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THE INFLUENCE OF SUSTAINABLE EARNINGS ON STOCK PRICE: EVIDENCE FROM PUBLICLY LISTED VIETNAMESE BUSINESS ENTERPRISES

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ABSTRACT

Expected earnings and stock price are important determinants of investors' decision. This research is conducted to estimate earnings persistence and examine the relationship between sustainable earnings on price-to-earning (P/E) ratio based on financial statements' information of 631 publicly listed non-financial companies on Vietnam's stock market, by using Ordinary Least Squares (OLS) and Logit function. The results show that earnings persistence depends on net operating assets growth, profit margin changes, operating asset turnover changes and past profitability. Besides, both the sustainable and unsustainable components of earnings growth are proved to empirically affect P/E ratio, even though investors underreact to sustainable earnings and overreact to unsustainable earnings. This study helps to improve investors' perception of their future earnings, investment value and companies' sustainable growth, particularly in the context of developing stock market of Vietnam which is full of market anomalies.

Keywords: Earnings persistence, earnings per share, market price, P/E, returns on net operating assets (RNOA)

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INTRODUCTION

Earnings persistence has its roots from works of profit forecast, which provides the basis for security valuation and business enterprise valuation in the context of investment decision making. Investors wish to determine the fair price of stocks and thus can pinpoint the overpriced or underpriced ones. The fair price of a stock can be determined by different versions of the discounted earnings model, which requires prediction of firm' future earnings. Every prediction of future earnings needs to be based on current earnings. Decades ago, it was believed that firms' profit did not strictly follow "random walk" pattern, instead of past profit and future profit are somehow correlated (Ball & Watts, 1972; Graham & Dodd, 1951; Penman & Zhang, 2004). Therefore, researchers came up with a variety of methods to estimate future profit based on current profit (Brownlee, Ferris, & Haskins, 1990; Damodaran, 1999; Graham, Dodd, & Cottle, 1962; Haskins, Ferris, Sack, & Allen, 1993; Kieso & Weygandt, 1995). The ability of current profit to be sustained in future is termed earnings persistence. With other things equal, future profit tends to be easier to predict, given more earnings persistence. In contrast, if firm's current profit is highly temporary, it is more difficult to have an accurate forecast of future earnings.

This research provides an estimation of earnings persistence based on accounting information and examines the relationship between earnings persistence and expected earnings as well as the stock price. The research focuses on investigating the situation of developing stock markets to compare with that of developed stock markets, which have already been studied in previous papers. Accordingly, this research involves non-financial firms publicly listed on the Vietnamese Stock Exchange.

LITERATURE REVIEW

Examination of Earnings Components' Persistence

According to DuPont, profitability, as measured by Return on Assets (ROA) and Return on Equity (ROE), can be separated into profit margin, asset turnover and (in the case of ROE) equity multiplier. Therefore, changes of ROA and ROE can be attributed to changes in those components, implying that the analysis of these components' fluctuations is helpful in earnings persistence estimation and future profitability prediction. Fairfield and Yohn (2001) developed a forecasting model of future earnings changes based on the above approach. Their findings show that by breaking down ROA following DuPont approach, the forecast

efficiency of the model is improved compared to usual lag models. Subsequent studies by Jin (2017), Khalaj and Zabihi (2016), Demmer (2015), Bauman (2013), and Habib (2006), all followed this track, with some adjustments to the original model. All those studies confirm the benefit of applying DuPont approach in estimating earnings persistence and improving earnings forecast efficiency. Besides, Bauman (2013) found that the direction of profit margin changes has additional power in explaining future changes of *ΔRNOA* of listed companies in the U.S. from 1991 to 2009. This result was shared by Demmer (2015), who conducted similar research for U.S. firms during 1990–2012, using changes of profit margin and asset turnover as control variables to represent earnings quality. Khalaj and Zabihi (2016) applied the same model to study earnings persistence of companies listed on the Tehran Stock Exchange from 2010 to 2014 and reached the same conclusion. Recently, Jin (2017) found that by disaggregating ROE using DuPont equation, the prediction of Canadian companies' one-year-ahead ROE became more efficient. Habib (2006) disaggregated *ΔRNOA* of Japanese *keiretsu* companies and non-*keiretsu* companies from 1990 to 2000 into changes of profit margin, asset turnover and other financial factors. The study showed that such disaggregation only improves earnings forecast efficiency of non-*keiretsu* companies.

In general, those studies gave proof that it is helpful for forecast analysts to break down earnings into components by using DuPont equation. Most of these studies, however, did not intentionally bring in the effect of earnings persistence as defined above, except for the study by Penman and Zhang (2004). According to them, earnings persistence depends on the persistence of revenue and the persistence of expenses, and DuPont equation can be used to disaggregate ROA into these components. Specifically, change of profit margin indicates the relation between change of operating income and change of revenue, thus representing persistence of operating expenses. In contrast, change of asset turnover indicates the relation between change of revenue and change of operating assets, thus representing persistence of revenue. Such disaggregation was proved to enhance efficiency of earnings persistence estimation and profit prediction (Penman & Zhang, 2004) .

