# Is accrual quality a priced risk factor? Empirical evidence from Vietnamese stock market

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## Abstract

Literature proposed that under efficient capital market, AQ as a proxy for informational risk is a non-diversifiable risk and is a priced risk factor. We extend this literature by examining AQ in an inefficient market in Vietnam to test if AQ is indeed a priced risk in this market. Using a sample of 538 listed firms in both two stock exchanges across 8 industries from 2007 to 2016, the study found that there is no significant evidence to show that discretionary AQ is priced by investors while innate AQ is indeed a priced risk factor in Vietnam. The possible reason for this finding is that investors in market may not be aware of the difference in quality of accruals due to difference in management's choice of reporting and accounting standards, so that they did not incorporate AQ in their expected returns. This finding is consistent with the unique features of Vietnamese capital market as predicted. In addition, by using the two-stage least square method to correct issue in quantitative models as suggested by Core et al. (2008), the study demonstrates a robust finding in Vietnam.

## 1. Introduction

Accrual quality (AQ) is commonly used as a proxy for information risk and the impact of AQ on future stock returns has long been under debate in the market-based accounting literature (see Dechow et al. (2010) for a review). AQ is a measure that is used to determine the precision of future cash flow prediction and it has been classified into two types namely discretionary AQ and innate AQ in which discretionary AQ is arised due to management reporting choices while innate AQ reflects the economic fundamentals (Gray et al., 2009). Theoretically, Lambert et al., (2007) linked AQ with the information risk by arguing that AQ is the quality of information that investors have on expected cash flow while information asymmetries is the difference in precision of information across investors. Thus, AQ (i.e the quality) should be used as a proxy for informational risk rather than information asymmetries. Easley and Ohara (2004) proposed a model that incorporates information risk factor in asset pricing since they argued that investors cannot diversify away all of the information risk. Thus, the information risk factor is associated with the increase in the cost of capital.

Empirically, mixed findings have been concluded in various studies across different countries. For example, in the US, Francis et al (2005) found that poor AQ as a proxy for higher information risk is linked with higher cost of capital. However, Core et al (2008) while criticizing the methods employed by Francis et al (2005), argued that if using appropriate method, AQ is not a priced risk factor in the US. A later study by Kim and Qi (2010) by contrast, confirmed that AQ is indeed a priced risk factor in the US after controlling for low-priced stock. In other countries, such as Australia, Gray et al. (2009) documented that cost of capital including cost of debt in Australia is influenced by AQ arising from economic fundamentals (i.e innate accrual quality) but not discretionary reporting choices (i.e discretionary accrual quality). Similar to Gray et al. (2009) study, Aldamen and Duncan (2013) found that discretionary accruals and innate accrual both affect the cost of debt, in particularly, higher innate accrual quality significantly reduce cost of debt. In the UK, Mouselli et al (2013) found that AQ is not a priced risk factor where AQ is measured by discretionary AQ.

One important assumption for studies on AQ as a priced risk factor is the efficient market. However, if this assumption is to be relax, can AQ be a priced risk factor? There is still very limited studies in markets with low efficiency or even inefficiency level. We aim to re-examine this issue in a market at a very weak form of efficiency as Vietnam. Our study reports an empirical investigation on the AQ as a proxy for information risk to answer the question: "whether AQ explains the cross-section of stock return and is a priced risk factor in Vietnamese stock market". The study answers this question by examining three aspects: (i) Is discretionary AQ factor a priced risk factor (ii) is innate AQ factor a priced risk factor and (iii) if they are priced risk factor, how do they influence the future return of the constructed portfolio. This research base on the data in Vietnam market, an emerging and developing market characterized by global fund managers and investors with major concern on the reliability of accounting data (Zhou et al., 2006). Phan and Zhou (2014) also reported that although the efficiency of the Vietnamese stock market has gradually been improved during nearly 10 years in operation, the weak-form efficient market hypothesis does not hold for the Vietnamese stock market. In other words, Vietnamese market is not yet efficient due to incomprehensive legal corridors, small market size and unprofessional investors. Nevertheless, Bach and Hang (2016) claimed that the in-progress reform of Vietnamese accounting system toward international accounting standards and the post –crisis economic restructuring policies have provided a positive impact on the quality of accounting information with conservatism principal warranted in financial reporting practices. Our study aims to examine if in the context of Vietnam, AQ as a proxy for information risk is a priced risk factor, and how AQ affects the stock return.

We adopted the two-stage cross sectional regression (2SCSR) approach as suggested by Core et al. (2008) since this method provides a well-specified test for the hypothesis of the association between proposed risk factor and cross-sectional variation in expected return. We also decomposed the AQ factor into discretionary AQ factor and innate AQ factor and found that only innate AQ factor is a priced factor because innate AQ factor does carry a significant risk premium with respect to future returns.

This study contributes to literature in several aspects. First, our result supports the theoretical argument that information risk is a risk factor in an equilibrium asset price in Vietnam where information risk is proxied by innate AQ factor. This result is consistent with other studies in US (such as Francis et al. (2005), Lambert et al. (2007)), and in Australia (Gray et al. (2009). In the context where the information risk is high, future stock return is expected to be high to compensate for higher risk.

Second, this study is one of the first study examining the AQ in the context of emerging and developing countries. Different from developed countries, in these countries, the market is weak efficient or even not efficient, thus the information risk is at a higher level. This study demonstrates that in a different context, the level of influence of AQ factor differs. Discretionary AQ factor arising from managerial discretion in reporting is not a priced risk factor, only innate AQ factor arising from fundamental environment affects the stock returns.

Finally, by using 2SCRS suggested by Core et al. (2008), we provides further evidence on the relation between AQ and stock return, in which AQ is a priced risk factor for Vietnam market. This is consistent with previous studies in US and Australia (Gray et al., 2009). Thus, our findings contribute to the growing body of literature on empirical study focusing on AQ as a priced risk factor.

