) and (-0.08) respectively. The evidence supports Sloan's earnings-fixation hypothesis: accruals that are not directly tied to current investment expenditures have strong predictive power for stock returns.

The literature finds that external financing, like accruals, is negatively related to subsequent returns, but there is some disagreement about the connection between the anomalies. For example, Fama and French (2006) find that share issuance and accruals have distinct predictive power for returns, but Dechow et al. (2008) conclude that accruals subsume the external financing anomaly. It seems worthwhile, then, to consider the joint predictive power of accruals, investment, and external financing.

Table 6. Accruals vs. external financing, 2005-2011, Regression result of accruals and components and future size-adjusted return

This table reports average slopes and R^2s from annual cross-sectional regressions of annual stock returns. t-statistics, reported below the slope estimates, are based on the time-series variability of the estimates, incorporating a Newey-West correction with Schwarz info criterion for possible autocorrelation in estimations. All variables are winsorized annually at their 1st and 99th percentiles. The sample includes all nonfinancial firms on TSE. Table 6 uses 945 firm-year observations from 2005-2011. LogSizeit is the natural logarithm of market value of equity at the fiscal year end. OPC_DCLit is the annual decile rank for OPCit, assigned for each firm every year. Specifically, every year, we assign a decile-based rank to OPCit from one to ten. Then we transform this rank by subtracting one and dividing by nine such that the decile ranks range from o to 1. Similarly, INC_DCLit is the annual decile rank for INCit, assigned for each firm every year. OPCit is the three-year average of operating cycle, which is defined as the average of the operating cycles of year t, t-1 and t-2. Operating cycle is defined as 360×COAit /SALEit. INCit is the three-year average of investment cycle, which is defined as the average of the investment cycles of year t, t-1 and t-2. Investment cycle is defined as 360×NCOAit /SALEit. All other variables are defined as in Table 1.

Variable	**Coefficient (t-Statistic)**	**Variable**	**Coefficient (t-Statistic)**
$RET_{i,t+1} = \alpha_0 + \beta_1 ROA_{i,t} + \beta_2 TotAcc_{i,t} + \beta_3 ExtFin_{i,t} + \beta_4 TotAcc_{i,t} * OPC\_DCL_{i,t} + \beta_5 ExtFin_{i,t} * OPC\_DCL_{i,t} + \beta_6 OPC\_DCL_{i,t} + LogSize + \varepsilon_{i,t}$ (8)		$RET_{i,t+1} = \alpha_0 + \beta_1 ROA_{i,t} + \beta_2 \Delta WC_{i,t} + \beta_3 InvAcc_{i,t} + \beta_4 NTAcc_{i,t} + \beta_5 \Delta Debt_{i,t} + \beta_6 Issue + \beta_7 \Delta WC_{i,t} * OPC\_DCL_{i,t} + \beta_8 InvAcc_{i,t} * OPC\_DCL_{i,t} + \beta_9 NTAcc_{i,t} * OPC\_DCL_{i,t} + \beta_{10} \Delta Debt_{i,t} * OPC\_DCL_{i,t} + \beta_{11} Issue * OPC\_DCL + \beta_{12} OPC\_DCL_{i,t} + \beta_{13} LogSize + \varepsilon_{i,t}$ (9)	
C	3.18	C	-0.92
	(5.81)		(-2.47)
ROA	0.01	ROA	-0.0009
	(0.79)		(-0.07)
TOTAcc	-0.30	dWC	0.20
	(-6.88)		(4.14)
ExtFin	-1.38	InvAcc	0.12
	(-8.35)		(2.78)
TOTAcc*OPC_DCL	-0.06	NTAcc	-0.08
	(-1.98)		(-3.77)
EXTFIN*OPC_DCL	1.35	ΔDebt	-0.03
	(7.95)		(-2.15)
OPC_DCL	0.22	Issue	0.06
	(3.74)		(5.32)
LogSize	-4.33	dWC*OPC_DCL	-0.23
	(-5.94)		(-3.88)
R^2		InvAcc*OPC_DCL	1.46
0.96			(2.23)
		NTAcc*OPC_DCL	0.05
			(2.31)
		ΔDebt*OPC_DCL	0.07
			(5.72)
		Issue*OPC_DCL	-0.02
			(-1.22)
		OPC_DCL	-1.42
			(-1.64)
		LogSize	0.58
			(1.90)
		R^2	0.91

$$RET_{i,t+1} = \alpha_0 + \beta_1 ROA_{i,t} + \beta_2 TotAcc_{i,t} + \beta_3 ExtFin_{i,t} + \beta_4 TotAcc_{i,t} * INC\_DCL_{i,t} + \beta_5 ExtFin_{i,t} * INC\_DCL_{i,t} + \beta_6 INC\_DCL_{i,t} + LogSize_{i,t} + \varepsilon_{i,t} \quad (10)$$

