國 立 交 通 大 學

財務金融研究所

碩 士 論 文

從行為財務觀點探討超額股票報酬及經濟附加價值間的關係

The Relationship between Excess Stock Return and EVA from the

Behavioral Finance Perspective

研 究 生：陳英茵

指導教授：王淑芬 博士

中 華 民 國 一 百 年 六 月
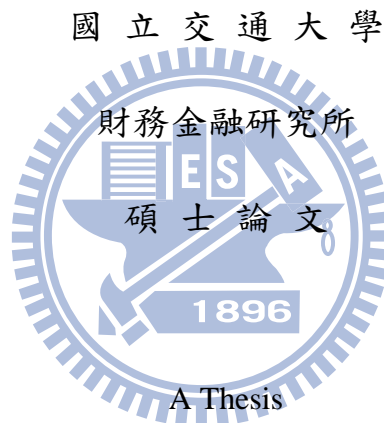
從行為財務觀點探討超額股票報酬及經濟附加價值間的關係

The Relationship between Excess Stock Return and EVA from the Behavioral Finance Perspective

研 究 生：陳英茵　　　　　　　　　　　　Student：Ying-Yin Chen

指導教授：王淑芬　博士　　　　　　　　　Advisor：Dr. Sue-Fung Wang

國 立 交 通 大 學

財務金融研究所

碩 士 論 文

從行為財務觀點探討超額股票報酬及經濟附加價值間的關係

研 究 生：陳英茵　　　　　　　　　指導教授： 王淑芬 博士

國立交通大學財務金融研究所碩士班

摘要

　　效率市場假說與行為財務學的觀點對於市場的資訊反應有所不同，前者認為企業經營資訊會充分反映在股價報酬，而後者則認為股價報酬具有先行性之資訊效果。從過去的文獻發現企業的每股盈餘(EPS)在效率市場假說之下的資訊含量比較高， 然而在2002 年行為財務學的崛起，發現企業的獲利行為與市場的表現並不完全一致。文獻上對於 EPS 與經濟附加價值(EVA)何者具有較高的資訊含量一直沒有定論。有鑑於此，本研究以美國市場的製造業為樣本進行實證研究，並以股價報酬與兩種超額股價報酬的代理變數分別利用縱橫資料迴歸(Panel 迴歸)都發現 EVA 對這三種股票報酬的資訊內涵較 EPS 高，並進一步透過因果關係模型分析，其結果發現 EPS、EVA 都與股票報酬間呈現反向因果關係，尤其 EVA 相對更為顯著，此符合行為財務學的論點。

關鍵字：行為財務、因果分析、經濟附加價值

The Relationship between Excess Stock Return and EVA from the Behavioral
Finance Perspective

Student：Ying-Yin Chen   Advisor: Dr. Sue-Fung Wang

Graduate Institute of Finance
National Chiao Tung University

ABSTRACT

Efficient market hypothesis (EMH) and behavioral finance have different point of views on the market's reaction to information. The former believes that business operating information is fully reflected in stock returns, whereas the latter states that stock returns have price leadership over business information. Previous literature shows that earnings per share (EPS) is more informative under EMH; however, after the blooming of behavioral finance in 2002, recent research has shown that corporate operating profitability is not at all consistent with the market perception. Literature has not been conclusive on relative information content for EPS and EVA. This study explores the empirical data of manufacturing firms within the US market. Total stock returns and two excess stock returns are first used as proxies through panel regression analysis, respectively. Results show that EVA is more informative than EPS for all three stock returns. Furthermore, a causality test in performed, revealing that both EVA and EPS present reverse causalities to the three stock returns, and EVA is relatively more significant. These results are consistent with the perspective of behavioral finance.

Keywords: Behavioral Finance, Causality test, EVA

誌謝

　　努力了將近一年多的時間，論文的工作終於來到了尾聲，真的要感謝很多人的幫助。首先要感謝我的指導教授王淑芬老師，在這段時間內對我的論文的大方向指導，尤其是關於財務觀念的清楚說明，使得缺乏相關背景的我，可以比較容易的抓住研究的方向；以及老師在每一次討論會議中，對我的文章編寫或是報告方式所做的建議。特別感謝幾位口試委員不辭辛勞的幫忙審核論文和給出的改進建議。

　　另外，自然要特別感謝我的家人們，在論文的工作中經常必須面臨晚歸以及通勤的狀況，多虧她們的體貼與關懷，每天外帶的家常便當，忙裡偷閒的喝茶時間，使得我可以持續地堅持下去。最後，還要感謝眾多研究室同學的鼎力相助：感謝吳堃瑋同學在計量模型方法以及文書處理格式的繁雜問題裡給我的許多幫助；感謝吳思蓉學姊在搜尋資料庫的時候所給的額外幫忙；感謝同一研究室的黃光萍、黃馨儀和其他同學們，在辦公室討論時所給的很多很多相關文獻或是模型設計的建議。

　　真的要再次謝謝各位對我的學位論文所給的幫助！

<div align="right">

陳英茵謹製

國立交通大學財務金融所碩士班

中華民國一百年六月

</div>

List of Contents

List of Tables

1. Introduction

"A company's market value is a function of its book value of equity, earnings, and other information" (Ohlson, 1995). One can either interpret firm value as the risk premium explained by common market risk factors in asset pricing theory (Fama & French, 1996–2008; Ali, Hwang, & Trombley, 2003; Baginski & Wahlen, 2003). Alternately, firm value can also refer to operating performance based on summation of accounting numbers in fundamental analysis (Ohlson, 1995; Myers, 1999). Although performance sometimes fails to be realized as market stock price, the reason business valuation from market and operating perspectives is too distinct remains unexplained.

No one knows the intrinsic value of firms under efficient market hypothesis (EMH). Scholars believe market stock price to be the best reflection of intrinsic value. We can thus evaluate the degree of asymmetric information through the explanatory power of valuation indicators to market stock price in relative magnitude of adjusted R-square or correlation coefficients (Yoo et al., 2004; 2008). Most studies often focus on one question: "Which valuation indicator is more informative due to lower asymmetric information?" In the present paper, we employ three market stock returns (Ri, ER1, and ER2) as proxies for performance from the market perspective (Fama & French, 1998–2008; Bhagat & Bolton, 2008). In addition, we use two earning-based measures, EPS and EVA[1], as proxies for valuations from the operating perspective to illustrate the information content between EPS and EVA.

The pros and cons of EPS have been well documented in many studies and textbooks (Ross, 2006). EPS is considered as the shareholders' wealth, and more reasonably related to

---

[1] EVA (economic value added) is also known as residual earning or residual income (RE or RI). Basic formula of EVA in per share basis (1) is listed below:

$EVA_t = EPS_t - r \times BPS_{t-1}$, where EPS_t denotes forecasted EPS at time t-1; r denotes Implied (opportunity) Cost Of Equity (ICOE)[2]; BPS_{t-1} denotes Book value of equity funds per share at time t.

the goal of maximizing firm value. Thus, EPS is considered more highly associated with both returns and firm values than EVA or cash flow from operations (Biddle, Bowen, &Wallace, 1997). In addition, because the computation of EVA contains EPS, the shortcoming of EPS is passed on to EVA as well (Ohlson, 2000). Major problems of EVA can be demonstrated by its basic formula in per share basis in notation 1.

The first problem is forecast EPS. Although forecast EPS is not available at all times in all firms, some researchers prefer to articulate the role of forward EPS in valuation. They state that forward EPS is more informative than EPS, EVA, DCF, and DDM (the worst is listed last) (Ohlson & Juettner-Nauroth, 2000). Meanwhile, according to Richardson and Tinaikar (2004), there exist detective links between historical and forecast data branches, which often produce similar results. Moreover, long-term analyst earning forecasts into EVA have been proven not to improve pricing performance significantly (Lo & Lys, 2001). Some, such as Frankel and Lee (1999), continue to use shorter forecast horizon with one- and two-year ahead analyst earnings forecasts; however, these still suffer from biases in forecasting errors. The limitations encountered by previous studies suggest the validity of using historical EPS over forecast EPS in this paper. The second problem with EVA concerns ICOE[2]. ICOE must be estimated, and is often viewed exogenous. In the present study, we use CAPM-derived ICOE because individual betas predict positive and systematic association to ICOE in the literature (Yoo et al., 2004)[3]. Likewise, we obtain CAPM-derived ICOE by substituting beta for individual firms (βi) into CAPM. The third problem with EVA involves clean surplus relation (CSR) violation. According to Ohlson

---

[2] ICOE here is derived from CAPM, which substitutes beta for individual firms (βi) in models because individual betas predict positive and systematic association to ICOE in literature. Several alternative approaches to estimate ICOE are well reviewed in Section 2.1 of Yoo et al. (2004).

[3] Several alternative approaches to estimate ICOE are well reviewed in Section 2.1 of Yoo et al. (2004): (1) ex post realized stock returns as natural proxy for the ex ante ICOE, but proven noisy and potentially biased (Fama & French, 1997; Elton, 1999); (and 2) internal rate of return (IRR) that equates stock prices with the valuations based on analyst earnings forecasts (Gebhardt et al., 2001).

Most variation of stock returns can be described by FF3 or FF4 (above 80% in US market), however, stock returns prove to be noisy; thus, we neglect FF4-derived ICOE.

(2000), CSR violation could affect EVA on a case-by-case basis.

Despite problems of EVA above, some studies continue to align with EVA to be more informative. Frankel and Lee (1999) conclude that firm value estimates derived from EVA can better explain the cross-sectional distribution of the stock prices, accounting for more than 70% of its variation within 20 countries, than earnings or book value. Even for studies that claim EPS outperforms EVA, empirical results continue to reveal that EVA has significant marginal contribution (Biddle, Bowen, & Wallace, 1997; Lundholm, 2001; Yoo et al., 2004; 2008)[4]. Therefore, EVA has information unique from EPS. In addition, the authors suggest that EVA and AEG (abnormal earning growth) models are more related to systematic and industrial impact and risks (Jeon, Kang, & Lee, 2003, 2005; Cheng, 2004; Baginski & Wahlen, 2003). Yoo et al. (2004; 2008) indicate that these risks possibly represent economic-wide and country-level, industry-specific[5] related information. Some suggest EVA may be more sensitive to ICOE because of its inner beta estimation in the hotel business; however, there is a lack of significant empirical results. We argue that EVA can reflect some information from the market.