In addition, several previous studies have investigated the persistence of total earnings. A pioneering study on earnings persistence estimation based on time-series data was conducted by Kormendi and Lipe (1987). After that, Sloan (1996) also conducted empirical research applying a similar model for non-financial firms in the U.S. from 1962 to 1991 and discovered a high level of earnings persistence (> 0.7) for both the whole sample and industry-based subsamples. The regression coefficient is highly significant, suggesting that future

profit is indeed affected by past profit. This work by Sloan (1996) is considered as one of the most typical studies of earnings persistence, which paves way for similar follow-up studies. Dichev and Tang (2008) expanded the above model to measure persistence of ROA for every five years of 22,113 companies, from 1988 to 2004 and also confirmed a significant relationship between past earnings (earnings of period t) and future earnings (earnings of period $t + k$), even though the impact of past profit decreases as k increases, especially for periods when profit changed dramatically. This research took a different approach as earnings persistence was estimated for each period groups of different profit fluctuation levels. Sloan (1996), and Dichev and Tang (2008) not only estimated the persistence of total earnings but also the persistence of each separated component of earnings. However, total earnings persistence estimation is one of the crucial parts of their studies, which established a "standard" method for earnings persistence estimation and also provided empirical evidence of past earnings' effect on future earnings prediction.

The Influence of Earnings Persistence on Price-to-Earning (P/E)

Higher earnings persistence indicates that future earnings and therefore, future cash flows can be estimated more certainly based on current or past earnings cash flows. Besides, the value of a security can be normally defined as the sum of discounted value of these cash flows. The more secured (or less risky) those expected cash flows are, the more valuable the security is (as less risky cash flows should be discounted at lower rates). Investors' perception of securities' risks thus affects securities' perceived fair prices, which is the basis to determine which securities are overpriced or underpriced and help investors to make decisions correspondingly. The outcome is then reflected in P/E ratio. Therefore, it is logical to infer that earnings persistence can affect P/E.

However, not so many studies have been conducted on the potential effect of earnings persistence on P/E. According to the theory developed by Molodovsky (1953), although high P/E may signal long-term profitability growth, a firm with long-term profitability growth still may have low P/E if its current earnings are largely temporary. Such phenomenon is referred to as Molodovsky effect, and it implies that P/E can be affected by the non-persistent component of current earnings. Beaver and Morse (1978), as well as Penman (1996), discovered that P/E has a positive correlation with future profit growth but negative correlation with current profit growth, which can be regarded as empirical evidence of earnings persistence's impact on P/E. Penman (1996) developed a financial statement-based P/E model, which involved firm's growth expectation and current non-sustainable earnings. The model can explain 54% of cross-sectional variations of P/E ratios within industries. The model was later adapted and adjusted by Penman

and Zhang (2004). They applied both DuPont approach and cash-versus-accruals approach to disaggregate earnings variations and also integrated additional factors representing sources of firm's hidden reserves such as intangible assets investment and research and development (R&D) investment into original the model. Their final model proves to help identify unsustainable earnings and explaining cross-sectional variations of profitability, as well as forecasting stock's (abnormal) return based on the difference between P/E in fact and fitted value of P/E from the model. Chen (2004) examined the role of sustainable earnings in predicting stock's abnormal return following earnings announcement. The result shows that the correlation between accounting profit fluctuations and stock's abnormal return depends on the level of earnings persistence. In the case of high earnings persistence, the correlation is positive and vice versa. Chen (2004) concluded that stock price overreacted to earnings announcements under high earnings persistence but underreacted under low earnings persistence. Such difference in reaction takes place as investors' expectation of earnings persistence is neutralised to the average, which is largely equal to the level of earnings persistence. Therefore, it is feasible to attain abnormal return from hedged portfolio by exploiting the earnings persistence variations of stocks.

Many studies on earnings persistence have been conducted to examine different aspects of sustainable earnings in several countries, especially the developed ones. For example, they review the concept of sustainable earnings and earnings persistence, estimate earnings persistence, disaggregate and analyse the persistence of earnings components, identify influential factors of earnings persistence, investigate the impact of sustainable earnings on stock price and investors' behaviours. Previous studies not only established a theoretical framework for earnings persistence analysis but also suggested applicable sustainable earnings-based models for stock performance forecast.