The remainder of the paper is structured as follows. Section 2 provides a review of literature on AQ, information risk and stock return. In Section 3, we described the methodology and data collection process. Results and discussion are provided in section 4. Finally, section 5 concludes the paper with further implication.

## 2. Literature review

Accruals are important elements of earning quality, which has implications for equity valuation. According to Sloan ( 1996), accrual component of earnings exhibits lower persistence in predicting future earnings than cash flow component of earnings. Meanwhile, investors fail to distinguish fully the different properties between accruals and cash flow, which causes accrual anomaly. Accrual anomaly refers to the negative relation between the level of accounting accruals and future stock returns: firms with high (low) accruals experience low (high) future returns. After Sloan (1996), accrual anomaly has been widely discussed in literature (Doukakisa & Papanastasopoulosb, 2014; Hui, Nelson, & Yeung, 2016; Ozkan & Kayali, 2015; Papanastasopoulos & Tsiritakis, 2015; Pincus, Rajgopal, & Venkatachalam, 2007; S.A. Richardson, Sloan, Soliman, & Tuna, 2005; Xie, 2001). Most of these empirical studies provide consensus on the existence of accrualanomalyin both developed and emerging markets. The most commonexplanation to interpret accrual anomaly is mispricing theory, which argues that the anomaly is mainly attributable to investors misunderstanding earnings management. The mispricing theory implies that either market is not efficient or existing asset pricing models may lack rational risk factors (Francis, LaFond, Olsson, & Schipper, 2005; Khan, 2008; Sloan, 1996; Xie, 2001). Based on this suggestion, scholars have conducted various research on the impact of accrual quality (AQ) on future stock return (Francis et al., 2005; Kim & Qi, 2010; Mouselli, Jaafar, & Goddard, 2013; Ogneva, 2012). A key question is that whetheraccrual quality, a proxy of information risk, should be priced. Nevertheless, literature has shown no agreement on the answer for this topic.

One strand is based on the notion that accounting information relating to a firm's expected cash flow influences on the firm's equilibrium asset price.Easley and O'hara (2004)argue that differences in the composition of information between public and private information affect the cost of capital. Stocks of companies with greater private information and less public information demand a risk premium. It is suggested that quantity and quality of accounting information may reduce the cost of capital by lessening the risk faced by uninformed investors arising from information asymmetry for uninformed investors. Therefore, information risk is non-diversifiable risk factor that is price by capital market. The authors further imply that accounting standards, market microstructure and financial analysis can all be thought of as influencing the information structure surrounding a company's stock and may be included in existing asset pricing models. Prior research indicates that accrual quality is associated with information asymmetry(V. J. Richardson, 2000; Trueman & Titman, 1988) and is widely recommended to be a proxy for information risk (Francis et al., 2005; Gray, Koh, & Tong, 2009; Mouselli et al., 2013; Mouselli, Jaafar, & Hussainey, 2012). Empirical studies supporting for the idea that accrual quality, a proxy for information risk- should be priced,consist of Francis et al. (2005), Khan (2008), Callen, Khan, and Lu (2013), Ecker, Francis, Kim, Olsson, and Schipper (2006) and Gray et al. (2009). Francis et al. (2005) report that US firms with poor accruals quality have higher costs of capital than do firms with good accruals quality.

Time series regression of each firm's realized returns on the AQ risk factor, controlling for other risk factors (market, firm size and book value to market value) indicates that AQ factor is useful in explaining the time series variation in abnormal return, hence AQ factor, representing for information risk, is a non-diversifiable risk factor. Notably, the authors find out that the innate accrual component of accrual quality, which reflects economic fundamentals, shows lower effect on cost of capital than its discretionary counterpart does. In line with Francis et al. (2005), Gray et al. (2009) provide evidence that total accrual quality is significantly related to the cost of equity of Australian firms. However, unlike Francis et al. (2005), the authors find that only innate component of AQ is associated with cost of equity and no evidence provided for the impact of discretionary AQ on firms' cost of capital in Australian market. Ecker et al. (2006) build another proxy for information risk, namely AQbased e loading, which is the coefficient estimate from firm-specific regressions of daily excess returns on a factor-mimicking portfolio , controlling for other risk factors (market, size, book to market and accrual quality). The authors conclude that firms with higher e-loadings have lower earnings response coefficients and more dispersed and less accurate analysis' forecasts. This finding further implies that higher e-loading firms are perceived by market participants to be noisier signals than lower ones. Khan (2008) reports that evidences achieved from intertemporal capital asset pricing model (ICAPM) indicate that considerable portion of the cross-sectional variation in average returns to high and low accrual firms is due to risk. More specifically, trading strategy based on accrual deciles is associated with same macroeconomic risks as a distress index. Callen et al (2013) find that the accrual quality component of delay (the average delay with which information is impounded into stock price) is related to average future stock return. In particular, poor accrual quality (representing for delay associated with accounting information quality) takes a portion of 20% of total risk premium for price delay arising from both accounting delay and non-accounting delay. Kim and Qi (2010)achieve a significant AQ risk factor after excluding lowpriced stock effects. Ogneva (2012)indicates a significant negative association between AQ and return after controlling for cash flow shocks. The author'sfindings support the notion of Francis et al. (2005) that AQ is a priced risk factor.

Another strand argues that the level of information precision (defined as the quality of information on a firm's expected cash flows made available to investors) rather than information asymmetry affects equilibrium prices in perfect world (Lambert, Leuz, & E. Verrecchia, 2012). Hughes et al. (2007)demonstrated that the pricing effect of private information indicated by Easley and O'Hara is driven mainly by under diversification and would tend to disappear in large economies. In addition, after controlling for betas, there is no cross sectional effect of information asymmetries on cost of capital. Mohanram and Rajgopal (2009)find that there is no evidence that PIN[1] is associated with the implied cost of capital derived from analysts' earning forecasts. Accordingly, it is questionable whether information riskis priced.