In sum, early studies all show that EPS is more informative (Biddle, Bowen, & Wallace, 1997; Ohlson & Juettner-Nauroth, 2000). However, a phenomenon of conflict results on information content is evident approximately after year 2000. Recent studies show that EVA is more informative otherwise (Frankel & Lee, 1999; Yoo et al., 2004, 2008). The cause of such changes in the results remains unknown.

Because of the coincidence of time with conflict in studies involving EVA, we consider whether this can be caused by the rising angle of behavior finance. Behavior finance provides a fresh viewpoint to review many issues, especially in light of Kahneman's

---

[4] Biddle, Bowen, and Wallace (1997), using incremental tests, suggest that EVA components can add marginally to information content beyond earnings. Lundholm (2001) suggests that, under certain assumptions, DCF and EVA can even carry similar information. Yoo et al. (2004, 2008) list facts regarding uncertain dominance of EVA depending on clean surplus relation (CSR) in global case.

[5] Gode and Mohanram (2003) and Guay, Kothari, and Shu (2003) claim ICOEs derived from EVA (RIV models in original paper) reflect more "industry-specific" information.

Nobel Prize in 2002. Kahneman's study is more committed to ideas regarding psychology such as anticipation, bias of analysts, and mental account (Tversky & Kahneman, 1981; Thaler, 1985). The studies on behavior finance prove to against the impact of EMH-based studies. In the present study, we aim to determine whether behavioral finance effect also affects our valuation.

To be more specific, in business valuation, EMH and behavioral finance have different point of views regarding market reaction. EMH believes business operating information is fully reflected in stock returns, whereas behavioral finance state stock returns have leadership in business information over EMH. Therefore, some studies suggest behavioral finance effect is likely to have power for reversing the directions of causality between stock returns and earnings (Bar-Yosef, Callen, & Livnat, 1987; Peiers, 1997; Linnainmaa, 2010). This can be realized by dot-com companies during Internet bubbles. For companies such as America Online and Twitter, which have encountered long-time losses but still receive high market prices[6], or for corporate companies such as Netscape and Facebook, which have new business models and lack of accordance of past performance, the earning-based valuations seem to be off the hook to the stock returns; otherwise, even though valuations are affected by stock returns, they do not correspond to the positive relationship between earnings and returns that we expect under EMH.

As a result, this study mainly develops to answer three questions: First, as previous studies did, we want to verify which earning indicator makes asymmetric information decrease the most. Further, we want to investigate whether the blooming of behavior finance does make a changing viewpoint of century, and whether we can directly see the behavior finance effect in time and in causality. Finally, can we then document which

---

[6] In the Internet bubble in 1998 to 2000, as Penman (2010) states, all dot-com companies worth over 1 trillion dollars in total, with 33 times on average price-to sales ratio far beyond the historical level of 1, maintain only 30 billion dollars on revenue; a recent report by The Guardian UK (2011)) also suggests a 2nd phenomenon of Internet bubble may occur. Microblogger and Twitter have an estimated worth of $ 10 B; Facebook, which have recently planned to initiate IPO, is estimated to be worth $ 60 B; this figure is slightly over Ford ($ 55 B) and below Visa ($ 63 B).

earning indicator is more influenced by behavior finance effect, and thus affecting its information content.

Several firm characteristics, including financial constraints, growth of investments, profitability, solvency, and debt ratio, are viewed as control variables. These variables are not Fama and French factors, but are also recognized as existing influences on firm value in extensive prior studies[7]. Some studies show that the information regarding these influences may not be possibly explained by FF factors. We specifically intend to sort out the impact of financial constraints (proxy by asset tangibility) on firm value, thereby showing that investing behavior changes under financial constraints.

The remainder of this paper is organized as follows. Section 2 describes the methodology, including the sample selection, research models, and beta estimations. Section 3 presents and discusses the empirical results. Section 4 provides a summary of our main findings and the conclusion.
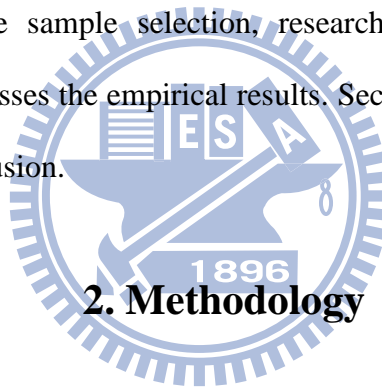
2. Methodology

2.1. Data and Variable Definition

The sample consists of manufacturing firms (those with SIC codes between 2000 and 3999) of S&P 500 Index members (COMPUSTAT auto-selection in 2010) over the 1994 to 2009 period. Sample selection criteria also include panel data requirements, 1% data trimming of outliers, and at least 24–60 month-ahead CRSP stock returns available for individual firm's beta estimation[8]. In all, 110 sample firms for 16 years of effective sample period remain.

---

[7] The detailed discussion is provided in Section 2.1.
[8] In the following, two parts are needed to estimate betas for individual firm (denoted as βi): the computation of ICOE (denoted as r) based on CAPM, and the computation of expected stock returns (E(Ri)) based on FF4. Details are listed in Section 2.3 beta estimation.

Financial statement and accounting data for main variables such as EPS, book value of total assets, and number of shares are collected from COMPUSTAT and Global Vantage. Stock return data are available and computed from CRSP. Risk-free rate and Fama and French factors (MKT, SMB, HML, and MOM) are collected from the Kenneth R. French Data Library in Dartmouth website.

All key variables are defined in Table 1.

Table 1   Definitions of Key Variables

This table displays the definition of all key variables. The full sample period is from 1994 to 2009.[9]

Indication	Variables	Name of Variables	Definition
Proxy for Firm Value[10] (FV)	Stock Return	Ri	Annual stock return computed from CRSP
	Annual Excess Return (1)	ER1	Annual stock return – Risk-free rate = Sum of 12-month (Stock return – T-bill rate)
	Annual Excess Return (2)	ER2	Annual stock return – Expected stock return derived from FF4[11]
Measures of Valuations (V)	Actual EPS	EPS	(Income before extraordinary items－Preferred dividends) / Common shares outstanding
	Economic Value Added (per share)	EVA	EVA t (per share) = Earnings per share at time t [12]– Implied cost of equity[13] $\times$ Book value of common equity per share at time t-1 = EPS t – r $\times$ BPS t-1

[9] Most definition of our control variables follow Hahn and Lee (2009) and other reference we already mentioned in paper, including I, P, and G…,etc, whose original description can be referred to Hahn and Lee (2009) P.898-904 and Appendix P.919, and the detail is listed in our Table 1.
Definition of stock returns and EVA related variables mainly follow Fama, French ,1998-2008 and Yoo et al., 2004,2008, and there are some time adjustments concerning financial data publish in accounting system are considered here but omitted in time line description. The original description can be referred to their notations, and the detail is listed in our Table 1 as well.
[10] In general discussion, extensive literature use stock returns (denoted as Ri), Tobin's Q, and ROA as proxies for firm value or firm performance in solid and regular illustration in textbook of finance. Stock returns should to be considered of equity value because of the return in market value of holding a share of equity.
[11] Two kinds of expected stock returns (denoted as E(Ri)) are considered in this paper: risk-free rate and expected return derived from FF4.
[12] We use actual earning at time t as the forecasted ahead earning of time t-1. The implication is that we use forecasts exactly equal to actual.
[13] ICOE is derived from CAPM. Detail is listed in Section 2.3.

Proxy for Financial constraints (FC)	Size	ln(TA)	The natural log of book value of total assets at fiscal year end.
	Tangibility1	Tang1	Cash holdings + 0.715 × Receivables + 0.547 × Inventories + 0.535 × PPE) / book value of total assets[14]
	Tangibility2	Tang2	Cash holdings + 0.715 × Receivables + 0.547 × Inventories + 0.535 × PPE $-$ book value of total debt) / book value of total assets
Proxy for Profitability (P)	Profitability	Profitability (P)	EBITDA/ Book value of total assets
Proxy for Growth of Investments (G)	Investment	Investment (I)	Capital expenditures / Beginning-of-period capital stock = CAPEX / lagged PPE(lagged property, plant, and equipment)
	Tobin's Q	Q	Market value of total assets / Book value of total assets = Book value of total assets + Market value of common shares $-$ Book value of common shares + Deferred tax) / Book value of total assets
Proxy for Solvency(S)	Current Ratio	CR	Current assets/ Current liability
Proxy for Debt Ratio(D)	Times Interest Earned	TIE	Times Interest Earned (or Interest coverage) = Operating income before depreciation / Interest expense
	Debt Ratio	DR	Debt ratio (or Book leverage) = (Book value of Short-term debt + Long-term debt) / Book value of equity

Three stock return measures are used as dependent variables (Ri, ER1, ER2). They also represent the valuation made from market perspective. In the literature, stock returns are decomposed into expected (or normal) returns and excess (or abnormal) returns. However,

---

[14] The weights of each item in tangibility follow those suggested by Almeida and Campello (2007) and Hahn and Lee (2009), and we do not re-estimate the weights. It might cause some biases in this measure.

in this paper, the first expected return is equal to risk-free rate and the second expected return is mostly constructed as benchmark for the four-factor model (hereafter, FF4) of Fama and French, which is adapted from the regression procedures of Fama and MacBeth (1973). Annual stock return is the proxy for total value, and two excess stock returns are the proxies for excess value. Because of this difference of meanings, we expect to observe distinct empirical results when different dependent variables are used.

Two earning-based valuation indicators are used as major independent variables (EPS and EVA). They also represent the valuation made from operating perspective composed of accounting numbers. EPS is commonly considered as the measure of total equity value, and reflects much more on absolute performance, indicating the absolute magnitude of profit per share. Therefore, we infer that EPS might be more associated with stock returns (Ri). Meanwhile, EVA is equal to the remaining part of EPS minus the total opportunity cost of equity funds. That is, EVA should be considered as an excess equity value. Moreover, EVA originally reflects on relative performance, indicating excess profit earned comparing to the growth with cost, thus it should indicate excess returns (ER) more adequately.