In Vietnam, the literature on earnings persistence, however, is still highly underdeveloped with just a few relevant papers being publicised in domestic journals. Most of these works follow the same approach of previous internationally recognised studies of earnings persistence in terms of both research methodology and research content development. For example, Nguyen, Nguyen and Nguyen (2014), and Le, Tran, Phan and Lee (2013) researched on the influence of accounting accruals on earnings persistence of Vietnamese listed companies. They only focused on investigating the effects of different earnings components (cash flow and accruals) but did not go into detail about integration of other potential impacting factors into earnings persistence model, thus the explanatory power of the models was questionable. Besides, Dao (2016) studied informativeness of earnings announcements in banking and finance industry and gave a review

on similar previous studies but did not concentrate on analysis of sustainable earnings as an impacting factor of stock price. In research about earnings quality, Duong (2013), followed Richardson, Sloan, Soliman and Tuna (2005) by using total accruals as the proxy for earnings quality and examined the earnings quality effects of debt financing structure. However, Duong (2013) only investigated how the values of those factors in each year might affect earnings quality of the same period instead of earnings quality of next periods.Thus the future earnings quality effects of those factors were not discovered even though such issue was one of the essential research objects of works on sustainable earnings. Bui and Nguyen (2018) empirically tested the effects of several financial factors as firm's age, financial leverage, capital intensity, sales growth, operating efficiency and firm's size on earnings quality. They just applied the same model by Dechow and Dichev (2002) in the context of the Vietnamese stock market, hence there was no remarkably novel contribution to the literature of earnings persistence.

Furthermore, a few studies developed earnings or cash flow forecast models. However, they did not integrate earnings persistence into the model, with their results presented only in working papers or internally circulated research reports of some domestic educational institutions, so the research quality was still unconfirmed.

In conclusion, academic works of sustainable earnings/earnings persistence analysis and especially earnings persistence's effect on stock price and investors' behaviours (which is reflected in P/E ratio) are still very underdeveloped, which is a significant research gap needed to be filled in Vietnam. Besides, in another working paper of Do and Pham (2019), the average persistence index of Vietnamese listed firms from 2008 to 2010 was estimated to be –0.0850. Such a low level of earnings persistence makes it challenging for investors to forecast future stock price movements and stock returns and does not help much in reducing investment risk. Therefore, it is not unreasonable to consider the Vietnamese stock market as a highly volatile and risky environment for investors. Since the stock market plays an important role as a major fund conduit of the whole economy, the fact that investors are likely to be discouraged by stock return's high level of unpredictability can seriously affect the intranational capital flows and resources allocation. Under such circumstance, it matters to discover the underlying reasons of low earnings persistence of Vietnamese listed stocks, with the starting point being the examination of their earnings persistence's potential influential factors. Our research thus also has a practical contribution in the sense that unveiling the effects of those impacting factors can be the very first step in providing a guideline for further appropriate policy responses in future.

METHODOLOGY

Data

This research focuses on publicly listed companies on Vietnam's Stock Exchange. Their financial data are publicised and audited on a regular basis to assure the reliability and transparency of the data.

In Vietnam, many industry classification standards are applied to classify listed companies on the Vietnam stock market. Listed companies aim at multi-sector and multi-sector business activities in the scale expansion. Thus, it is difficult to specify sector of companies. According to the 4-level industry classification standards of Industry Classification Benchmark (ICB), the proportion of operating revenue is the basic to classify companies' sector. Which operating revenue get high value in total revenue will be important basic to specify the sector of company.

As of the end of 2017, there were 631 publicly listed non-financial firms on Vietnam's Stock Exchange. These firms can be classified into nine industries, excluding finance and banking industries (Vietnamese Security and Exchange Commision, 2018). Table 1 shows the number of listed companies in each industry.

Table 1
The number of Vietnam Stock Exchange's publicly listed firms

No.	Industry	Number of listed companies
1	Petroleum	6
2	Materials	100
3	Industrial manufacturing	276
4	Consumer goods	105
5	Health care and pharmaceutical products	23
6	Consumption services	61
7	Public services	39
8	Technology	21
	Total	631

(Source: https://www.stockplus.com.vn)

Data of all 631 Vietnamese publicly listed non-financial companies from 2010 to 2017 were collected from the official sites of Vietnamese Stock Exchange Committee, Hanoi Stock Exchange (HNX) and Ho Chi Minh City Stock Exchange (HoSE). The data include companies' financial statement items and stock market price. Particularly, the stock price used to calculate annual stock return is determined as the closing price of the last day in each fiscal year.