$$RET_{i,t+1} = \alpha_0 + \beta_1 ROA_{i,t} + \beta_2 \Delta WC_{i,t} + \beta_3 InvAcc_{i,t} + \beta_4 NTAcc_{i,t} + \beta_5 \Delta Debt_{i,t} + \beta_6 Issue + \beta_7 \Delta WC_{i,t} * INC\_DCL_{i,t} + \beta_8 InvAcc_{i,t} * INC\_DCL_{i,t} + \beta_9 NTAcc_{i,t} * INC\_DCL_{i,t} + \beta_{10} \Delta Debt_{i,t} * INC\_DCL_{i,t} + \beta_{11} Issue * INC\_DCL + \beta_{12} INC\_DCL_{i,t} + \beta_{13} LogSize + \varepsilon_{i,t} \quad (11)$$

C	3.05	C	-1.64
	(4.25)		(-6.18)
ROA	0.005	ROA	-0.01
	(0.26)		(-1.10)
TOTAcc	-0.25	dWC	0.15
	(-5.23)		(4.45)
ExtFin	-0.54	InvAcc	1.10
	(-3.24)		(4.89)
TOTACC*INC_DCL	0.12	NTAcc	-0.28
	(5.57)		(-3.47)
ExtFin*INC_DCL	0.29	ΔDebt	-0.02
	(1.78)		(-1.51)
INC_DCL	-0.06	Issue	0.08
	(-4.16)		(7.44)
LogSize	-4.05	dWC*INC_DCL	-0.14
	(-4.24)		(-3.13)
R^2	0.95	InvAcc*INC_DCL	-0.60
			(-3.07)
		NTAcc*INC_DCL	0.87
			(5.93)
		ΔDebt*INC_DCL	0.02
			(0.82)
		Issue*INC_DCL	-0.06
			(-3.66)
		INC_DCL	0.39
			(1.36)
		LogSize	0.40
			(2.12)
		R^2	0.93

Table 6 reports four sets of return regressions using the external-financing, total accruals, operating and investment cycle as predictor variables. We also include size in all regressions as a control variable. It shows that, controlling for current ROA, external financing is negatively related to a firm's subsequent return with a slope of (-1.38). The slope on total accruals is (-0.30), implying that it negatively relates to subsequent return. The existence of accrual and external financing anomaly is clear by displaying these negative relationships. One percentage point increase in external financing and total accruals is associated with a (1.38) and (0.30) percentage drop in subsequent return.

The coefficient of ExtFin*OPC_DCL (1.35) shows that the persistence of external financing is higher than TOTAcc*OPC_DCL (-0.06) in longer operating cycle. The persistence of total accruals decreases and the persistence of external financing increases in longer operating cycle. Comparing these two terms shows that total accruals are least persistent variable in long operating cycle. This result supports fourth hypothesis that Accruals anomaly relative to external financing anomaly decreases more in longer operating cycles and investment cycles.

The next part shows that the ΔWC and InvAcc and NTAcc with slopes (0.20), (0.12) and (-0.08) respectively, have predictive power for subsequent return. From among accruals ΔWC has a stronger ability to predict subsequent returns and ΔDebt and stock issuance relate to the subsequent returns with opposite coefficients (-0.03) and (0.06), respectively.

Table 6 presents our analysis of how operating and investment cycles affect the persistence of accruals. The interaction of ΔWC*OPC_DCL is negative (-0.23). It means that the predictive ability of working capital accruals is inversely related to operating cycle. The interactions of NTAcc*OPC_DCL and InvAcc*OPC_DCL are positive and

significant with slopes (0.05) and (1.46), respectively. It means that the predictive ability of non-transaction accruals and long-term investment becomes higher in longer operating cycle.

The slope on TOTAcc, ΔWC and ExtFin drop down to (-0.25), (0.15) and (-0.54) and the slope on InvAcc and NTAcc increase to the point (1.10) and (-0.28) when investment cycle is included in the regressions. The interaction of total accruals with investment cycle is positive and significant (0.12). It suggests that, the predictive ability of total accruals is higher in longer investment cycles. On the other hand, the predictive ability of InvAcc (-0.60) decreases and the interactions of NTAcc*INC_DCL (0.87) increases in longer investment cycle. The interaction of ExtFin*INC_DCL (0.29) and ΔDebt*INC_DCL (0.02) is insignificant means that the persistence of external financing and changes in debt are not related to investment cycle. At the end, we show that long-term investment is the least persistent variable with a slope (-0.60) and non-transaction accruals are the most reliable variable with a slope (0.87) in longer investment cycle.

In sum, our findings suggest firms with longer operating cycle are associated with more reliable long-term investment and less reliable working capital accruals. On the other hand, we find that investment cycle is associated with higher reliability of non-transaction accruals and less reliability of long-term investment.