EVA decomposes EPS into normal value and excess value, where normal value is concerned with ICOE, whereas excess value is simply EVA. Using the decomposition of EPS, we want to explore whether we can augment the goal of finance to a further step. That is, we can maximize firm value by maximizing shareholder wealth. Nevertheless, can we can maximize shareholder wealth by maximizing EVA because another part of EPS is only of normal value. If this value is true, maximization of firm value is then more reasonably related to the maximization of EVA.

Several firm characteristics are reported in this paper, including financial constraints, growth of investments, profitability, solvency, and debt ratio, are viewed as control variables. We attempt to develop the expected signs of coefficients of those variables in the following discussion, and we provide descriptive statistics for key variables in Table 2.

Table 2 Summary Statistics of Key Variables

This table displays the summary statistics of key variables   reported as time-series averages of the cross-sectional mean, median, and standard deviations over   the period from 1994 to 2009. The number of total sample firm years (N) is 1760.

Variables	Mean	Median	Std. Dev.	Variables	Mean	Median	Std. Dev.
Ri	0.149	0.154	0.358	Investment	0.219	0.185	0.147
EPS	1.554	1.350	1.898	Q	2.390	1.955	1.679
EVA	0.863	0.688	4.071	Profitability	17.244	16.770	6.829
ln(TA)	8.833	8.812	1.202	CR	1.796	1.532	1.285
Tang1	0.395	0.398	0.097	TIE	35.700	11.700	335.500
Tang2	-0.184	-0.191	0.204	DR	1.350	1.360	34.98

In Table 2, EVA is accounted for as 55.5% of EPS on average (0.863/1.554), but with larger variance (4.071 > 1.898). This indicates that a few firms earn abnormally. Although R_i, EPS, and EVA are positive in mean, they still present negative relation to R_i in some cases afterward. Two measures of asset tangibility have counter signs in mean due to definitions. Thus, the ratio of total debt to total assets of book value on average is approximately 57.9% [0.395-(-0.184)].

Before we proceed with our discussion regarding expected signs of coefficients of variables, we must point out that collinearity problems[15] exist in our model (such as Q to R_i, profitability (P) and investment (I), the correlation is approximately 30% and 50%, respectively). Based on our partition of variables, collinearity exists between stock returns, investments, Tobin's Q, and profitability (P is the ratio of EBITDA to book value of total assets, and can be interpreted as cash-based ROA) (Aggarwal & Kyaw, 2006). ROA can also be used to measure profitability. Previous studies usually classify investment and Tobin's Q under growth opportunity of investments, and state that growth is realized as

---

[15] In multivariate analysis, the existence of collinearity may cause noise on coefficients of variables. And for some variables here, high correlations exist between y and x, and x and x. General procedure to deal with collinearity, such as observing Pearson correlation table and setting up partition of variables suggested in literatures, are considered in this study. We also consider endogenous problem, which will be mentioned in Section 3.4 Robustness check.

future profitability; thus, at times, profitability and investments are classified as categories of profitability as well (Hahn & Lee, 2009; Tim & Vidhan, 2008; Doukas & John, 1995). However, stock returns, investments, Tobin's Q, and ROA are all considered proxy variables for firm performance in a large body of literature (Klapper, 2004; Wright, Kroll, Mukherji, & Pettus, 2009; Bhagat & Bolton, 2008). We also attempt to make some adjustments in the following models by providing models without coexistence of stock returns, Tobin's Q, and profitability; the results are mentioned, but are omitted from the final table to make the coefficients in empirical results more stable and reliable.

Expected signs of coefficients of variables

We use the natural log of a firm's assets at the end of the year as the proxy of firm size (Gozzi et al., 2008)[16]. Firm size is considered a determinant of financial constraints or capital market access (Titman & Wessels, 1988) that affects decisions of managers and firm value (Cho, 1998; Lee & Chuang, 2009). It is positively related to firm value (Opler & Titman, 1994；Maury, 2006) because small firms are younger and less well known, and are therefore more likely to face financing constraints and vulnerable to capital market imperfections arising from information asymmetries and collateral constraints (Gertler & Gilchrist, 1994).

However, in some cases, asset size also serves as proxy for firm risk. When asset size is the proxy for firm risk, controversial results arise, as reflected in previous studies. Some studies claim that size has a positive effect on the risk taking of a firm due to the moral hazard associated with "too-big-to-fail" policy (Boyd, Jagannathan, & Kwak, 2009), whereas others suggest a negative correlation between firm size and risk (Fama & French, 1992). Thus, both positive and negative impacts on firm value caused by asset size seem plausible, if one views stock returns as risk premiums.

---

[16] Other proxy variables for firm size also exist, such as natural log of a firm's total sale or market value of equity.

Asset tangibility is considered the expected asset liquidation value for a firm. A firm with greater expected asset liquidation value (or collateral assets) should have less financial constraints, and therefore have a higher firm value (Almeida & Campello, 2007; Hahn & Lee, 2009). Following all that, we expect that financial constraints are negatively related to stock returns (measures of financial constraints are all reverse indicators; when these measures are bigger, financial constraints are less, and stock returns are bigger). We also expect that measures of financial constraints are positively related to stock returns.

The discussion of financial constraints in some studies often involves issues of maturity stage and firm scale. Previous studies suggest that large firms tend to have low growth (maturity stage) and lower firm performance (Opler &Titman, 1994；Maury, 2006; Lee & Chuang, 2009). If we attempt to restate the description above, we could say that large firms tend to earn normal stock returns and have lower firm value, whereas small firms tend to earn abnormal (or excess) stock returns and have higher firm value. Therefore, this theory suggests a negative relation of size to stock returns, and negative relation of size to excess stock returns.

In sum, after combining theories of size effect, firm risk, financial constraints, and maturity stage, both positive and negative impacts on firm value caused by asset size are still likely to appear, and the relation of asset tangibility to excess stock returns remains unknown as well.

Growth of investments and profitability both have positive contribution to firm value (Hahn & Lee, 2009, Fama & French, 1992), and naturally, we expect to observe a positive relation between investments, profitability, and stock returns. As Penman (2010) says, "Don't pay too much for the growth." After considering corresponding opportunity cost of equity funds, seeking for growth of investment and profitability may be harmful to a corporation. That is, when firms make inefficient investments with rate of returns lower

than ICOE, we infer that such may enhance stock returns, while simultaneously decrease excess stock returns.

Current ratio is expected to observe a positive relation with stock returns (Menon,1987; Richards, 1980; Donaldson, 2000). Meanwhile, debt ratio (or book leverage) is expected to observe a negative relation with stock returns. Times interest earned is a quality measure for debt. Studies show controversial results on the relation between leverage and firm value; some support a positive relation (Harris & Raviv, 1990; Stulz, 1990), whereas others support a negative relation (Opler & Titman, 1994; Majumdar & Chhibber, 1999; Weill, 2008). Studies also suggest that the relation is based on degrees of growth opportunities; thus, debt financing will enhance firm value in low-growth firms, but reduce firm value in high-growth firms (McConnell & Servaes, 1995; Jung, Kim, & Stulz, 1996; Barclay, Marx, & Smith, 2003). Often, high debt ratio can reduce the opportunities of managers to overinvest, and decrease agency cost in low-growth firms, thereby generating high free cash flow (Jensen, 1986; Stulz, 1990; Gul & Tsui, 1998). Based on the pecking order theory, firms that are more profitable can meet the funding requirements through internal earnings and less borrowing (Myers & Majluf, 1984).

2.2. Models and Hypotheses

Three kinds of model designs are presented in this paper: whole sample model, sub-period model, and causality model.

(1) Whole sample model

In the whole sample model, we take a full effective sample period (1994–2009) to conduct panel regression tests with fixed effect and no intercept model settings. Based on our partition of control variables mentioned above, we proceed to determine the valuation indicator, EPS or EVA, that has better explanatory power of stock returns in all eight model combinations.

(2) Sub-period model

According to Haugen (1999), EMH-based studies and behavior finance are rivals in new finance period[17]. Under this competition, we investigate whether the rising perspective of behavior finance seriously impact the power of EMH-based studies on business valuation.

Therefore, in sub-period model, we set the year 2002 (the year the Nobel prize is won by Kahneman, a scholar of behavior finance) as the cut-off point of the rising stage of behavioral finance; thus, we divide the whole sample period into two sub-periods (i.e., the former period, 1994–2001, and the latter period, 2002–2009. The year 2009 is used as year dummy to avoid the influence of financial crisis). We then proceed to apply the same panel regression tests to each sub-period to compare their explanatory power. Under EMH, the explanatory power after considering FF factors should increase (Former < Latter). However, we expect to observe the "behavior finance effect" as time goes on; thus, we infer that the explanatory power of sub-period models will decrease over time (Former > Latter).

(3) Causality model

We attempt to investigate the interactions between valuations made from operating and market perspectives, and test for the "behavioral finance effect" by causality models. We can consider the operating perspective consisting of two levels. Based on the theory of finance on value generators, major operating decisions (investing, financing, and payout policies) contribute to the quality of performance of a firm, and the performance reflect on valuations made from operating perspective such as EPS and EVA. As a result, we prepare to carry out the causality tests by setting up a three-step

---

[17] According to Haugen 1(999), the present finance progress could be divided into several segmentations: accounting-related research dominates "Old Finance" period until 1960; economic theories and rational hypothesis influence "Modern Finance" period until 1980. After 1980, theories regarding inefficiency and psychology take over, thus to form the "New Finance" period.

analysis on causality as follows: (I) investigate the causality between financial constraints and earnings from operating perspective; (II) investigate the causality between earnings from operating perspective and returns from market perspective; and (III) investigate the causality between financial constraints (FC) and returns from market perspective (MP)

Following this logic, we are able to establish a natural causality loop under EMH for this three-step analysis: financial constraints (FC) belongs to parts of operating decisions as the literature stated (Hahn & Lee, 2009), asset size can be regarded as an index of financing policy, and tangibility can also be treated as the bridge index between financing and investing policies through the use of net operating assets or collateral assets. Thus, we conduct the first step of natural causality loop: (I) financial constraints affect valuations from operating perspective. Thus, if firms publish good valuations from operating perspective to the public, good informative announcement based on accounting analysis should bring up the market price of individual stock, or market stock returns of individual stock. Therefore, we conduct the second step of natural causality loop: (II) valuations from operating perspective affect valuations from market perspective. Finally, combining (I) and (II), we obtain the third step of natural causality loop: (III) financial constraints affect valuations from market perspective. This is consistent with a number of studies documenting that corporate investment behavior arising from financial constraints are reflected in the stock returns (Hahn & Lee, 2009; Forbes, 2007; Whited & Wu, 2006) because the inability to borrow externally causes many firms to bypass attractive investment opportunities; it influences the firm value (Campello et al., 2010; Cleary, 1999) based on internal fund assumption (Fazzari et al., 1988).