Variables

Earnings are measured based on the financial ratios. These ratios reflected in the financial statements of the business. Business earnings are increased from the growth of assets. When investments in net operating assets are increasing, it is the basis of sustainable growth of profits. However, changes in the rate of return of net operating assets will cause the instability of earnings (Penman & Zhang, 2004). In Vietnam, there are specific characteristics. The information disclosure on the financial statements of listed companies is deemed reliable enough. These information help investors identify the value of the firm, as well as see the correlation between business value, earnings and market price of stock. Therefore, the study uses financial information from financial reports to test the P/E volatility, in which the sustainability of profitability plays an important role. The study shows that changes in operating assets of the enterprise will lead to a change in the rate of return on net operating assets (RNOA), the rate of growth of net operating assets to increase corporate profits (G). To estimate the influence of earnings persistence on P/E ratio, the following model is proposed:

$$(E/P)_0 = a + b_1 + b_2\widehat{\Delta RNOA}_1 \times G_0^{NOA} + b_3 RNOA_0 + e_0 \quad (1)$$

where;

$(E/P)_0$ = The multiplicative inverse of P/E. The E/P is used instead of P/E itself to avoid the potential problem of small denominator of P/E, as suggest by Penman and Zhang (2004).

$RNOA_0$ = The return on net operating assets (RNOA).

RNOA = Net operating profit after tax (NOPAT) / NOA
= NOPAT / (Operating assets – Operating liabilities). Basically, operating assets are those that take part in the process of sales generation of companies, excluding financial assets (i.e., financial short-term and long-term investments) and operating liabilities are companies' obligations excluding financing liabilities (i.e., firms' borrowing).

G_0^{NOA} = the growth rate of net operating assets: $G_t^{NOA} = (NOA_t - NOA_{t-1})/NOA_{t-1}$.

$RNOA_1$ = the expected change of return on net operating assets one-year ahead.

At the same time, we apply the approach of DuPont model built in 1918 by Donaldson Brown and the DuPont company. The DuPont model is widely applied in the financial analysis of businesses, some researchers have developed DuPont model analysis such as Sheela and Karthikeyan (2012) for the pharmaceutical sector or (Doorasamy, 2016) for the food sector. The return on net operating assets is presented as the product of profit margin (PM) and net operating assets turnover (ATO):

$$RNOA = PM \times ATO$$

where;

PM = Net operating profit after tax / Revenues;

ATO = Revenues / Net operating assets.

On that basis, the return on net operating assets is disaggregated into:

1. The sustainability of revenues and that of costs
2. Assets utilisation efficiency and increase in intangible assets' value.

Firstly, operating profit margin (PM): PM = NOPAT / Revenue; ATO is the asset turnover: ATO = Net revenue / assets.

Secondly, the utilities of assets come from short-term assets such as accrued profits, growth of assets, changes of each asset (cash, inventory, intangible assets).

Growth of net operating assets (G^{NOA}): Based on the characteristics of a developing market, the growth rate of assets is strongly affected. The potential impact of net operating assets growth on the profitability in the next period is demonstrated by the growth rate of operating assets. Therefore, their verification is necessary. Investors will use this growth rate as an important factor to identify the sustainability of enterprises ahead.

Accrual and potential profits (Accr): Sustainable earnings are also reflected in the accumulated profits of the business. Sustainable earnings are partially integrated from the cash flow and the accrual of sustainable profits. It means that the firm's sustainable earnings did not just come from accumulated profits. Sustainability will be a combination of operating cash flow and accrued profits. It is trade-off risk and returns to maximise the value of business assets (Earnings Persistence: Frankel & Litov, 2009; Atashband, 2014; Sloan, 1996).

Inventory changes (Q): The impact of increasing or decreasing the reserve of materials and goods on the temporary profitability of enterprises (Penman & Zhang, 2002).

Change in intangible asset value (C): It is prudent principles of accounting in profit recognition. The research is developed *C*-score to quantify the value of intangible assets created from business activities. It made increased the value of operating assets. In essence, *C*-score estimates the potential resources generated from an enterprise's intangible assets. In addition, the value of intangible assets is also affected by specific business factors.

Based on variable above, as $\Delta\widehat{RNOA}_1$ is not available, it is estimated from the following model, as suggested by Penman and Zhang (2004):

$$\Delta RNOA_1 = \acute{a} + \hat{a}_1 RNOA_0 + \hat{a}_2 \Delta RNOA_0 + \hat{a}_3 \Delta PM_0 + \hat{a}_4 \Delta ATO_0 + \hat{a}_5 G_0^{NOA} + \hat{a}_6 Accr_0 + \hat{a}_7 Q_0 + + \hat{a}_8 C_0 + \mathring{a}_1 \quad (2)$$