5. Conclusion

Prior literature documents that accruals contain both information and noise, which in turn affects their predictive ability of future performance (Sloan, 1996); (Dechow et al., 1998). Also, S. A. Richardson et al. (2005) and Wu et al. (2010) mention that it is well known that different components of accruals contain different levels of information and noise, and thus their predictive abilities of future performance are different. Our paper shows that earnings are persistent, but controlling for CF_t, higher accruals forecast lower subsequent profits. The implication is that the cashflow component of earnings and the accrual component have similar persistence. Our estimates contradict the slopes reported by S. A. Richardson et al. (2005) and Dechow et al. (2008). Controlling for current cash flow (CF), long-term investment and non-transaction accruals can predict subsequent net income with opposite coefficients. On the other hand, controlling for CF_t, higher accruals predict higher future free cash flows. The predictive power of total accruals for future free cash flow is much higher than its power for predicting subsequent net income. Long-term investment (InvAcc) has positive relation and non-transaction accruals (NTAcc) have negative relation with future net income and CF is the least persistent component of earnings. On the other side, the results of this test indicate that the predictive power of non-transaction accruals is mostly due to depreciation relative to other accruals.

For predicting subsequent cash flows, InvAcc and NTAcc are positively related to future free cash flow, implying that the predictive power of accruals derive from long-term investment and non-transaction accruals and surprisingly dWC does not have any significant relationship with subsequent free cash flows. Our results show that NTAcc is more negatively related to subsequent earnings than to subsequent cash flow. It means that, NTAcc predicts future free cash flow much more strongly than it predicts future profits. Moreover, our results indicate that the predictive power of non-transaction accruals is due to both depreciation and other accruals.

Next, we show that controlling for current ROA, external financing and total accruals are negatively related to a firm's subsequent performance. Our results show that the predictive ability of external financing is much stronger than accruals. Moreover, we show that working capital accruals and long-term investment have predictive power for subsequent performance and NTAcc is insignificant in our regressions. From among accruals InvAcc has greater ability to predict subsequent performance. The interaction of total accruals with operating cycle is negative. It suggests that, the predictive ability of total accruals is much lower in long operating cycles. The predictive power of working capital accruals and non-transaction accruals become insignificant and do not have any relationship to operating cycle. The persistence of long-term investment and external financing decrease in longer operating cycle. We also document that the long-term investment is the least persistent variable in long operating cycle. Our results support the third hypothesis that firms with longer operating cycle should have less persistent accruals and those with longer investment cycle have more persistent accruals, respectively. On the other hand, the interaction of total accruals with investment cycle is positive and significant. It suggests that, the predictive ability of total accruals is higher in longer investment cycles. The predictive ability of non-transaction accruals and external financing decreases in long investment cycle and the persistence of changes in working capital is not related to investment cycle. It should be noted that these findings are based on information gained from Tehran Exchange Market and should not be generalized to other financial markets.

In sum, our findings suggest firms with longer operating cycle are associated with more reliable stock issuance and less reliable long-term investment. On the other hand, we find that investment cycle is associated with higher reliability of changes in debt and long-term investment. More importantly, we find that operating cycle and

investment cycle have opposite effects on accruals persistence and reliability. In particular, longer operating cycle and shorter investment cycle are associated with higher reliability and persistence of accruals. This result is against the third hypothesis that the persistence of total accruals relative to external financing decreases more in a longer operating cycle and investment cycle. Next, our empirical results show that non-transaction accruals have predictive power for subsequent stock returns, consistent with the earnings-fixation hypothesis. The most negative slope is found on non-transaction accruals among accruals, but external financing has the most negative slope in the model in total. Our evidence points out that investment does not (fully) explain the accrual anomaly seems to be most consistent with Sloan's (1996) mispricing-based earnings-fixation hypothesis. The existence of accrual and external financing anomaly is clear by finding a negative relationship between subsequent return and total accruals and external financing. The persistence of total accruals decreases and the persistence of external financing increases in long operating cycle and total accruals is least persistent variable in long operating cycle. Then we show that the working capital accruals and long-term investment and non-transaction accruals have predictive power for subsequent return. The persistence of working capital accruals decreases and the persistence of non-transaction accruals and long-term investment increases in longer operating cycle. On the other hand, the predictive ability of total accruals increases in longer investment cycle. In addition, the predictive ability of long-term investment and working capital accruals decreases and non-transaction accruals increases in longer investment cycle and the persistence of external financing does not relate to investment cycle.

To conclude, our findings suggest firms with longer operating cycle are associated with more reliable long-term investment and less reliable working capital accruals. On the other hand, we find that investment cycle is associated with higher reliable non-transaction accruals and less reliable long-term investment. This result supports fourth hypothesis that Accruals anomaly relative to external financing anomaly decreases more in longer operating cycle and investment cycle.

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