We conduct the two-way Granger Causality and Wald tests[18] to illustrate the causality or leadership between stock returns, financial constraints, and earning-based valuations. We expect to detect the behavior finance effect by reversing the directions of causality. We establish one hypothesis for each model design. A total of three hypotheses are listed below:

Hypothesis 1: EVA is more informative due to lower information asymmetry.

Hypothesis 2: The explanatory power of Fama and French's market risk factors reduces over time due to the rising perspective of behavior finance (psychological and other factors).

Hypothesis 3: There exists a reverse causality relationship (behavioral finance effect) between stock returns (valuation from market perspective), earning-based valuation (valuation from operating perspective), and financial constraints.

2.3. Beta Estimation

In the present paper, two parts are needed to estimate betas for individual firms (denoted as β_i): one is related to the computation of EVA, whereas the other is related to the computation of expected returns (risk-adjusted returns). The former follows CAPM, whereas the latter follows the Fama and French four-factor model.

We follow the COMPUSTAT procedure for beta estimation of individual firms. The data is only traceable within five years of the present date. For data out of this range, we adapt the formula and steps set in the database using S&P 500 Index returns as market returns (R_m), risk-free rate (R_f), stock returns of each firms (R_i) in monthly data form, to estimate current individual beta (β_i). At least 24–60 previous observations are required to meet the regression requirements. We then substitute individual beta (β_i) into CAPM to

---

[18] The causality model requires the two preliminary tests (unit root test and co-integration test) to be conducted to check whether the variable is stationary and existing an economic equilibrium, and an optimal lag number in time series model be selected based on AIC or SIC. In this paper, the validity of these preliminary results is checked, but omitted in the final table, and we conduct those tests by SAS procedures (varmax). We must note that the causality test cannot identify the difference between causality and leadership in statistic.

obtain ICOE (r_i) for individual firms[19].

In the following, we estimate the expected stock return by the procedures in (Hahn & Lee, 2009): estimating the Fama and French factor loadings (β'_{ik}) for individual stock *i* using monthly rolling regressions with a 60-month window every month requires at least 24 monthly return observations in a given window and substituting those betas into the model

$$E(R_i) = R_{i\,t} - R_{f\,t} - \sum_{\{k=1\sim4\}} \beta'_{ik} \times F_{kt} \qquad (3)$$

to obtain expected stock returns, where R_{it} is stock return of firm *i* at time *t*, R_{ft} is the risk-free rate (T-bill rate) at time *t*, and F_{kt} denotes one of the Fama and French four-factor loading (MKT, SMB, HML, and MOM).

3. Regression Results

Panel regression is used to consider cross-sectional and time-series effects.

3.1. Whole Period Model

Table 3 and Table 4 report the panel regression results of the whole sample model for EPS and EVA. Several noticeable empirical results are significant, based on Tables 3 and 4. First, by comparing Table 3 and Table 4, we find that the explanatory power of EVA is dominant over those of EPS in every model, (Average adj-R^2：$0.261 > 0.211$，$0.414 > 0.399$，$0.583 > 0.560$); therefore, it confirms H1: EVA is more informative due to lower information asymmetry.

Furthermore, although EPS in Table 3 is positively related to total returns in omitted-collinearity-adjusted models, EPS is not significant and negatively related with firm value, especially in some models whose dependent variable is stock return (Ri). This

---

[19] CAPM derived ICOE (r_i) = $R_f + \beta_i \times [E(R_m) - Rf]$ (2)；Industry betas (market value weighted βi within a single industry) for 19 industries (classified by SIC division) are once conducted; however, it does not seem to improve the empirical results. Therefore, it is omitted in the final table.

finding corresponds with prior studies claiming that EPS may be a misleading indicator of returns, likely because EPS can affect investment decisions due to earning management problems (Stern, 1974; Stewart & Jones, 2001)[20]. In addition, this may illustrate some occasions in which valuations from operating and market perspective move in counter-directions such as dot-com companies during Internet bubbles, which might encounter long-term loss on earnings but still receive high valuations and external funds from the market. In addition, as Table 4 shows, EVA is nearly negatively related to stock returns (Ri) in every case, suggesting that EVA may illustrate more behavioral finance effect.

Second, we can observe the increasing explanatory power as we gradually change the dependent variable from stock return to excess return 2 (Average adj-R^2：$0.211 < 0.399 < 0.560$；$0.261 < 0.414 < 0.583$). This finding illustrates the improvements made by adding Fama and French risk factors on valuation in the market perspective.
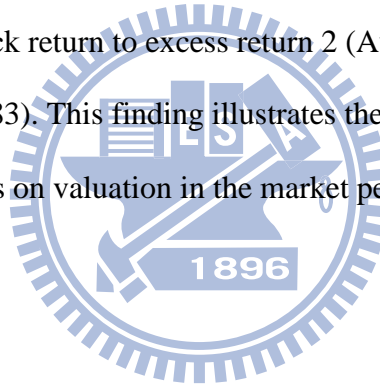
Table 3　Panel Regression — Whole Sample Model for EPS

This table reports the regression coefficients but omits the associated *t*-statistics from the panel regression model with fixed effect and no intercept settings for whole sample period 1994 to 2009. The number of total sample firm-years (N) is 1760 for every model. F-statistics of validity tests of panel regression models are also provided. Three dependent variables, including stock returns, excess stock returns 1, and excess stock returns 2, are all used in each model, and earning-based valuation indicator EPS is used as the major independent variable. The table summarizes all model combinations composed of controlled variables: size, tangibility 1, tangibility 2, profitability, investment, Tobin's Q, current ratio times interest earned, and debt ratio. (The detailed definition is listed in Table 1.) For example, Model 1 indicates three regression results conducted by three dependent variables explained by EPS as major independent variable plus first combinations of controlled variables in the model. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

---

[20]　Some also suggest that the negative coefficients may due to long-run reversal condition of returns, because individual beta is related to previous returns.

Panel A	Model 1			Model 2			Model 3		
Dependent Variable	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2
EPS	0.014 **	0.015 **	0.039 *	0.014 **	0.026 **	0.048 **	0.019 ***	0.017 ***	0.042 **
ln(TA)	-0.197 ***	0.83 ***	0.62 ***	-0.192 ***	0.738 ***	0.53 ***	-0.156 ***	0.889 ***	0.663 ***
Tang1	-0.128	0.353	0.463				-0.065	0.371	0.489
Tang2				-0.017	-1.198	-1.09 ***			
Investments	-0.28 ***	-2.273 ***	-1.645 ***	-0.28 ***	-2.291 ***	-1.669 ***			
Q							0.12 ***	0.076 ***	0.071 ***
Profitability	0.003	-0.034	-0.024 ***	0.003	-0.029	-0.018 ***	-0.01 ***	-0.053 ***	-0.039 ***
Current Ratio	0.019 **	0.163 **	0.103 ***	0.019 *	0.197 *	0.135 ***	-0.018 **	0.081 **	0.038
TIE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Debt Ratio									
Dum09	0.377 ***	3.166 ***	0.367	0.374 ***	3.177 ***	0.301	0.407 ***	3.272 ***	0.397
F-stat.	1.43 ***	2.9 ***	2.65 ***	1.6 ***	3.8 ***	3.5 ***	1.67 ***	2.79 ***	2.55 ***
Adj. R-square (%)	0.143	0.404	0.562	0.143	0.408	0.565	0.28	0.389	0.555

Panel A (*continued*)	Model 4			Model 5			Model 6		
Dependent Variable	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2
EPS	0.019 ***	0.027 ***	0.05 **	0.014 **	0.018 **	0.04 **	0.014 **	0.029 **	0.049 **
ln(TA)	-0.153 ***	0.799 ***	0.575 ***	-0.197 ***	0.823 ***	0.618 ***	-0.192 ***	0.732 ***	0.529 ***
Tang1				-0.121	0.328	0.45			
Tang2	-0.001	-1.15	-1.05 ***				-0.018	-1.202	-1.09 ***
Investments				-0.278 ***	-2.268 ***	-1.644 ***	-0.279 ***	-2.286 ***	-1.668 ***
Q	0.12 ***	0.074 ***	0.071 ***						
Profitability	-0.01 ***	-0.048 ***	-0.034 ***	0.003	-0.034	-0.024 ***	0.003	-0.029	-0.019 ***
Current Ratio	-0.018 **	0.113 **	0.069 **	0.019 **	0.163 **	0.103 ***	0.019 *	0.196 *	0.135 ***
TIE	0.000	0.000	0.000						
Debt Ratio				0.000	-0.001	0.000	0.000	-0.001	0.000
Dum09	0.406 ***	3.284 ***	0.335	0.374 ***	3.178 ***	0.379	0.372 ***	3.188 ***	0.313
F-stat.	2.17 ***	3.65 ***	3.34 ***	1.43 ***	2.9 ***	2.67 ***	1.6 ***	3.82 ***	3.54 ***
Adj. R-square (%)	0.28	0.393	0.558	0.143	0.405	0.562	0.142	0.409	0.565

| Panel A (*continued*)	Model 7			Model 8					
Dependent Variable	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2			
EPS	0.019 ***	0.02 ***	0.043 **	0.019 ***	0.031 ***	0.052 **			
ln(TA)	-0.157 ***	0.882 ***	0.66 ***	-0.153 ***	0.793 ***	0.573 ***			
Tang1	-0.063	0.335	0.468						
Tang2				-0.001	-1.152	-1.05 ***			
Investments									
Q	0.12 ***	0.076 ***	0.071 ***	0.121 ***	0.074 ***	0.071 ***			
Profitability	-0.01 ***	-0.054 ***	-0.039 ***	-0.01 ***	-0.049 ***	-0.034 ***			
Current Ratio	-0.018 **	0.081 **	0.038	-0.019 **	0.112 **	0.069 **			
TIE									
Debt Ratio	0.000	-0.001	-0.001	0.000	-0.001	-0.001			
Dum09	0.407 ***	3.288 ***	0.411	0.406 ***	3.299 ***	0.35			
F-stat.	1.67 ***	2.78 ***	2.55 ***	2.17 ***	3.67 ***	3.37 ***	Avg. .	Avg. .	Avg.
Adj. R-square (%)	0.28	0.39	0.555	0.28	0.393	0.558	0.211	0.399	0.560