The fitted value of $\Delta RNOA_1$ is used es the estimation of $\Delta\widehat{RNOA}_1$. ΔPM_0 is the change of profit margin; ΔATO_0 is the change of asset turnover, $Accr_0$ is the accruals, Q and C are respectively proxies for effects of changes of reserves and accounting conservatism on firm's temporary earnings (Penman & Zhang, 2002). Accruals can be calculated as (NOPAT–Net operating cash flows). *C*-score is computed as follows: *C* = Estimated hidden reserves / Net operating assets = (LIFO reserve + R&D investment + Advertising expenses) / NOA. In Vietnam, *C*-score estimated by the value of intangible assets (Atashband, 2014; Penman & Zhang, 2002). *Q*-score is the simple average of change of *C* and difference of *C* compared to industry median, i.e., $Q_t = [(C_t - C_{t-1}) + (C_t$ – industry median $C_t)] / 2$ (Penman & Zhang, 2002). On a side note, Model (2) can also be used to estimate earnings persistence level and/or examine profitability's mean reversion, as indicated by the value of $RNOA_0$'s coefficient. If the estimated coefficient of $RNOA_0$ is negative, mean reversion of *RNOA* is confirmed. Hence, Model (2) can be used for two purposes:

1. Examining earnings persistence.
2. Estimating $\Delta\widehat{RNOA}_1$ (so that we can subsequently use it as an input for the Model (1).

Method of Analysis

Firstly, the correlation matrix is used to diagnose independent variables' correlations and consistent factor. As one of the independent variables is *RNOA*, which should be estimated independently from accounting information, this also helps to examine the quality of accounting information as the input data for this research. Subsequently, cross-sectional autocorrelation and serial autocorrelation diagnostic tests for panel data are also employed.

Thereafter, $\Delta\widehat{RNOA}_1$ is estimated by running regression Model (2), using Ordinary least squares (OLS). $\Delta RNOA_1$ is regressed on past profitability, profit margin, operating asset turnover, operating asset growth, accruals, an indicator of hidden reserves and accounting conservatism. $\Delta\widehat{RNOA}_1$ is estimated as the fitted value of $\Delta RNOA_1$ from the model. By the way, the industry effect is integrated into regression via industry coding process.

Model (2) helps to identify the influential factors of $\Delta RNOA_1$ and estimate earnings persistence via "direct" forecast of $RNOA_1$. However, the forecast accuracy depends heavily on the quality of accounting information and derived variables, so the follow-up *t*-test may not be efficient for this type of dataset. Therefore, logit function should also be employed as it seems a more appropriate analysis approach (Fama & French, 2000). To be specific, $\Delta RNOA_1$ is also forecasted "indirectly" by the following logit function:

$$S_0 = \text{Prob}(\Delta RNOA_1 > 0) = e^k/(1 + e^k),\ k = \acute{a} + \hat{a}_1 RNOA_0 + \hat{a}_2 \Delta RNOA_0 + \hat{a}_3 \Delta PM_0 + \hat{a}_4 \Delta ATO_0 + + \hat{a}_5 G_0^{NOA} + \hat{a}_6 Accr_0 + \hat{a}_7 Q_0 + \hat{a}_8 C_0 + \hat{a}_1 \quad (3)$$

S-score measures the probability of an increase of *RNOA* in the next year. The value of *S*-score ranges from 0 to 1. *S*-score ranging from 0.5 to 1 predicts a one-year ahead increase of *RNOA*, while *S*-score ranging from 0 to 0.5 predicts a decrease instead. Earnings are deemed completely sustainable if *S*-score equals to exactly 0.5.

Hence, both Models (2) and (3) are used to predict $\Delta RNOA_1$ and estimate earnings persistence, but they follow different approaches. The next step is

to integrate $\Delta\widehat{RNOA}_1$ into Model (1) and *S*-score into Model (4), which is an adjusted version of Model (1), to estimate P/E as follows:

$$(E/P)_0 = \acute{a} + b_1 S_0 + b_2 RNOA_0 \times G_0^{NOA} + b_3 RNOA_0 + e_1 \quad (4)$$

These models are used to investigate the relationship between sustainable earnings and stock price. As the literature shows, stock investors actually buy future earnings of the company, so they will offer to pay less if the firm's earnings are less sustainable (i.e., firm's earnings are just temporarily high), which lowers stock price and P/E ratio. Therefore, it makes sense to rely on earnings persistence to analyse P/E ratio, as an (indirect) approach to examine the effect of sustainable earnings on stock price. These P/E models are estimated by running OLS.

RESULTS AND DISCUSSION

Correlation of Variables

The correlation of variables used to estimate $\Delta RNOA_1$ and earnings persistence is shown in Figure 1.

Figure 1. Correlation matrix of variables in earnings persistence estimation model

The correlation coefficient ranges from –1 to +1. A positive correlation coefficient indicates a positive relationship between variables and vice versa.

The closer the absolute value of correlation coefficient to 1, the stronger the relationship.

The above correlation matrix shows that all correlation coefficients are low, thus the model does not suffer from serious multicollinearity. Therefore, the data can be used to estimate Δ*RNOA* and E/P.