Many empirical studies on accrual quality, as a proxy of information asymmetries, provide supporting evidences for this strand. For example, Core, Guay, and Verdi (2008) suggest that two-stage cross sectional regression (2SCSR) instead of time series regression (Francis et al., 2005) should be applied to test of whether a proposed risk factor is priced. Using 2SCSR approach, Core et al. (2008) find no evidence that AQ is a priced risk factor. This finding is also supported by Mouselli et al. (2013)who apply 2SCSR model to test AQ factor in UK market. Fan and Yu (2013)indicate that accrual abnormal returns are positively correlated to idiosyncratic risk in international equity markets. However the impact is lower in developed countries than emerging countries. Liu and Wysocki (2007)show that after controlling for firm-specific characteristics, AQ is not related to systematic risk. Cohen (2008)argues that the level of AQ is only a strategic decision for management.

Since the previous empirical studies almost focus on the developed markets including US, UK and Australia, there is a demand to extend the literature to emerging and

[1] PIN- the probability of informed trading- is a proxy of information risk introduced by (Easley & O'hara, 2004)

developing countries. Although these countries have a different environmental context as compared with developed countries, information risk and its influence on stock return is of importance and interest of researchers, practitioners and regulators.

Therefore, this study focused on Vietnam – a developing country to re-examine the relation between information risk proxied by AQ factor and stock return.

## 3. Methodology and data

### *3.1. Data and sample selection*

The sample comprises all monthly data return covering all non-financial listed companies in both Ho Chi Minh and Ha Noi stock exchange, for the period from April 2007 to March 2016. Following F. U. Fama and Frech (1993) and Mouselli et al. (2013), we exclude financial sector companies (banks, insurance companies, investment funds and property companies) and negative book value to market value (BM) ratio. Annual account data areobtained from Stoxplus database. Monthly inclusive stock return are calculated from adjusted stock prices provided by Stoxplus. Annual government bill yield, achieved from The State Bank of Vietnam, is used as a proxy for risk-free rate. We use Stoxplus Industrial Classification Benchmark (ICB) to construct the industry portfolios. According to the Circular numbered 52/2012/TTBTC of the Ministry of Finance, public companies are required to disclose annual financial reports no longer than 90 days after the end of fiscal year. Therefore, monthly return of year t is calculated from April of year t to March of year t+1. In addition, BM and AQF factors require accounting data of year t-1. Therefore, to be included in the sample, companies are required to have accounting data and adjusted stock prices from the first quarter of 2007 to the first quarter of 2016. In total, the sample includes 536 companies covering 8 industries according to Stoxplus's ICB level 1.

Table 1: The number of sample firms by industry from 2007-2015

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| | | 17 | 29 | 42 | 61 | 67 | 72 | 74 | |
| **Industry** | | | | | | | | | |
| Basic materials | 9 | | | | | | | | 79 |
| Consumption goods | 24 | 35 | 41 | 56 | 72 | 76 | 80 | 80 | 81 |
| Consumption services | 9 | 13 | 17 | 31 | 40 | 44 | 44 | 47 | 49 |
| Health care | 4 | 3 | 8 | 11 | 16 | 18 | 18 | 18 | 18 |
| Industrial | 54 | 77 | 109 | 154 | 214 | 231 | 240 | 244 | 252 |
| Oil and gas | 1 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 |
| Technology | 4 | 6 | 10 | 11 | 21 | 22 | 22 | 22 | 22 |
| Utility | 7 | 8 | 9 | 20 | 25 | 28 | 30 | 30 | 30 |
| **Number of firms** | **112** | **162** | **227** | **329** | **453** | **490** | **510** | **520** | **536** |

### *3.2. Asset pricing tests*

Core et al. (2008) suggest that the two-statge cross sectional regress (2SCSR) introduced by E. F. Fama and MacBeth (1973) should be applied to test if a proposed risk factor is priced. In this paper, following Core et al. (2008) and Mouselli et al (2013), we apply 2SCSR to examine whether AQ is a priced risk factor. In particular, we run two following stages.

Stage 1:we examine whether AQ factors reflecting the difference in average returns between low-AQ firms and high-AQ firms are useful in pricing 6 size-BM portfolios by comparing R-Square of Ep.(1) and Eq. (2). If AQ factors are helpful in explaining time series variation of excess return, the coeeficient of AQF($\beta_{AQ,i}$) in Ep.(2) of at least one pofortfolio should be sinificantly different from zero.

Eq. (1): $$\boldsymbol{R_{i,t} - R_{f,t} = \alpha_i + \beta_{m,i}(R_{m,t} - R_{f,t}) + \beta_{SMB,i}SMB_t + \beta_{HML,i}HML_t + \varepsilon_{i,t}}$$

Eq. (2): $$\boldsymbol{R_{i,t} - R_{f,t} = \alpha_i + \beta_{m,i}(R_{m,t} - R_{f,t}) + \beta_{SMB,i}SMB_t + \beta_{HML,i}HML_t + \beta_{AQF,i}AQF_t + \varepsilon_{i,t}}$$

- $R_{i,t}$: the average monthly return of BM-size portfolio i in month t

- $R_{m,t}$: the return on market portfolio
- $R_{f,t}$: the risk free return
- $SMB_t$: Size factor in month t defined in section 3.3.3
- $HML_t$: BM factor in month t defined section 3.3.3
- $AQF_t$: AQ factor constructed in section 3.3.4
- $\boldsymbol{\varepsilon_{i,t}}$: the error term

Stage 2: We run cross-section regressions of portfolio excess returns on the factors' betas in order to investigate whether the AQ factor is priced and to identify the model that best explains the cross-sectional variation in porfolio returns. The estimated betas from Ep.s (1) and (2) are used as independent variables in the Eq.s (3) and (4) as follows:

Eq.(3): $$\boldsymbol{R_{i,t} - R_{f,t} = \gamma_{0,t} + \gamma_{m,t}\widehat{\beta}_{m,i} + \gamma_{SMB,t}\widehat{\beta}_{SMB,i} + \gamma_{HML,t}\widehat{\beta}_{HML,i} + \epsilon_{i,t}}$$