Table 4　Panel Regression — Whole Sample Model for EVA

This table reports the regression coefficients but omits the associated *t*-statistics from the panel regression model with fixed effect and no intercept settings for the whole sample period from 1994 to 2009. The number of total sample firm years (N) is 1760 for every model. F-statistics of validity tests of panel regression models are also provided. Three dependent variables, including stock returns, excess stock returns 1, and excess stock returns 2, are all used in each model, and earning-based valuation indicator EVA is used as the major independent variable. The table summarizes all model combinations composed of　controlled variables: size, tangibility 1, tangibility 2, profitability, investment, Tobin's Q, current ratio times interest earned, and debt ratio (the detailed definition is listed in Table 1.) For example, Model 1 indicates three regression results, which are conducted by three dependent variables explained by EVA as major independent variable plus the first combinations of controlled variables in the model.

*, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A	Model 1			Model 2			Model 3		
Dependent　Variable	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2
EVA	-0.025 ***	0.058 ***	0.075 ***	-0.025 ***	0.057 ***	0.074 ***	-0.021 ***	0.062 ***	0.079 ***
ln(TA)	-0.126 ***	0.721 ***	0.497 ***	-0.121 ***	0.656 ***	0.436 ***	-0.09 ***	0.781 ***	0.544 ***
Tang1	-0.119	0.333	0.407				-0.063	0.361	0.443
Tang2				-0.042	-1.018 ***	-0.861 ***			
Investments	-0.286 ***	-2.253 ***	-1.619 ***	-0.287 ***	-2.267 ***	-1.639 ***			
Q							0.111 ***	0.097 ***	0.1 ***
Profitability	0.01 ***	-0.043 ***	-0.032 ***	0.01 ***	-0.037 ***	-0.027 ***	-0.002	-0.065 ***	-0.05 ***
Current Ratio	0.023 **	0.156 ***	0.096 ***	0.023 **	0.185 ***	0.122 ***	-0.013	0.068 *	0.024
TIE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Debt Ratio									
Dum09	0.248 ***	3.471 ***	0.442 *	0.245 ***	3.473 ***	0.381	0.299 ***	3.601 ***	0.453 *
F-stat.	1.11	2.63 ***	2.31 ***	1.18	3.38 ***	2.95 ***	1.43 ***	2.54 ***	2.22 ***
Adj. R-square (%)	0.203	0.419	0.584	0.203	0.422	0.586	0.318	0.405	0.579
Panel A (*continued*)	Model 4			Model 5			Model 6		
Dependent　Variable	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2
EVA	-0.021 ***	0.061 ***	0.078 ***	-0.025 ***	0.059 ***	0.075 ***	-0.025 ***	0.058 ***	0.074 ***
ln(TA)	-0.087 ***	0.717 ***	0.483 ***	-0.125 ***	0.716 ***	0.496 ***	-0.121 ***	0.653 ***	0.435 ***
Tang1				-0.109	0.304	0.394			
Tang2	-0.007	-0.954 ***	-0.808 ***				-0.043	-1.011 ***	-0.858 ***
Investments				-0.286 ***	-2.245 ***	-1.617 ***	-0.287 ***	-2.259 ***	-1.637 ***
Q	0.111 ***	0.095 ***	0.099 ***						
Profitability	-0.002	-0.059 ***	-0.045 ***	0.01 ***	-0.043 ***	-0.032 ***	0.01 ***	-0.037 ***	-0.027 ***
Current Ratio	-0.013	0.096 **	0.049	0.023 **	0.156 ***	0.096 ***	0.023 **	0.184 ***	0.122 ***
TIE	0.000	0.000	0.000						
Debt Ratio				0.000	-0.002	-0.001	0.000	-0.002	-0.001
Dum09	0.297 ***	3.604 ***	0.398	0.243 ***	3.489 ***	0.456 *	0.241 ***	3.491 ***	0.395
F-stat.	1.7 ***	3.26 ***	2.8 ***	1.1	2.63 ***	2.32 ***	1.18	3.41 ***	2.98 ***
Adj. R-square (%)	0.318	0.407	0.581	0.203	0.419	0.584	0.203	0.422	0.586

Panel A (*continued*)		Model 7			Model 8				
Dependent Variable	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2			
EVA	-0.021 ***	0.063 ***	0.08 ***	-0.021 ***	0.062 ***	0.079 ***			
ln(TA)	-0.09 ***	0.776 ***	0.542 ***	-0.087 ***	0.715 ***	0.482 ***			
Tang1	-0.057	0.321	0.421						
Tang2				-0.008	-0.946 ***	-0.804 ***			
Investments									
Q	0.111 ***	0.097 ***	0.1 ***	0.111 ***	0.095 ***	0.099 ***			
Profitability	-0.002	-0.065 ***	-0.05 ***	-0.002	-0.059 ***	-0.045 ***			
Current Ratio	-0.013	0.068 *	0.024	-0.013	0.096 **	0.049			
TIE									
Debt Ratio	0.000	-0.002 *	-0.001	0.000	-0.002 *	-0.001			
Dum09	0.296 ***	3.623 ***	0.471 *	0.295 ***	3.625 ***	0.415			
F-stat.	1.43 ***	2.54 ***	2.23 ***	1.7 ***	3.28 ***	2.82 ***	Avg.	Avg.	Avg.
Adj. R-square (%)	0.318	0.406	0.579	0.318	0.409	0.581	0.261	0.414	0.583

Third, we compare from the figures Table 3 to Table 4 and the expectation of variables in Section 2.2.

Coefficients of financial constraints are partly consistent with the expectation (Opler & Titman, 1994; Maury, 2006; Lee & Chuang, 2009); thus, significance is achieved. Among three measures for financial constraints (i.e., inverse measures), tangibility is positively related to stock returns, but negatively related to excess returns, whereas size is negatively related to stock returns and positively related to excess stock returns. These results may hint that small   firms facing lower financial constraints tend to have higher stock returns, and large firms facing greater financial constraints tend to have more excess stock returns and vice versa, but we cannot conclude that strongly. Hahn & Lee, 2009 state that size effect cannot fully explain the difference created by financial constraints, even after considering FF factors. Even, in their study, they find that especially when under constraint-group (by lots of measures, such size, tangibility, bond rating…,etc), bigger tangibility is still more related to bigger excess returns significantly, and our results is similar to theirs.

Coefficients of growth of investments and profitability are not fully consistent with the expectation (Hahn & Lee, 2009; Fama & French, 1992). Significance is achieved in most cases, except in some models of Ri. Some models are negatively related to stock returns,

and even more negatively related to excess returns. This situation does not alter models avoiding collinearity. Possibly, for manufacturing firms in S&P 500 index members, firms making less investment tend to have higher stock returns. In addition, after considering corresponding opportunity cost of equity funds, firms making less investment tend to earn even higher excess stock returns.

On the one hand, coefficients of current ratio and debt ratio are mostly consistent with the expectation, although significance is only achieved with some models. On the other hand, this significantly improves models avoiding collinearity. Current ratio is positively related with stock returns (Menon, 1987; Richards, 1980; Donaldson, 2000), whereas debt ratio is negatively related with stock returns (Opler & Titman, 1994; Majumdar & Chhibber, 1999; Weill, 2008); however, times interest earned is not significant in all cases.

In sum, our empirical results illustrate that, for manufacturing firms in S&P 500 index members, small firms with less financial constraints, less investment, less profitability, higher current ratio, and less debt ratio tend to have significantly higher stock returns, whereas large firms facing greater financial constraints, less investments, less profitability, higher current ratio, and less debt ratio tend to have higher excess stock returns significantly.

3.2. Sub-period Model

In the sub-period model, we apply identical panel regression models in two sub-periods: 1994–2001 and 2002–2009. Table 5 reports the panel regression results of sub-period model. Empirical results based on Table 5 show that the explanatory power of the former sub-period is lower than the latter sub-period; thus, it fails to confirm H2. The explanatory power of the market risk factors of Fama and French reduces over time due to the rising perspective of behavior finance.