Earnings Persistence

In long-term, the most important goal of the company is to maximise shareholder value. Therefore, it is maximising the value of an enterprise's assets. Hence, the sustainable profit is the earnings expectation that will affect operating assets of the company. That growth of operating assets brings benefits to shareholders.

Firstly, earnings persistence is estimated by Model (2), using OLS method for a linear function. The estimation result is shown in Table 2.

Table 2
Estimation of Model (2)'s parameters

	Estimate	Standard Error	*t*-value	Pr (>|t|)
(Intercept)	0.00259	0.002064	1.259	0.20869
RNOA	–0.16	0.02469	–6.48	–2.07E-10***
DRNOA	–0.1815	0.04055	–4.475	0.00000935***
DPM	0.004215	0.002147	1.963	0.05014†
DATO	0.01527	0.007521	2.03	0.04281*
G^{NOA}	–0.0144	0.004627	–3.111	0.00196**
ACCR	–1.388E-15	8.59E-16	1.616	0.1067
Q_DP	–1.529E-14	9.595E-14	–0.159	0.87343
C	0.05367	0.04495	1.194	0.23298

Note: † significant at 10%, * significant at 5%, ** significant at 1%, *** significant at 0.1%. (Source: Author's calculation based on Stockplus data). *RNOA* = Return on net operating assets; *DRNOA* = "delta" (change) of return on net operating assets; *DPM* = "delta" (change) of profit margin; *DATO* = "delta" (change) of net operating assets turnover; G^{NOA} = growth rate of net operating assets; *ACCR* = accruals; *Q_DP* = proxy for reserves change's effect on temporary earnings; *C* = proxy for accounting conservatism's effect on temporary earnings.

Both profit margin and asset turnover have positive impact on $\Delta RNOA_1$, which is the same as the findings by Penman and Zhang (2004), Frankel and Litov (2009). Similarly, operating assets growth also positively predicts $\Delta RNOA_1$. Meanwhile, *ACCR* (accruals) and *Q* (reserve changes) negatively impact $\Delta RNOA_1$. Besides, the negative coefficient of *RNOA* confirms *RNOA*'s mean reversion.

The estimation result of Q's coefficient is contrary to the result of Penman and Zhang (2004). This seems to be evidence of unstable situation of market shares and business plans of Vietnamese publicly traded firms. A common drawback of Vietnamese companies' operation is generally inconsistent inventory management and production strategy, partly due to unstable macroeconomic conditions, especially the fluctuations of output markets.

As mentioned before, to examine earnings persistence from another perspective, $\Delta RNOA_1$ is also forecasted by S-score estimated from non-linear Model (3). The estimation result is shown in Table 3.

Table 3
Estimation of Model (3)'s parameters

	Estimate	Standard Error	*t*-value	Pr (>|t|)
(Intercept)	0.5801	0.199	–2.915	0.00356**
RNOA	–112.1	12.2	–9.189	2E-16***
DRNOA	–97.07	11.55	–8.407	2E-16***
DPM	1.78	0.7811	2.28	0.02263*
DATO	10.51	1.599	6.573	–4.92E-11***
ACCR	–1.4E-13	–1.063E-13	–1.317	0.18793
Q_DP	5.716E-11	4.941E-11	1.157	0.24729
C	–4.765	4.202	–1.134	0.25676

Note: † significant at 10%, * significant at 5%, ** significant at 1%, *** significant at 0.1%. (Source: Author's calculation based on Stockplus' data)

Overall, the results show that changes of profit margin, asset turnover and reserves have positive impact on sustainable earnings growth while past profitability negatively affects it. This is basically the same as findings of Fairfield and Yohn (2001), who confirmed that by disaggregating changes of *RNOA* into profit margin and asset turnover changes, the forecast of *RNOA* would be improved. Especially, the growth rate of net operating assets G^{NOA} is the expected change of *RNOA* in near future (Penman & Zhang, 2004). However, the results of G^{NOA} is not meaning. It does not affect earning persistence of companies listed on Vietnam stock market.

To be specific, the coefficients of ΔPM and ΔATO are respectively 1.78 and 10.51, showing that an increase in profit margin or asset turnover will improve sustainable earnings. This is different from the findings of Penman and

Zhang (2002) as they found that ΔATO had negative impact on future *RNOA*. For the case of Vietnamese firms, an increase in asset turnover does not necessarily imply asset decreases. In fact, operating assets of most Vietnamese firms tend to increase over time, but their sales may increase at a higher rate, so their *ATO*s still rise. Of course, an increase in sales will be followed by an increase in variable cost. However, given that the rate of sale growth is not lower than expense growth rate, the company' profitability will likely to be improved. Therefore, the net effect is that as *ATO* increases due to strong sales growth, future profitability as measured by *RNOA* is more likely to increase than to decrease (Fama & French, 2000; Bauman, 2013).