Eq. (4):

$$\boldsymbol{R_{i,t} - R_{f,t} = \gamma_{0,t} + \gamma_{m,t}\widehat{\beta}_{m,i} + \gamma_{SMB,t}\widehat{\beta}_{SMB,i} + \gamma_{HML,t}\widehat{\beta}_{HML,i} + \gamma_{AQ,t}\widehat{\beta}_{AQ,i} + \epsilon_{i,t}}$$

where:

- $R_{i,t}$: the average monthly return of BM-size portfolio i in month t
- $\gamma_{0,t}$: the zero-beta risk premium in month t
- $\gamma_{m,t}$: the risk premia on the market factor in month t
- $\gamma_{SMB,t}$: the risk premia on size factor in month t
- $\gamma_{HML,t}$: the risk premia on BM factor in month t
- $\gamma_{AQ,t}$: the risk premia on AQ factor in month t
- $\boldsymbol{\epsilon_{i,t}}$: pricing error
- $\hat{\beta}_{m,i}$; $\hat{\beta}_{SMB,i}$; $\hat{\beta}_{HML,i}$ in Eq. (3) are coefficients obtained from the estimation of Eq. (1)
- $\hat{\beta}_{m,i}$; $\hat{\beta}_{SMB,i}$; $\hat{\beta}_{HML,i}$; $\hat{\beta}_{AQ,i}$ in Eq. (4) are coefficients obtained from the estimation f Eq.(2)

Eqs. (3) and (4) are estimated for every month in the sample period, providing for each factor 108 observations of a time series of its risk premium. We use the average estimated value of 108 observations to present for risk premia of each factor in Eq.s (3) and (4). Particularly, we denote: $\overline{\gamma_0} = \sum_1^t \frac{\gamma_{0,t}}{108}$; $\overline{\gamma_m} = \sum_1^t \frac{\gamma_{m,t}}{108}$;$\overline{\gamma_{SMB}} = \sum_1^t \frac{\gamma_{SMB,t}}{108}$; $\overline{\gamma_{HML}} = \sum_1^t \frac{\gamma_{HML,t}}{108}$; $\overline{\gamma_{AQ}} = \sum_1^t \frac{\gamma_{AQ,t}}{108}$. We examine the null hypotheses that these average estimated risk premia are zero. The goodness-of fits of Eq.s (3) and (4) are compared using a cross-sectional adjuested-$R^2$ measure (Jagannathan & Wang, 1996).

### 3.3. Measurement of variables

*3.3.1. Caculation of monthly stock returns and monthly porfolio returns*

Inclusive dividend monthly stock returns are caculated based on adjusted closing prices of the first and the last trading day of month t. Monthly porfolio returns are equally weigted average returns of all stocks in the porfolio.

*3.3.2. Measurement of market risk premium (MRP=$Rm_T$-$Rf_T$)*

Monthly market returns are value weighted index returns of Vn-Index and Hnx-Index. Accordingly, Vn-Index and Hnx-index returns are caculated from closing Vn-Index and closing Hnx-index of the fist and the last trading days every month. The average monthly risk free rate is annual closing bid yields of government bond devided by 12 months. The market risk premium is the difference between monthly market return ($R_{m,t}$) and the risk free rate ($R_{f,t}$).

*3.3.3. Measurement size factor (SMB) and BM factor (HML)*

We follow F. U. Fama and Frech (1993) and Mouselli et al. (2013) in construction of SBM and HML factors. At the end of June for each year t, all stocks are allocated into one of two size groups, small (1) or big (2), depending on whether they fall below or above the median of market cap. According to Fama and French (1993), market capitalization of a stock is equal to the product of average number of outstanding shares in year t and the stock price at the end of June for year t. Independently, all stocks are also allocated into one of three book value to market value (BM) groups, low (1), medium (2) and high (3), defined with refrence to the breakpoints of the bottom 40% , middel 20% and top 40% BM values recorded at the end of year t-1. BM is equal to book value devided by market value in year t-1. Book value is the difference between equity and prefered share in year t-1. In total, six sizeBM portfolios (11,12,13,21,22,23) are defined by the intersections of the two size and three BM groups. We then calculate the equally weighted monthly returns for the six size-BM portfolios over the following 12 months. The size factor $SMB_t$is the difference between the average returns on the three small size portfolios (11,12,13) and the average ruturns on the three big-size portfolios (21,22,23). The BM factor $HML_t$ is the diference between the average returns in the two high-BM portfolios (13,23) and the average rerurns on the two low-BM portfolios (11,21).

*3.3.4. Measurement of AQ factor*

*a. Measurement of acrual quality*

In this paper, we employ both discretionary accruals and innate acruals as proxies for AQ. Discreationary accruals are a measure of earning management that requires managers' justments and discretion(Dechow, Sloan, & Sweeney, 1995; Jones, 1991; Kothari, Leone, & Wasley, 2005; Mouselli et al., 2013; Xie, 2001)while innate acruals (non discretionary accruals) reflect economic fundamentals (Francis et al., 2005; Gray et al., 2009). In particular total acruals are divided into two componets: non-discreationary (NDAC) and discretionary (DAC). We use the model proposed by Kothari et al. (2005) to estimate DAC and NDAC. Following Mouselli et al. (2013), we estimate a cross-sectional regress in order to maximize the sample size and avoid the problem of survivor bias that arises from firm-specific time-series regression. The total accrual ($TAC_{i,t}$) of firm *i* in year *t* is

$$\text{Eq.(5) } TAC_{i,t} = NI_{i,t} - CFO_{i,t}$$

Where $NI_{i,t}$is net profit of firm i in year t and $CFO_{i,t}$ is cash flow from operating activities of firm i in year t. To compute DAC for any firm year observation, we estimate the following cross-sectional ordinary least squares (OLS) regression for all firms in each industry sector with at least 10 observations in year t:

$$\text{Eq.(6)} \frac{TAC_{i,t}}{TA_{i,t-1}} = \alpha \frac{1}{TA_{i,t-1}} + \beta_1 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{TA_{i,t-1}} + \beta_2 \frac{PPE_{i,t}}{TA_{i,t-1}} + \beta_3 ROA_{i,t-1} + \varepsilon_{i,t}$$