Table 5 Panel Regression －Sub-period Model

This table reports the adj-R^2 of regression but omits the associated F-statistics from the panel regression model with fixed effect and no intercept settings for two sub-periods, 1994 to 2001 and 2002 to 2009. The regression coefficients here are omitted in the final table. The number of total sample of firm years (N) is 880 for every model in each sub-period. Three dependent variables including stock returns, excess stock returns 1, and excess stock returns 2 are all used in each model, and two earning-based valuation indicators, EPS and EVA are used as major independent variables. In Panel A, EPS is used as earning-based valuation indicator, while in Panel B, EVA is used instead. Each panel summarizes all model combinations composed of controlled variables: size, tangibility 1, tangibility 2, profitability, investment, Tobin's Q, current ratio, times interest earned, and debt ratio. (The detailed definition is listed in Table 1.) For example, Model 1 in Panel A indicates three regression results, which are conducted by three dependent variables explained by EPS as the major independent variable plus first combinations of controlled variables in the model.
*, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A (for EPS)

Dependent Variable (Y)	(1) Ri		(2) ER1		(3) ER2	
Sub-period	1994~2001	2002~2009	1994~2001	2002~2009	1994~2001	1994~2001
Models	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square
1	0.2057	0.2012	0.0746	0.4048	0.4815	0.7976
2	0.2109	0.2081	0.0785	0.3603	0.4878	0.7971
3	0.3822	0.363	0.1091	0.3677	0.5457	0.7973
4	0.387	0.3628	0.1127	0.375	0.5522	0.7965
5	0.1989	0.2011	0.0735	0.3988	0.4803	0.7975
6	0.2059	0.208	0.0795	0.3398	0.4878	0.797
7	0.3634	0.3627	0.1047	0.3552	0.5413	0.7972
8	0.3714	0.3625	0.1111	0.3623	0.5498	0.7965
Avg.	0.2907	0.2837	0.0930	0.3705	0.5158	0.7971

Panel B (for EVA)

Dependent Variable (Y)	(1) Ri		(2) ER1		(3) ER2	
Sub-period	1994~2001	2002~2009	1994~2001	2002~2009	1994~2001	1994~2001
Models	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square
1	0.211	0.3141	0.1328	0.4194	0.5094	0.8072
2	0.2158	0.3172	0.1377	0.3826	0.5158	0.8063
3	0.3801	0.4089	0.1852	0.3894	0.5776	0.8061
4	0.3842	0.4086	0.1896	0.3919	0.5838	0.8051
5	0.2037	0.3152	0.1323	0.4082	0.5084	0.8071
6	0.2104	0.318	0.139	0.3603	0.5159	0.8063
7	0.361	0.4093	0.1815	0.3746	0.5735	0.806
8	0.3681	0.4089	0.1884	0.3781	0.5816	0.8051
Avg.	0.2918	0.3625	0.1608	0.3881	0.5458	0.8062

The result supports EMH instead of behavioral finance, and indicates that our

empirical results on behavioral finance effect may not be sufficiently strong to support the

existence of a changing viewpoint from the perspective of behavioral finance. In particular, from Panel A (for EPS) y = Ri case, we can see that the explanatory power of EPS to stock returns appears to slightly decrease over time (Avg: 0.2907 > 0.2837). This suggests the use of EVA as well.

3.3. Causality Model

Table 6 reports the two-way Granger Causality and Wald test results. The first column with H_0：X do not affect Y is to test EMH, and the second column of H_0：Y do not affect X is to test behavioral finance effect. Empirical results based on causality tests in Table 6 show that reverse causalities are detectable in all three steps of causality, which confirms H3 (Figures in column 2 are more significant than figures in column 1). There exists a reverse causality relationship (behavioral finance effect) between stock returns (valuation from market perspective), earnings (valuation from operating perspective), and financial constraints (FC).

In the first step of causality (I) [i.e., causality between financial constraints (FC) and operating perspective (OP)], asset size affects EPS and EVA, and vice versa; however, EVA affects tangibility 1 and 2. We document that for asset size, two-way causality (feedback) exists between financial constraints and operating perspective; however, for tangibility 1 and 2, only reverse causality exists. This may correspond to some empirical findings that it is superior to the univariate series in predicting future investments, but not in predicting future earnings (Bar-Yosef, Callen, & Livnat, 1987), and sometimes suggests the existence of earning management problem.

In the second step of causality (II) [i.e., causality between operating perspective and market perspective], EPS and EVA affect stock returns and excess returns 2, and vice versa. We document that two-way causality fully exists between operating perspective and market perspective. As a possible explanation, a previous study states that individual investors may lose money around earnings announcements, experience poor post-trade returns, exhibit the

disposition effect, and make contrarian trades because of reverse causality from behavioral

biases to order choices (Linnainmaa, 2010).

In the third step of causality (III) [i.e., causality between financial constraints and

market perspective] asset size and tangibility 1 affect stock returns and excess returns 2, and

vice versa. However, tangibility 2 affects excess returns 2, and stock returns affect

tangibility 2. We document that to asset size and tangibility 1, two-way causality fully exists

between financial constraints and market perspective; however, with tangibility 2 to stock

returns, only reverse causality exists. If we interpret the causality here as leadership,

informed traders who influence stock price may be one source of behavioral finance effect

(Peiers, 1997).

We also state that EVA and ER2 have a tendency of stronger causality. In (I) and (II)

of Table 6, we find that the number of χ^2-statistics of EVA are all bigger than those of EPS,

except for EPS, which affects Ri (21.79 < 94.37). In (II) and (III), χ^2-statistics of ER2 are all
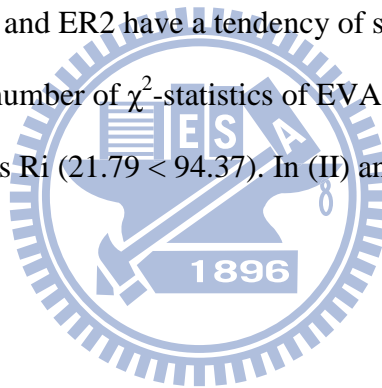
bigger than those of Ri.

Table 6   Two-way Granger Causality and Wald Test

This table reports the three-step results of two-way Granger Causality and Wald tests with the associated
χ^2-statistics and null hypothesis for whole sample period from 1994 to 2009. Information statistics and optimal lag
numbers of time series models here are omitted in the final table. The number of total sample of firm years (N) is
1760. The two-way Granger Causality and Wald tests are built to tests two null hypothesis at one time: H0, the
independent variable (X) does not cause the dependent variable (Y); and H0, The dependent variable (Y) does not
cause the independent variable (X)]. Thus, we sequentially set three-step causality tests as follows:
(I)   Three measures of financial constraints (FC) as (X), and two measures of valuations from operating
       perspective (OP) as (Y); to investigate the causality between FC and OP.
(II)   Two measures of valuations from operating perspective (OP) as (X), and two measures of valuations from
       market perspective (MP) as (Y); to investigate the causality between OP and MP.
(III) Three measures of financial constraints (FC) as (X), and two measures of valuations from market
       perspective (MP) as (Y); to investigate the causality between FC and MP.
Three possible outcomes in causality model are used to describe causality: independency (i.e., Do not reject both
two-way H0 at the same time), unidirectionality (i.e., Reject 1-way H0; and we refer rejecting H0: (Y) does not
cause (X) as "reverse causality"), and   feedback (i.e., Reject both 2-ways H0.)
Three measures of financial constraints (FC) include asset size (ln(TA)), asset tangibility 1(Tang1), and asset
tangibility 2 (Tang2); two measures of valuations from operating perspective (OP) include EPS and EVA; two
measures of valuations from market perspective (MP) include stock returns (Ri) and excess stock returns 2(ER2).
*, **, and *** indicate significance at 10%, 5%, and 1% respectively.

(I) Causality between Financial constraints (FC) and Operating Perspective (OP)

Granger-Causality Wald Test		H0:Financing Constraints(X) do not cause Valuation(Y)		H0:Valuation(Y) do not cause Financing Constraints(X)	
Dependent Variable (Y)		(1) EPS	(2) EVA	(1) EPS	(2) EVA
	Variable(X)	χ^2	χ^2	χ^2	χ^2
Financial constraints **(FC)** as (X)	ln(TA)	13.57 *	45.05 ***	47.88 ***	231.13 ***
← →	Tang1	3.86	5.59	4.6	34.36 ***
Operating Perspective **(OP)** as (Y)	Tang2	9.02	8.02	6.28	25.18 ***

(II) Causality between Operating Perspective (OP) and Market Perspective (MP)

Granger-Causality Wald Test		H0:Valuation(X) do not cause Market Stock Returns(Y)		H0:Market Stock Returns(Y) do not cause Valuation(X)	
Dependent Variable (Y)		(1) Ri	(2) ER2	(1) Ri	(2) ER2
	Variable(X)	χ^2	χ^2	χ^2	χ^2
Operating Perspective **(OP)** as (X)	EPS	94.37 ***	96.74 ***	53.7 ***	72.86 ***
← → **Market Perspective** **(MP)** as (Y)	EVA	21.79 ***	920.02 ***	86.83 ***	133.25 ***

(III) Causality between Financial Constraints (FC) and Market Perspective (MP)

Granger-Causality Wald Test		H0:Financing Constraints(X) do not cause Valuation(Y)		H0:Valuation(Y) do not cause Financing Constraints (X)	
Dependent Variable (Y)		(1) Ri	(2) ER2	(1) Ri	(2) ER2
	Variable(X)	χ^2	χ^2	χ^2	χ^2
Financial constraints **(FC)** as (X)	ln(TA)	85.32 ***	218.13 ***	112.31 ***	306.54 ***
← →	Tang1	32.66 ***	65.88 ***	18.55 ***	76.55 ***
Market Perspective **(MP)** as (Y)	Tang2	11.88	44.61 ***	44.18 ***	110.06 ***

3.4. Robustness Check

In this section, we provide the panel regression results of whole sample and sub-period models. However, we adjust clustered robust standard errors, as proposed by Petersen (2009), to serve as robustness check in order to avoid possible spurious relationship on panel regressions and to increase credibility on regression coefficients.

Table 7　Panel Regression – Sub-period Model Adjusted by Clustered Robust Standard Errors

This table reports the adj-R2 of regression, but omits the associated F-statistics (in parentheses) from the panel regression model with fixed effect and no intercept settings for two sub-periods, 1994 to 2001 and 2002 to 2009, adjusted by clustered robust standard errors, as proposed by Petersen (2009). Regression coefficients here are omitted in final table. The number of total sample firm years (N) is 880 for every model in each sub-period. Three dependent variables, including stock returns, excess stock returns 1, and excess stock returns 2 are all used in each model, and two earning-based valuation indicators, EPS and EVA are used as major independent variables. In Panel A, EPS is used as earning-based valuation indicator, whereas in Panel B, EVA is used instead. Each panel summarizes all model combinations composed of controlled variables: size, tangibility 1, tangibility 2, profitability, investment, Tobin's Q, current ratio, times interest earned, and debt ratio (the detailed definition is listed in Table 1.) For example, Model 1 in Panel A, indicates three regression results, which are conducted by three dependent variables explained by EPS as major independent variable plus the first combinations of controlled variables in model.

*, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A (for EPS)

Dependent　Variable (Y)	(1) Ri		(2) ER1		(3) ER2	
Sub-period	1994~2001	2002~2009	1994~2001	2002~2009	1994~2001	1994~2001
Models	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square
1	0.2057	0.2012	0.0746	0.4476	0.4815	0.7976
2	0.2109	0.2081	0.0785	0.449	0.4878	0.7971
3	0.3822	0.363	0.1091	0.4398	0.5457	0.7973
4	0.387	0.3628	0.1127	0.4407	0.5522	0.7965
5	0.1989	0.2011	0.0735	0.4479	0.4803	0.7975
6	0.2059	0.208	0.0795	0.4493	0.4878	0.797
7	0.3634	0.3627	0.1047	0.4402	0.5413	0.7972
8	0.3714	0.3625	0.1111	0.441	0.5498	0.7965
Avg.	0.2907	0.2837	0.0930	0.4444	0.5158	0.7971

Panel B (for EVA)

Dependent　Variable (Y)	(1) Ri		(2) ER1		(3) ER2	
Sub-period	1994~2001	2002~2009	1994~2001	2002~2009	1994~2001	1994~2001
Models	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square	Adj. R-square
1	0.211	0.3141	0.1328	0.4572	0.5094	0.8072
2	0.2158	0.3172	0.1377	0.4579	0.5158	0.8063
3	0.3801	0.4089	0.1852	0.4484	0.5776	0.8061
4	0.3842	0.4086	0.1896	0.449	0.5838	0.8051
5	0.2037	0.3152	0.1323	0.4579	0.5084	0.8071
6	0.2104	0.318	0.139	0.4586	0.5159	0.8063
7	0.361	0.4093	0.1815	0.4491	0.5735	0.806
8	0.3681	0.4089	0.1884	0.4497	0.5816	0.8051
Avg.	0.2918	0.3625	0.1608	0.4535	0.5458	0.8062

Tables of the panel regression results of whole sample model for EPS and EVA, adjusted by clustered robust standard errors, are the same as Table 3 and Table 4 after rounding to the 3rd decimal place. Table 7 reports the panel regression results of the sub-period model adjusted by clustered robust standard errors.

After adjustments, we find smaller estimating errors on panel regression coefficient estimates, which are decreasing and accurate to the 2nd–3rd decimal place in both models. Empirical results remain close to the original before adjustments in whole sample model, and it only differs in the explanatory power of dependent variables taking ER1 in the sub-period model in Table 7 (0.4444 > 0.3705；0.4535 > 0.3881), which may due to improvement or missing value.

Besides, we also take addition VIF test to illustrate the collinearity problem is not severe here (VIF < 10, tolerance > 0.1). Furthermore, we consider the endogenous problem by providing another panel regression result of changing X into Y & Y into X in Table 8, and we still get the same result that the coefficients of EPS and EVA to stock returns (Ri) appear in counter signs. EPS is mostly positively related to Ri, while EVA is negatively related to Ri. The significance and signs on coefficients of control variables only slightly differ, so it is consistent with our previous findings.

Table 8   Panel Regression — Whole Sample Model for Returns to Earnings

This table reports the regression coefficients but omits the associated F-statistics and *t*-statistics from the panel regression model with fixed effect and no intercept settings for whole sample period 1994 to 2009. The number of total sample firm-years (N) is 1760 for every model. Three major independent variables are all used in each model, including stock returns, excess stock returns 1, and excess stock returns 2, and two earning-based valuation indicators EPS and EVA are used as the dependent variables. The table summarizes all model combinations composed of controlled variables: size, tangibility 1, tangibility 2, profitability, investment, Tobin's Q, current ratio times interest earned, and debt ratio. (The detailed definition is listed in Table 1.) For example, Model 1 in Panel A indicates three regression results conducted by y=EPS and each three returns (Ri,ER1,ER2) as independent variables plus first combinations of controlled variables in the model; in Panel B, y=EVA.   *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A for y=EPS

Major (X)	Model 1 (1) Ri	(2) ER1	(3) ER2	Model 2 (1) Ri	(2) ER1	(3) ER2	Model 3 (1) Ri	(2) ER1	(3) ER2
Returns	0.274	0.017	0.06 **	0.271	0.029	0.073 ***	0.445	0.019	0.063 **
ln(TA)	1.302 ***	1.238 ***	1.212 ***	1.404 ***	1.335 ***	1.312 ***	1.282 ***	1.206 ***	1.185 ***
Tang1	0.054	0.013	-0.209				0.008	-0.028	-0.238
Tang2				2.14 ***	2.177 ***	1.992 **			
Investments	0.21	0.173	0.049	0.24	0.232	0.117			
Q							-0.13 **	-0.079	-0.065
Profitability	0.145 ***	0.147 ***	0.145 ***	0.134 ***	0.136 ***	0.135 ***	0.157 ***	0.155 ***	0.151 ***
Current Ratio	0.02	0.023	0.042	-0.035	-0.036	-0.014	0.055	0.046	0.059
TIE	0	0	0	0	0	0	0	0	0
Debt Ratio									
Dum09	-0.054	-0.004	-1.068 ***	-0.058	-0.05	-0.931 ***	-0.15	-0.029	-1.025 ***

Panel A (*continued*)

Major (X)	Model 4 (1) Ri	(2) ER1	(3) ER2	Model 5 (1) Ri	(2) ER1	(3) ER2	Model 6 (1) Ri	(2) ER1	(3) ER2
Returns	0.437	0.03	0.075 ***	0.271	0.021	0.061 **	0.268	0.033 *	0.074 ***
ln(TA)	1.385 ***	1.304 ***	1.287 ***	1.31 ***	1.244 ***	1.217 ***	1.406 ***	1.335 ***	1.312 ***
Tang1				0.145	0.106	-0.112			
Tang2	2.109 ***	2.159 ***	1.991 **				2.124 ***	2.165 ***	1.973 **
Investments				0.187	0.159	0.034	0.218	0.219	0.101
Q	-0.126 **	-0.077	-0.066						
Profitability	0.146 ***	0.144 ***	0.142 ***	0.145 ***	0.147 ***	0.145 ***	0.134 ***	0.136 ***	0.135 ***
Current Ratio	0.001	-0.011	0.004	0.021	0.023	0.043	-0.033	-0.034	-0.012
TIE	0	0	0						
Debt Ratio				0.005 **	0.005 **	0.005 **	0.005 **	0.005 **	0.005 **
Dum09	-0.154	-0.075	-0.89 ***	-0.096	-0.061	-1.176 ***	-0.099	-0.105	-1.038 ***

Panel A (*continued*)

Major (X)	Model 7 (1) Ri	(2) ER1	(3) ER2	Model 8 (1) Ri	(2) ER1	(3) ER2
Returns	0.442	0.023	0.064 **	0.434	0.034 *	0.076 ***
ln(TA)	1.291 ***	1.212 ***	1.191 ***	1.388 ***	1.304 ***	1.287 ***
Tang1	0.102	0.067	-0.14			
Tang2				2.093 ***	2.148 ***	1.972 **
Investments						
Q	-0.129 **	-0.078	-0.065	-0.125 **	-0.076	-0.065
Profitability	0.156 ***	0.154 ***	0.151 ***	0.146 ***	0.144 ***	0.141 ***
Current Ratio	0.056	0.046	0.059	0.002	-0.01	0.006
TIE						
Debt Ratio	0.005 **	0.005 **	0.005 **	0.005 **	0.005 **	0.005 **
Dum09	-0.193	-0.087	-1.134 ***	-0.194	-0.131	-0.998 ***

Panel B for y=EVA

Major (X)	Model 1 (1) Ri	(2) ER1	(3) ER2	Model 2 (1) Ri	(2) ER1	(3) ER2	Model 3 (1) Ri	(2) ER1	(3) ER2
Returns	-2.963 ***	0.414 ***	0.708 ***	-2.961 ***	0.404 ***	0.701 ***	-2.905 ***	0.426 ***	0.726 ***
ln(TA)	1.645 ***	1.827 ***	1.812 ***	1.54 ***	1.738 ***	1.742 ***	1.665 ***	1.664 ***	1.628 ***
Tang1	-0.023	0.209	0.33				-0.039	-0.005	0.13
Tang2				-2.163 **	-1.739 *	-1.164			
Investments	-1.143	0.621	0.802	-1.173	0.574	0.763			
Q							-0.021	-0.398 ***	-0.453 ***
Profitability	0.208 ***	0.207 ***	0.202 ***	0.219 ***	0.216 ***	0.209 ***	0.204 ***	0.245 ***	0.247 ***
Current Ratio	0.187 *	0.061	0.049	0.243 **	0.109	0.083	0.159	0.174 **	0.178 **
TIE	0	0	0	0	0	0	0	0	0
Debt Ratio									
Dum09	-4.093 ***	-6.522 ***	-1.772 ***	-4.087 ***	-6.48 ***	-1.851 ***	-4.071 ***	-6.65 ***	-1.494 **

Panel B (*continued*)		Model 4			Model 5			Model 6	
Major (X)	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2
Returns	-2.896 ***	0.416 ***	0.719 ***	-2.967 ***	0.419 ***	0.71 ***	-2.965 ***	0.409 ***	0.702 ***
ln(TA)	1.562 ***	1.583 ***	1.569 ***	1.654 ***	1.832 ***	1.817 ***	1.543 ***	1.739 ***	1.743 ***
Tang1				0.075	0.291	0.388			
Tang2	-2.149 **	-1.811 **	-1.171				-2.182 **	-1.753 *	-1.184
Investments				-1.176	0.595	0.776	-1.207	0.548	0.737
Q	-0.025	-0.399 ***	-0.452 ***						
Profitability	0.214 ***	0.254 ***	0.253 ***	0.208 ***	0.207 ***	0.202 ***	0.219 ***	0.216 ***	0.209 ***
Current Ratio	0.215 *	0.222 **	0.21 **	0.189 *	0.063	0.051	0.246 **	0.112	0.086
TIE	0	0	0						
Debt Ratio				0.006 ***	0.007 ***	0.006 ***	0.006 ***	0.007 ***	0.006 ***
Dum09	-4.068 ***	-6.612 ***	-1.574 **	-4.142 ***	-6.586 ***	-1.885 ***	-4.135 ***	-6.543 ***	-1.966 ***