Furthermore, past profitability has negative relationship with future profitability, as the coefficients of both $RNOA_0$ and $\Delta RNOA_0$ are negative, which is an evidence of profitability mean reversion. Accounting conservatism has negative effect on forecasted profitability as well even though such effect is statistically insignificant. These results generally reflect the findings of previous notable works on forecasting profitability (Dichev & Tang, 2008; Frankel & Litov, 2009).

Besides, to estimate earnings persistent of the Vietnamese listed companies, the important variables impacted on $\Delta RNOA_1$ are estimated (see Figure 2).

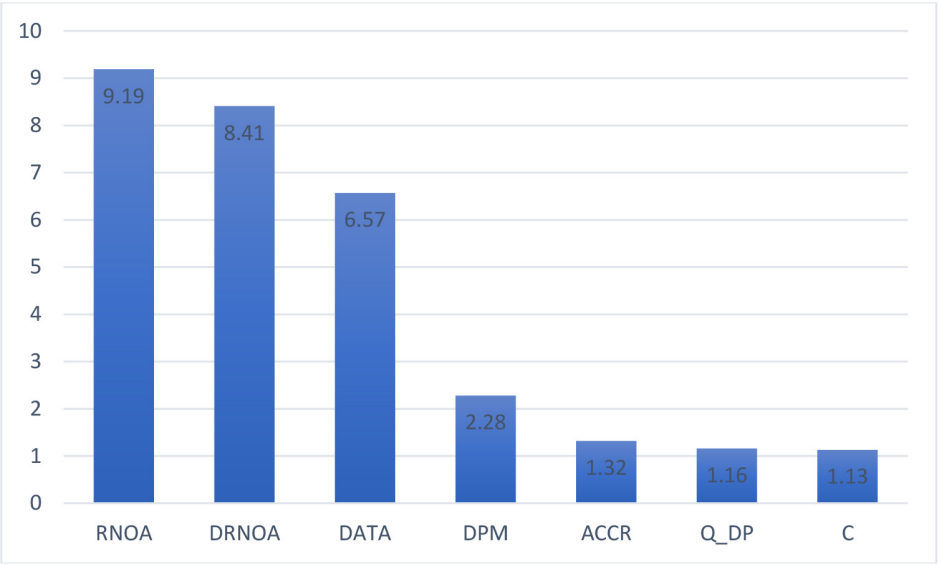

Figure 2. Variables importance impacted on earnings persistence

Figure 2 shows that RNOA, DRNOA and DATO are the strongest important variables. They are the strongest impact on earnings persistence of all companies listed on Vietnamese stock market. The variable importance of them are 9.19, 8.41 and 6.57, respectively. This also shows that the value of total assets and assets turnover are the most important factors in generating sustainable profits. The results are consistent with the previous studies.

Influence of Earnings Persistence on P/E

The influence of earnings persistence on E/P ratio is estimated by Models (1) and (4). The estimation result of Model (1) using OLS method is shown in Table 4.

Table 4
Estimation of E/P Model (1)

	Estimate	Standard Error	*t*-value	Pr (>|t|)
(Intercept)	0.00902	0.0142	0.635	0.525537
$DRNOA_1$	–7.37312	1.45229	–5.077	0.00000051***
$RNOA$	1.02815	0.2681	3.835	0.000139***
G^{NOA}	–0.03404	0.02377	–1.432	0.152644
$RNOA*G^{NOA}$	–2.43881	0.27034	–9.021	2E-16***

Note: † significant at 10%, * significant at 5%, ** significant at 1%, *** significant at 0.1%. (Source: Author's calculation based on Stockplus' data)

According to the result, stock prices of Vietnamese firms are empirically affected by earnings (or more correctly, profitability) and operating asset growth, as the coefficients of variables $\Delta\widehat{RNOA}_1$, $RNOA_0$ and $RNOA_0*G^{NOA}$ are all statistically significant. To be specific, the coefficients of $\Delta\widehat{RNOA}_1$ and $RNOA_0*G^{NOA}$ are both negative, so they have negative influence on E/P but positive influence on P/E and stock price. In contrast, $RNOA_0$ has positive coefficient, so it has positive impact on E/P, but negative impact on P/E. As $RNOA_0$ and $RNOA_0*G^{NOA}$ both represent the sustainable component of earnings growth which should have positive effect on P/E (Penman & Zhang, 2004). This result provides a mixed evidence of earnings persistence on P/E for Vietnamese stock market (the effect of earnings persistence on P/E will be revisited in the next part where we interpret the estimation result of Model (4), which is another P/E model in this study). Moreover, $\Delta\widehat{RNOA}_1$ represents the unsustainable component of earning growth which should have negative relationship with P/E (Penman & Zhang, 2004), but the result above actually shows the opposite. This may indicate investors' overreaction to unsustainable earnings, i.e. unsustainable earnings are

overvalued, and the information of unsustainable earnings growth is not correctly reflected in stock price, which is a proof of Vietnamese stock market's anomalies.