Where $\Delta REV_{it}$ is the change in revenue;$\Delta REC$ is the change in account recievables, $PPE_{it}$ is total fixed asset and $ROA_{it-1}$ is return on asset of year t-1. All variable of Ep.(6) is deflated by lagged total assets ($TA_{i,t-1}$). The residual of Ep. (6) is the proxy for $DAC_{i,t}$. Finally, $NDAC_{i,t}$ is the remaining portion of $TAC_{i,t}$ after subtracting $DAC_{i,t}$:

$$\textbf{Eq. (7)}: \boldsymbol{NDAC_{i,t} = \frac{TAC_{i,t}}{TA_{i,t-1}} - DAC_{i,t}}$$

Large positive or negative values of $NDAC_{i,t}$ and $DAC_{i,t}$ indicate large divergence between cash flow and earnings. According ly, the absolute value of $NDAC_{i,t}$ and $DAC_{i,t}$ are used as measures of AQ. On these measures, large values of NDAC and DAC reflect low AQ while small values of NDAC and DAC imply high AQ. However the score of DAC refers to accrual quality arising from discretions and adjustments of managers while the score of NDAC implies accrual quality associated with economic fundamentals such as accounting regulations, business conditions, legal corridors… .

*b. Construction of AQ factor (AQF)*

For the AQ factor, we construct portfolios to be held for 12 months from April of year t, based upon the AQ scores (measured by the absolute value of DAC and NDAC) in year t-1. The firms are sorted annually by AQ and allocated to five quintile AQ score portfolios (i=1,….5). and equally weighted portfolio monthly returns are calculated. The construction of the AQ score portfolios is repeated for each of 9 years. The AQ factor ($AQF_t$ - based on the absolute value of DAC and $AQF'_t$ - based on the absolute value of NDAC) is the difference between the average returns of the two high AQ score (low AQ) portfolios and the average returns of the two low AQ score (high AQ) portfolios.

## 4. Results and discussion

### *4.1 Summary statistics*

The table 2 reports summary staitics. Panel A of table 2 reflects the mean values, the median values and the standard deviations of the factors consiting of $MRP_t$, $SMB_t$, $HML_t$, $AQF_t$ and $AQF_t'$, caculated over 108 monthly data points. Panel B of table 2 reports the correlations between these factors. Both $AQF_t$ and $AQF_t'$reports negative correlations with $MRP_t$ and $SMB_t$ sinificantat 0.01 and 0.05 level but positive correlations with $HML_t$ factors. These results are different from emperical findings in developed countries where it is found that AQF has positive correlation with size factor and negative correlation with BM factor(Core et al., 2008; Mouselli et al., 2013). The negative correlation between $SMB_t$ and $AQF_t$ may reflect a tendency for big firms to have lower AQ on average than large firms. Similarly, the positive correlation between $HML_t$ and $AQF_t$ suggests a tendency for low BM firms to have lower AQ on average than high BM firms.

Table 2: Summary statistics for the three Fama–French factors and the AQ factors

| | **$MRP_t$** | **$SMB_t$** | **$HML_t$** | **$AQF_t$** | **$AQF'_t$** |
|---|---|---|---|---|---|
| *Panel A: Factor means, nd standard dev* | | | | | |
| Mean | 0.0035 | -0.0000 | 0.0150 | -0.0016 | 0.00277 |
| Median | -0.0125 | -0.0015 | 0.0106 | 0.0013 | 0.00534 |
| Standard deviation | 0.1195 | 0.0409 | 0.0436 | 0.0269 | 0.02638 |
| *Panel B: Correlations* | | | | | |
| Rm,t –Rf,t | 1.000 | | | | |
| $SMB_t$ | -0.0194 | 1.0000 | | | |
| $HML_t$ | 0.0226 | -0.0667* | 1.0000 | | |
| $AQF_t$ | -0.2606*** | -0.3647*** | 0.0201 | 1.0000 | |
| $AQF'_t$ | -0.2309*** | -0.0907** | 0.1765*** | 0.1179*** | 1.0000 |

*This table reports summary statistics and correlations for three F. U. Fama and Frech (1993) factors and the AQ factors (measured by the* *absolute values of DAC and NDAC). The sample mean values are calculated over 108 monthly observation from April 2007 to March 2016. The market factor $MRP_t$ is the difference between the return on the market portfolio and the risk –free rate on return. The size factor $SMB_t$ is the difference between the average returns on the three small-size portfolios*

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*and the average returns on the three big-size portfolios. The BM factor $HML_t$ is the difference between the average returns on the two high-BM portfolios and the average returns on the two low-BM portfolios. The AQ factors, $AQF_t$ and $AQF'_t$, are the differences between the average returns of the two highest AQ score quintiles and the average returns of the two lowest AQ score. All returns are monthly.*