Panel B (*continued*)		Model 7			Model 8	
Major (X)	(1) Ri	(2) ER1	(3) ER2	(1) Ri	(2) ER1	(3) ER2
Returns	-2.909 ***	0.431 ***	0.727 ***	-2.901 ***	0.422 ***	0.72 ***
ln(TA)	1.675 ***	1.67 ***	1.634 ***	1.566 ***	1.584 ***	1.57 ***
Tang1	0.056	0.091	0.203			
Tang2				-2.168 **	-1.825 **	-1.191
Investments						
Q	-0.02	-0.398 ***	-0.452 ***	-0.024	-0.4 ***	-0.452 ***
Profitability	0.203 ***	0.245 ***	0.247 ***	0.214 ***	0.254 ***	0.253 ***
Current Ratio	0.16	0.175 **	0.179 **	0.217 *	0.224 **	0.212 **
TIE						
Debt Ratio	0.006 ***	0.007 ***	0.006 ***	0.006 ***	0.007 ***	0.006 ***
Dum09	-4.118 ***	-6.718 ***	-1.609 **	-4.113 ***	-6.678 ***	-1.69 **

4. Conclusion

Efficient market hypothesis (EMH) and behavioral finance have different point of views on information for market reaction. The former believes that business operating information is fully reflected in stock returns, whereas the latter states that stock returns have price leadership over business information. The present study has empirically explored the relationship between stock returns and earnings, through both panel regression and causality models. We have examined three hypotheses using data from manufacturing firms within the US market to further investigate the interaction between valuation from operating perspective (in measures of EPS and EVA) and market perspective (in measures of three kinds of stock returns).

First, we have used total stock returns and two excess stock returns as proxies through panel regression analysis, respectively. We have also determined that EVA is more informative than EPS for all three stock returns due to lower asymmetric information. This result is consistent with existing literature after the blooming of behavioral finance in 2002.

Second, we have conducted a   causality test, and have found that both EVA and EPS to three stock returns present reverse causalities, indicating that the effect of behavioral finance exists to affect both EPS and EVA. In particular, EVA is relatively more significant than EPS. The results are consistent with the perspective of behavioral finance. In addition, excess returns derived from Fama & French four factors model show a tendency of stronger causality than stock returns; therefore, excess values of enterprises are more affected by behavioral finance effect.

Our analyses and findings still suffer from limitations, including taking certain firm characteristics as controlled variables that have influential presence on firm performance; thereby allowing is to omit other variables. Additionally, we use actual earning data to verify explanatory power only, and discuss each behavioral finance effect separately.

References

[1]   Ahn, S.Y., Cha, S.M, Ko, Y.W., Yoo, Y.K., " Implied cost of equity capital in earnings-based valuation model: Evidence from Korea", <u>Asia-Pacific Journal of Financial Studies</u>, 37, pp. 599-626, 2008.

[2]   Ali, A., Hwang, L.S. and Trombley, M.A, "Residual-income-based valuation predicts future stock returns: Evidence on mispricing vs. risk explanations', <u>Accounting Review</u>, 78, pp. 377-396, 2003.

[3]   Baginski, S.P. and Wahlen, "Residual income risk, intrinsic values, and share prices", <u>Accounting Review</u>, 78, pp. 327-351, 2003.

[4]   Bar-Yosef, S., Callen, J.L. and Livnat, J., " Autoregressive modeling of
        earnings-investment causality", <u>Journal of Finance</u>, 42, pp. 11-28, 1987.

[5]   Bhagat, S. and Bolton, B., "Corporate governance and firm performance", <u>Journal of
        Corporate Finance</u>, 14, pp. 257–273, 2008.

[6]   Biddle, G.C., Bowen, R.M. and Wallace, J.S., "Does EVA® beat earnings?
        Evidence on associations with stock returns and firm values", <u>Journal of Accounting
        and Economics</u>, 24, pp. 301-336, 1997.

[7]   Biddle, G.C., Bowen, R.M. and Wallace, J.S., "Evidence on EVA", <u>Journal of
        Applied Corporate Finance</u>, 12, pp. 69-79, 1999.

[8]   Campello, M., Graham, J.R. and Harvey, C.R., "The real effects of financial
        constraints: Evidence from a financial crisis", <u>Journal of Financial Economics</u>, 97,
        pp. 470-487, 2010.

[9]   Cleary, S., "The relationship between firm investment and financial status", <u>Journal
        of Finance</u>, 54, pp. 673–692, 1999.

[10]   Cheng, Q., "What determines residual income?", Working papers, 2001.

[11]   Chen, F., Jorgensen, B.N. and Yoo, Y.K., " Implied cost of equity capital in
        earnings-based valuation: International evidence", <u>Accounting and Business
        Research</u>, 34, pp. 323-344, 2004.

[12]   Easton, P.D., "PE ratios, PEG ratios, and estimating the implied expected rate of
        return on equity capital", <u>Accounting Review</u>, 79, pp. 73-95, 2004.

[13]   Fama, E.F. and French, K.R., "The cross-section of expected stock returns", <u>Journal
        of Finance</u>, 47, pp. 427-465, 1992.

[14]   Fama, E.F. and French, K.R., "Common risk factors in the returns on stocks and
        bonds", <u>Journal of Financial Economics</u>, 33, pp. 3-56, 1993.

[15]   Fama, E.F. and French, K.R., "Size and book-to-market factors in earnings and
        returns", <u>Journal of Finance</u>, 50, pp. 131-155, 1995.

[16]   Fama, E.F. and French, K.R., "Multifactor explanations of asset pricing
        anomalies", Journal of Finance, 51, pp. 55-84, 1996.

[17]   Fama, E.F. and French, K.R., "Industry costs of equity", Journal of Finance, 43, pp.
        153-193, 1997.

[18]   Fama, E.F. and French, K.R., "Average Returns, B/M, and Share Issues", Journal of
        Finance, 63, pp. 2971-2995, 2008.

[19]   Fama, E.F. and French, K.R., "Dissecting anomalies", Journal of Finance, 63, pp.
        1653-1678, 2008.

[20]   Fazzari, S.M, Hubbard, R.G. and Petersen,B.C., "Financing constraints and
        corporate investment", Brooking papers on Economic Activity, pp.141-206, 1988.

[21]   Frankel, R. and Lee, C.M.C, "Accounting valuation, market expectation, and
        cross-sectional stock returns", Journal of Accounting and Economics, 25, pp.
        283-319, 1998.

[22]   Feltham, G.D., Issac, G.E. and Mbagwu, C., "Perhaps EVA does beat
        earnings—revisiting previous evidence", Journal of Applied Corporate Finance, 16,
        pp. 83–88, 2004.

[23]   Forbes, K.J., "One cost of the Chilean capital controls: increased financial
        constraints for smaller traded firms", Journal of International Economics, 71, pp.
        294-323, 2007.

[24]   Garvey, G.T., "EVA versus Earnings: Does it matter which is more highly
        correlated with stock returns?", Journal of Accounting Research, 38, pp. supplement,
        1999.

[25]   Hahn, J. and Lee, H., "Financial constraints, debt capacity, and the cross-section of
        stock returns", Journal of Finance, 64, pp. 891-921, 2009.

[26]   Linnainmaa, J.T, " Do limit orders alter inferences about investor performance and
        behavior?", Journal of Finance, 65, pp. 1473-1506, 2010.

[27] Lundholm, R., "Reconciling value estimates from the discounted cash flow model and the residual income model", Contemporary Accounting Research, 2001.

[28] Myers,J.N., "Implementing residual income valuation with linear information dynamics", Accounting Review, 74, pp. 1-28, 1999.

[29] Ohlson, J.A, " Earnings, book values, and dividends in equity valuation", Contemporary Accounting Research, 11, pp. 661–687, 1995.

[30] Ohlson, J.A., " Valuation and clean surplus accounting for operating and financial activities", Contemporary Accounting Research, 11, pp. 689–731, 1995.

[31] Ohlson, J.A., "Discussion of "An analysis of historical and future-oriented information in accounting-based security valuation models" ", Contemporary Accounting Research, 16, pp. 381–384, 1999.

[32] Ohlson, J.A, "Residual income valuation: the problems", Unpublished paper, 2000.

[33] Ohlson, J.A., "Discussion of "Residual income and value-creation: The missing link" ", Review of Accounting Studies, 7, pp. 247-251, 2002.

[34] Ohlson, J.A., "On accounting-based valuation formulae", Review of Accounting Studies, 10, pp. 323-347, 2005.

[35] Ohlson, J.A. and Juettner-Nauroth,B.E., "Expected EPS and EPS growth as determinants of value", Review of Accounting Studies, 10, pp. 349-365, 2005.

[36] Peiers, B., "Informed traders, intervention, and price leadership: A deeper view of the microstructure of the foreign exchange market", Journal of Finance, 52, pp. 1589-1614, 1997.

[37] Penman, S.H., Financial Statement Analysis and Security Valuation (4e), McGraw-Hill, International, 2010.

[38] Petersen, M.A, "Estimating standard errors in finance panel data sets: Comparing approaches", Review of Financial Studies, 22, pp. 435-480, 2009.

[39] Ragunathan, V., Faff, R.W. and Brooks, R.D., "Australian industry beta risk, the

choice of market index and business cycles", <u>Applied Financial Economics</u>, 10, pp. 49-58, 2000.

[40]   Richardson, G. and Tinaikar, S., "Accounting based valuation models: what have we learned?", <u>Accounting & Finance</u>, 44, pp. 223–255, 2004.

[41]   Ross, S.A., Westerfield, R.W. and Jaffe, J., <u>Corporate Finance (8e)</u>, McGraw-Hill, International, 2006.

[42]   Whited , T.M. and Wu, G., "Financial constraints risk", <u>Review of Financial Studies</u>, 19, pp. 531-559, 2006.