Besides, the coefficient of G^{NOA} is negative but it is statistically insignificant. This result indicates that changes in operating assets alone cannot directly affect P/E. However, the coefficient of $RNOA_0 * G^{NOA}$ is negative and statistically significant. Therefore, operating assets growth can affect the relationship between earnings persistence and P/E. Specifically, higher operating assets growth tends to diminish the effect of sustainable earnings on E/P, i.e., boosts its effect on P/E. This is similar to Penman and Zhang's (2004) conclusion.

The effect of sustainable earnings on P/E ratio is again examined from another perspective via logit Model (4), whose estimation result is shown in Table 5.

Table 5
Estimation of E/P Model (4)

	Estimate	Standard Error	*t*-value	Pr (>|t|)
(Intercept)	0.10709	0.01771	6.046	2.71E-09***
S	–0.17603	0.03318	–5.305	0.000000162***
RNOA	0.88298	0.19259	4.585	0.00000561***
G^{NOA}	0.0317	0.01164	2.723	0.00667**
$RNOA * G^{NOA}$	–0.91969	0.28371	–3.242	0.00126**

Note: † significant at 10%, * significant at 5%, ** significant at 1%, *** significant at 0.1%. (Source: Author's calculation based on Stockplus' data)

The result shows that *S*-score has empirically negative impact on E/P (coefficient = –0.17), i.e., positive impact on P/E, which is similar to the positive effect of $\Delta\widehat{RNOA}_1$ on P/E as shown above. As both are proxies for the unsustainable component of earnings growth, we can finally conclude that for the case of Vietnamese stock market, the unsustainable component of earnings in fact does not degrade stock price. Although this is opposite to the conclusion of Penman and Zhang (2004), it may be a truthful reflection of Vietnamese stock market's anomalies, as the stock market in Vietnam is still young and not yet to achieve the efficiency level of other developed stock markets, and the investors may underreact to the (implied) information of unsustainable earnings.

Moreover, the coefficient of $RNOA_0$ is positive, but the coefficient of $RNOA_0 * G^{NOA}$ is negatively and both are statistically significant, so they have

different effects on P/E. As both $RNOA_0$ and G^{NOA} represent the sustainable component of earnings growth, this result provides mixed evidence of sustainable earnings' impact on P/E, which is similar to the result of Model (1). Therefore, it can be concluded that investors in Vietnamese stock market underreact to sustainable earnings, i.e., the information of sustainable earnings is not fully reflected in stock price as it should be. This is a further evidence of Vietnamese stock market's inefficiency. The results are supported by previous research (Tong, 2007; Frankel & Litov, 2009).

CONCLUSION

The literature on earnings persistence suggests a relationship between company's earnings and stockholders' wealth. In general, strong persistence may be disadvantageous to firms pursuing rapid growth, but fast growth in return can put stability and sustainability at risk, which affects stock price and stockholders' terminal wealth. Therefore, it is necessary to study the relationship between earnings persistence and P/E ratio, which is a proxy of investors' perception of company's perspective. According to previous studies, more sustainable earnings should have a positive effect on P/E, as the investors have a higher valuation of firms with more assured future earnings.

This research examines the relationship between earnings persistence and P/E ratio by analysing data of accounting and financial items such as profit margin, expenses, earnings, reserves, operating assets and cash flows of publicly listed Vietnamese companies on Hanoi and Ho Chi Minh City Stock Exchanges. The influential factors of earnings persistence were determined and the impact of sustainable earnings on P/E was estimated by using OLS method and Logit function.

The results show that changes in profit margin and operating asset turnover have significantly positive impact on earnings persistence, while past profitability has negative impact. Besides, operating asset growth is proved toto predict profitability change positively. However, reserve changes have negative relationship with earnings persistence, which can be explained by distinctive traits of the Vietnamese stock market. Hence, investors may refer to this research as a document of identifying the impacting factors of earnings persistence and forecasting future earnings/profitability.

Moreover, the findings show that investors of Vietnamese stock market underreact to sustainable earnings but overreact to unsustainable earnings. These

are the evidence for Vietnamese stock market's inefficiency. Therefore, it makes sense for investors to apply earnings persistence and P/E models to determine the fair value of stock-based on available information from financial statements. Studies on earnings persistence, including this research, hopefully, can help to improve investors' perception of their future earnings, investment value and companies' sustainable growth, particularly in the context of developing stock market of Vietnam which is full of market anomalies.

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