**** Denotes rejection of the null hypothesis at the 0.01 significance level*

*** Denotes rejection of the null hypothesis at the 0.05 significance level*

** Denotes rejection of the null hypothesis at the 0.1 significance level*

***4.2. Emperical results***

Table 3 reports estimations of the factor loadings from Eq. (1) and Eq. (2) for 6 size-BM portfolios. The F-test for the joint significance of the beta coefficients on a particular factor across the Eq. (1) and (2) identifies the factors that explain the time series variation in portolio returns. Panel A reports the coefficients of Eq.(1). Panel B and Panel C represent the coeeficients of Eq.(2), of which AQF is proxied by the absolute values of DAC in Panel B and AQF’ is measured by the absolute values of NDAC in Panel C. It can be seen that the intercept coefficients ($\alpha_i$) of Eq.s (1) and (2) are not sinificant and aproximately equal to zero. The factor loading of market risk ($\beta$m,i) shows significant positive relationship with excess return at p-value <0.01. The coefficient of size factor ($\beta_{SMB}$,i) reports significant level of 0.01 in 3/6 portfolios in Panel B and Panel C while the coefficient of BM factor($\beta_{HML,i}$) indicates signicant level of 0.05 and 0.1 in 4/6 portfolios in Pannel B and significant level of 0.01 and 0.1 in 4/6 porfolios in Panel C . For AQF measured by discrestionary acruals, the factor loading of acrual quality risk ($\beta_{AQF}$,i) reports sinificant level of 0.05 and 0.1 in 4/6 portfolios (Panel B). And if it is proxied by innate acruals, its correspoding coeffiecient is significant at p-value of 0.01 and 0.05 for all size-BM porfolios (Panel C). For both proxies of acrual quality, AQF reports a negative relationship with excess return. This finding sugeests that the AQ factor explains the time series variation in the returns of 6 portfolios sorted by size and BM. The adjusted $R^2$ values reported in Panel B and Panel C are generally higher than the corresponding values in Panel A. These findings go in line with Core et al. (2008) and Mouselli et al. (2013).

Table 3: Time series OLS estimations of Eq.(1) and Eq. (2) of six size-BM portfolios

| **BM** / **Size** | **1** | **2** | **3** | **1** | **2** | **3** |
|---|---|---|---|---|---|---|
| *Panel A: The three factor model (Equation 1)* | | | | | | |
| | | $\alpha_i$ | | | t-test | |
| 1 | -0.002 | -0.004 | 0.000 | -0.28 | 0.59 | 0.10 |
| 2 | -0.000 | -0.001 | -0.004 | -0.00 | -0.21 | -0.48 |
| | | $\beta_{m,i}$ | | | t-test | |
| 1 | 0.601*** | 0.579*** | 0.598*** | 3.94 | 4.11 | 3.82 |
| 2 | 0.594*** | 0.582*** | 0.607*** | 3.88 | 3.99 | 3.99 |
| | | $\beta_{SMB,i}$ | | | t-test | |
| 1 | 1.024*** | 1.192*** | 1.278*** | 3.59 | 6.18 | 5.50 |
| 2 | 0.272 | 0.186 | 0.051 | 0.18 | 0.64 | 0.19 |
| | | $\beta_{HML,i}$ | | | t-test | |
| 1 | -0.468* | 0.155 | 0.501* | -1.83 | 0.73 | 1.83 |
| 2 | -0.495* | 0.136 | 0.536** | -1.80 | 0.65 | 2.09 |
| | | Adj.$R^2$ | | | F-test | |
| 1 | 0.571 | 0.605 | 0.615 | 8.81*** | 17.15*** | 19.72*** |
| 2 | 0.536 | 0.487 | 0.520 | 5.74*** | 5.49*** | 6.65*** |
| **BM** / **Size** | **1** | **2** | **3** | **1** | **2** | **3** |

*Panel B: Four factor model (Equation  2): AQF measured by the absolute values of DAC*

| | | | | | | |
|---|---|---|---|---|---|---|
| | | $\alpha_i$ | | | t-test | |
| 1 | -0.003 | -0.004 | -0.000 | -0.42 | -0.58 | -0.01 |
| 2 | -0.000 | -0.002 | -0.004 | 0.07 | -0.37 | -0.61 |
| | | $\beta_{m,i}$ | | | t-test | |
| 1 | 0,561*** | 0,564*** | 0,561*** | 3,65 | 3,86 | 3.58 |
| 2 | 0,573*** | 0,539*** | 0,572*** | 3,67 | 3,66 | 3.70 |
| | | $\beta_{SMB,i}$ | | | t-test | |
| 1 | 0.863*** | 1.131*** | 1.128*** | 4.20 | 6.25 | 5.65 |
| 2 | 0.187 | 0.014 | -0.093 | 0.93 | 0.07 | -0.45 |
| | | $\beta_{HML,i}$ | | | t-test | |
| 1 | -0.467** | 0.155 | 0.502** | -2.16 | 0.75 | 2.02 |
| 2 | -0.495* | 0.136 | 0.536** | -1.86 | 0.80 | 2.38 |
| | | $\beta_{AQF,i}$ | | | | |
| 1 | -0.660* | -0.251 | -0.615** | -1.69 | -0.97 | -2.11 |
| 2 | -0.352 | -0.705* | -0.591* | -1.34 | -1.86 | -1.74 |
| | | Adj,$R^2$ | | | F-test | |
| 1 | 0.590 | 0.608 | 0.632 | 9.31*** | 15.60*** | 23.86*** |
| 2 | 0.543 | 0.515 | 0.538 | 5.87*** | 6.24*** | 7.54*** |
| **BM** / **Size** | **1** | **2** | **3** | **1** | **2** | **3** |

*Panel C: Four factor model (Equation 2) : AQF measured by the absolute values of NDAC*

| | | | | | | |
|---|---|---|---|---|---|---|
| | | $\alpha_i$ | | | t-test | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | -0.001 | -0.003 | 0.002 | -0.15 | -0.44 | 0.28 |
| 2 | 0.001 | -0.000 | -0.003 | 0.16 | -0.07 | -0.40 |
| | $\beta_{m,i}$ | | | | t-test | |
| 1 | 0.562*** | 0.545*** | 0.551*** | 3.77 | 3.88 | 3.62 |
| | | | | | 2 | 0.549*** |
| | $\beta_{SMB,i}$ | | | 0.543*** | | 0.575*** |
| 1 | 0.984*** | 1.157*** | 1.229*** | 3.66 | 3.79 | 3.81 |
| 2 | 0.226 | 0.146 | 0.017 | | | |
| | $\beta_{HML,i}$ | | | 3.31 | 5.73 | 5.27 |
| 1 | -0.389* | 0.224 | 0.598*** | 1.17 | 0.48 | 0.06 |
| 2 | -0.404* | 0.215 | 0.603*** | -1.79 | 1.24 | 2.92 |
| | | | | | t-test | |
| | | | | -1.92 | 1.20 | 2.68 |
| | $\beta_{AQF,i}$ | | | | t-test | |
| 1 | -0.742*** | -0.646** | -0.905*** | -2.84 | -2.11 | -3.08 |
| 2 | -0.854*** | -0.748** | -0.630*** | -3.01 | -2.31 | -2.39 |
| | Adj,$R^2$ | | | | F-test | |
| 1 | 0.598 | 0.627 | 0.655 | 11.07*** | 17.46*** | 21.36*** |
| 2 | 0.580 | 0.522 | 0.542 | 7.68*** | 6.37*** | 8.06*** |

*This table reports OLS estimations of the three factor model (Eq.(1)) and the four factor model (Eq.(2)) for 6 portfolios sorted by size and BM. $\alpha_i$, $\beta_{m,i}$, $\beta_{SMB,i}$, $\beta_{HML,i}$and $\beta_{AQF,i}$ are coefficients of Eq.(1) and Eq.(2). Panel A reports coefficients of the three factor model (Eq.(1)). Panel B and Panel C represent coefficients of the four factor model (Eq.(2)), of which AQF is measured by the absolute values of DAC in Panel B and AQF' is measured by the absolute values of NDAC in Panel C.The t-statistics are corrected for heteroscedasticity, using robust standard errors, after checking for* *autocorrelation by Breusch-Godfrey test. The F-statistics test the null hypothesis of joint zero restrictions on the intercept coefficients, and the null hypothesis of joint zero restrictions on the loadings for each risk factor.*

**** Denotes rejection of the null hypothesis at the 0.01 significance level*

*** Denotes rejection of the null hypothesis at the 0.05 significance level*

** Denotes rejection of the null hypothesis at the 0.1 significance level*

Table 4 reports $\overline{\gamma_0}$, $\overline{\gamma_m}$, $\overline{\gamma_{SMB}}$, $\overline{\gamma_{HML}}$, $\overline{\gamma_{AQF}}$ $\gamma$, $\overline{_{AQF}}$ ', the average values of the coefficienst of Eq.s (3) and (4) obtained from the estimation of unrestricted and restricted versions of these cross-sectional regressions for portfolio returns over the 6 size-BM portfolios in each of the 108 monthly time period. Four alternative specifications are condidered: the unrestricted versions of Eq.s (3) and (4); and two restricted versions of Eq. (4), with the size factor excluded , and with both of the size and BM factors exlcuded, respectively. Panel A reports the coefficients of Eq.(3). Panel B and Panel C represent the factor loadings of Eq.(4) and its alternattive specifications, of which AQF is proxied by the absolute value of DAC in panel B and AQF' is measured by the absolute value of NDAC in panel C. If the models is correctly specified, the intercept coefficients should be zero, because assets with zero should earn the risk free rate (Jagannathan & Wang, 2007; Mouselli et al., 2013). It can be seen that the null hypothesis $\overline{\gamma_0}$=0 is not rejected for all four specifications. This implies that all four tested models correctly explain the returns for the 6 size-BM portfolios.

Consitent with Michou et al. (2007) and Mouselli et al. (2013), the results reported in Panel A and Panel B suggest that BM is the only priced risk factor. $\overline{\gamma_{HML}}$ is significantly different from zero at the 0.01 level in each of the three specifications which include the factor loading on the BM factor. However, the market beta is not a significant determinant of the cross-section of returns. This finding is in line with empirical result in developed market (see for example Mouselli et al. (2013). Nevertheless, contrary to comon nagative estimates of the market risk premium obtained in the developed markets (E. F. Fama & French, 1992; Jagannathan & Wang, 2007; Mouselli et al., 2013), postive estimates of risk premium is reported in Vietnam, an emerging market. Consistent with Core et al. (2008); Mouselli et al. (2013) and Gray et al. (2009), AQF, proxied by discretionary accruals, is not significantly different from zero in each of the three specifications that include the factor loading for acrual quality (panel B). Although adjusted $R^2$ measure indicates that the modified four factor model provides the best fit, with an adjust $R^2$ of 86% (comparing with adjusted $R^2$ for three factor model of 73%), the insignificant premium on the AQ factor implies that AQ, which reflects discretionary accruals relating to managers' discrestions and adjustements on earning, is not a priced risk factor in the 6 size-BM portfolios. However, when the proxy for AQ is changed to innate accruals, refering to economic fundementals, AQF' is significantly differennt from zero at the P-value of 0.1 in two of three specifications that include the coefficient for accrual quality (Panel C). In addition, the adjusted $R^2$ of 88% of the four factor model shows the best fit in comparison with adjusted $R^2$ of 73% of three factor model. The significant risk premium of AQF' and the highest adjusted $R^2$ of four factor model sugget that innate accrual AQ factor is a priced risk factor in Vietnamese stock market. This result is consitent with the findings of Francis et al. (2005) and Gray et al. (2009).

Table 4: Cross sectional estimation of Eq.(3) and Eq.(4) for six size-BM portfolios.

| | $\gamma_0$ | $\gamma_m$ | $\gamma_{SMB}$ | $\gamma_{HML}$ | $\gamma_{AQF}$ | $\gamma_{AQF'}$ | **Average Rsquared** |
|---|---|---|---|---|---|---|---|
| *Panel A: Cross-sectional estimation of Eq.(3)* | | | | | | | |
| Estimate | -0.017 | 0.030 | 0.001 | 0.014*** | | | 73% |
| FM t-stat | -0.32 | 0.32 | 0.12 | 3.34 | | | |
| NW t-stat | -0.33 | 0.33 | 0.12 | 3.35 | | | |
| Panel B: Cross sectional estimations of Eq.(4) and its two specifications. AQF is measured by DAC | | | | | | | |
| Estimate | -0.008 | 0.012 | 0.001 | 0.014*** | -0.004 | | 86% |
| FM t-stat | -0.15 | 0.12 | 0.16 | 3.28 | -0.52 | | |
| NW t-stat | -0.16 | 0.12 | 0.16 | 3.44 | -0.58 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Estimate | -0.006 | 0.008 | | 0.014*** | -0.003 | | 53% |
| FM t-stat | -0.10 | 0.08 | | 3.30 | -0.40 | | |
| NW t-stat | -0.10 | 0.08 | | 3.47 | -0.41 | | |
| Estimate | -0.014 | 0.02 | | | -0.011 | | 31% |
| FM t-stat | -0.25 | 0.18 | | | -1.35 | | |
| NW t-stat | -0.25 | 0.19 | | | -1.32 | | |
| Panel C: | | ıations of Eq.(4) and its t is measured by NDAC | | | | | |
| Estimate | -0.013 | 0.001 | -0.001 | 0.015*** | | -0.015* | 88% |
| FM t-stat | -0.23 | 0.01 | -0.10 | 3.55 | | 1.71 | |
| NW t-stat | -0.24 | 0.01 | -0.10 | 3.71 | | 1.69 | |
| Estimate | -0.015 | 0.005 | | 0.015*** | | -0.015* | 53% |
| FM t-stat | -0.26 | 0.05 | | 3.55 | | 1.70 | |
| NW t-stat | -0.26 | 0.05 | | 3.73 | | 1.69 | |
| Estimate | -.045 | 0.083 | | | | -0.007 | 30% |
| FM t-stat | -0.86 | 0.80 | | | | -0.65 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| NW t-stat | -0.84 | 0.78 | | | | -0.63 |

*This table reports the average estimated coefficients from 108 Fama-MacBeth crossectional regressions of portolio excess returns on full-period factor betas for 6 portfolios sorted by size and BM ratio (Eqs. (3) and (4)).*$\overline{\gamma_0}$ *is the average value of the intercept coefficients* $\gamma_{0,t}$.$\overline{\gamma_m}$ *is the average value* $\gamma_{m,t}$*, the factor loading on the market factor.*$\overline{\gamma_{SMB}}$ *is the average value of* $\gamma_{SMB}$*, the factor loading on the size factor.*$\overline{\gamma_{HML}}$ *is the average value of* $\gamma_{HML}$*, the fator loading on the BM factor.* $\overline{\gamma_{AQF}}$ *is the average value of* $\gamma_{AQF}$*, the fator loading on the AQ factor, proxied by the adsolute value of DAC.* $\overline{\gamma_{AQF'}}$ *is the average value of* $\gamma_{AQF'}$*, the fator loading on the AQ factor, proxied by the adsolute value of NDAC.Adjusted R-square follows Jagannathan and Wang (1996), and is reported as a percentage. FM t –statistics are caculated using E. F. Fama and MacBeth (1973) aprroach; NW t-statistics are caculated using Newey and West (1994), lag(2), to correct for heteroskedasticity and autocorrelation.*

**** Denotes rejection of null hypothesis at the 0.01 significance level*

*** Denote rejection of the null hypothesis at the 0.05 significance level*

** Denote rejection of the null hypothesis at the 0.1 significance level*

In summary, the cross-section evidence reported in table 4 for 6 size-BM portfolios suggests that AQ factor, reflecting the dicrestionary accruals, is not a priced risk factor in Vietnam. This finding is consistent with the results for 25 size-BM US portfolios reported by (Core et al., 2008) and 16 size-BM UK portfolios indicated by (Mouselli et al., 2013). Nevertheless AQ factor, proxied by innate accruals representing for economic fundaments, is a priced risk factor in Vietnamese stock market. This result goes in line with Francis et al. (2005) for US market and Gray et al. (2009) for Australian market.

## 6. Conclusion

Literature on the financial reporting quality, and in particularly AQ as a price risk factor is still under debate with mixed results found in numerous studies. Previous empirical studies mostly focused on developed countries where the market is efficient with strong legal setting that help to reduce the risk associated with information asymmetries and the precision of information. Yet, there is very limited studies in emerging and developing countries in this area.

Taken into account the unique context in Vietnam stock market where the market is inefficient and the company is lack of strong corporate governance internal and external control mechanisms, we predicted that the accrual quality as a proxy for information risk is a non-diversifiable risk and is a price risk factor. Different from other developed countries, Vietnam has an unique setting that may potentially affect the relationship between AQ and future stock return. With a low level of information disclosure and inefficient market in Vietnam, information asymmetries in the stock market are relatively high and the precision of information is rather low, the information risk associated with opportunistic managerial reporting and disclosure choices can be high. In that situation, investors may require a premium to compensate for the risk associated with poorer AQ factor that leads to an increase in the future return.

Using 2SCRS approach suggested by Core et al., (2009) and commonly employed in the literature, the findings demonstrate that innate AQ factor is indeed a priced risk factor which implies that the future stock return is actually influenced by accrual quality arising from economic fundamentals. This result is another evidence to support the findings in Kim and Qi (2008), Gray et al (2009) who also showed that AQ is a priced risk factor using the 2SCRS approach. However, discretionary AQ factor which arises from managerial reporting discretion is not a priced risk factor. This result is in line with findings in Mouselli et al. (2013) study. Mouselli et al. (2013) argued that the reason for AQ factor not being a priced risk factor is because discretionary AQ is not an appropriate proxy for information risk or AQ is diversifiable or AQ is captured by other risk factor.

Generally, the empirical result in this study suggest that information risk is non-diversifiable risk factor which is priced by the market. This result is as predicted in a weak form efficient capital market. However, we suggested that further study can extend this study to capture longer time period to test if discretionary AQ is indeed a priced risk factor.

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