國立政治大學財務管理學(系)研究所

碩士論文

401(k)退休金計劃中公司持股與公司績效之研究

A Study of the Relationship between the Company Stock Holdings of 401(k) Plan and Firm Performance

指導教授：陳鴻毅 博士

研究生：高郁翔 撰

中華民國 107 年 06 月

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

摘 要

本研究主要探討 401(k)退休金計畫的參與者是否利用其內部資訊對 401(k)退休金計畫中的公司持股進行操作。本研究對 401(k)退休金計畫中的公司持股變化是否能預測公司之非預期營收、非預期盈餘、營運績效以及股價報酬。實證結果顯示公司股票占退休金計劃總投資金額的比率具有預測未來四季的非預期營收與盈餘的能力。此外，在價值型公司以及小型公司中，退休金計畫中之公司持股與以資產為計算基礎的營運績效具有高度正相關。然而，退休金計畫中之公司持股與公司之未來股價報酬相關性較弱。

關鍵字：401(k)退休金計畫；非預期營收；非預期盈餘；營運績效；股價報酬

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Abstract

This paper tries to investigate whether 401(k) plan participants apply the insider information to alter the company stock holding in their 401(k) plans. Specifically, this study examines whether the company stock holding in 401(k) plans can predict revenue surprises, earnings surprises, operating performance, and stock returns of firms. Empirical results show that, the percentage of company stock over total investments in the 401(k) plan is positively associated with earnings surprises and revenue surprises in the following four quarters. In addition, the company stock holding can predict asset based operating performance among value firms and small firms. However, there is a weak evidence that the company stock holdings is related to better stock returns.

Keywords：401(k) plans; Revenue surprises; Earnings surprises; Operating performance; Stock return performance

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Contents

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

List of Tables

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Figure Contents

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

1. Introduction

In the past decades, various unprecedented financial crisis smashed the global economics and hugely shrink the wealth of the public and the private sector. In order to stimulate the economic or even to cater for the voters, the governments around the world all tried to implement the expansional fiscal policies or monetary policies, such as quantitative easing (QE). Recently, these expansional policies seem to work, and the economics of the leading countries or areas gradually recovered from the valley bottom. Nevertheless, there is no free lunch. These polices are all at the cost of, for instances, the fiscal budget deficits, highly overpriced nominal assets value, and so on. As the we can see from Figure I, the total global debt of all sectors soared significantly in the past few decades. Therefore, these consequences shed more spotlight on the issue of the government fiscal cliff problem all around the world, even raising the concern about the default of the traditional defined benefit retirement plans.

(Insert Figure I Here)

Take the typical retirement plans in Taiwan for example, the military, educator, civil servant, and labor insurances are all on the edge of default. In this case, more and more governments or the authorities have concerned the feasibility of defined contributed retirement plans, which transferring the burden of promised return of the retirement plans from the governments or the authorities to the plan participants. According to the report F Willis Tower Watson, the percentage of defined contribution to all retirement plans has increased to 49% in 2017 from 33% in 1997. The characteristics of the defined contribution plans offer more flexibility compared to the

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

traditional defined benefit plans, the defined contribution plans would not be the substitute, but the complement for the defined benefit plans. Hence, the purpose of this study is to find the implication of the investment behaviors in the 401(k) plans.

I handedly collect the company stock held by the participants (COMSTK) and total investment in the 401(k) plans (TTIVM) at firm level from the SEC EDGAR database. I also use COMPUSTAT's North America Fundamental Annual and Quarterly file to collect the data regarding income statement and balance sheet, including total assets, total liabilities, revenue per share, earnings per share, and so on. I also get the stock prices and returns excluded dividends from CRSP.

The data from the COMPUSTAT and CRSP is used to shape the dependent variables, for example, revenue surprises (SURGE), earnings surprises (SUE), ROE, ROA, Asset Turnover, Equity Turnover and the holding period return from three months to one year.

Then, I use the COMSTK and TTIVM to form the two independent variables PER_COMSTK and CHG_PER_COMSTK. The former is the percentage of company stock over total plans size in the 401(k), and the latter is the change of that ratio. The two independent variables would be used to examine the issue that if the participants could predict the revenue surprises, earnings surprises, operating performance and stock performance in the future based on the insider information (ex. heavier work load).

I examine the relationship of the percentage of company stock over total plans size (PER_COMSTK) and the change of that ratio (CHG_PER_COMSTK) with revenue surprises and earnings surprises. The result shows that the PER_COMSTK has some kind of pattern that contemporary SUE(Q) are positive and significant, and SUE(Q+1), SUE(Q+2) become insignificant; at last, the SUE(Q+3) turn negative and significant. The result in the CHG_PER_COMSTK implicate that the significance of

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

the coefficient in SURGE is a little bit greater in that of in SUE. Besides, the result of CHG_PER_COMSTK also indicates that participants in the value and small firms have the pattern I have mentioned above.

In the second section, I try to examine the relationship of the percentage of company stock over total plans size (PER_COMSTK) and the change of that ratio (CHG_PER_COMSTK) with operating performance proxies I find PER_COMSTK in small or value firms have positive and significant relationship with most of the operating performance, especially those proxies calculated on the basis of asset, like ROA_NI, ROA_EBIT and Asset Turnover. However, I find no clear relationship between CHG_PER_COMSTK and all the operating performance proxies.

Lastly, only CHG_PER_COMSTK controlled for past return performance has positive and significant relationship with holding period return for one year (HPR_FOL_1YR).

The paper is organized as followed：Section 2 presents the brief introduction of defined contribution (DC) plans and 401(k) plans in the U.S. Section 3 demonstrate the related literature and the result they offer as the fundamentals in this paper. Section 4 shows how I select and process the data, summary statistics and the hypothesis I presume. Section 5 includes the empirical result of the relationship between PER_COMSTK and CHG_PER_COMSTK with the revenue surprises, earnings surprises, operating performance and holding period returns. Section 6 includes this whole paper.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

2. Pension Plans and 401(k) Plans in the U.S

2.1 The Pension Plans

In principle, I divide pension plans into two categories: defined benefit (DB) plans and defined contribution (DC) plans. The former type of pension plan is quite popular in Taiwan.

Based on the definition provided by the Department of Labor in the United States, a DB plan promises a specified monthly benefit at retirement. The plan may state this promised benefit as an exact dollar amount, such as $100 per month at retirement. Or, more commonly, it may calculate a benefit through a plan formula that considers such factors as compensation and service—for example, 1 percent of average salary for the last 5 years of employment for every year of service with an employer. The pros of the DB plans are that it could provide the wealth reallocation, which can smooth the gap between the rich and the poor, and make the workers meet the obligation of raising the retired. Nevertheless, the cons of DB plans are that if the population aging rose the dependency ratio, the workers' economic burden would increase. The monthly benefit at retirement would also be affected by tenure, compensation growth, inflation risk. And if the employees change their jobs, or the employers fire the employees, it will interrupt the tenure and suspend the retirement benefits, putting the retired employees into a dangerous situation.

In the contrast, a DC plan does not promise a specific amount of benefits at retirement, but contribute to the employee's individual account under the plan, sometimes at a set rate, such as 5 percent of earnings annually. The pros of the DC plans are that employees could leave the job with the DC plans. Therefore, the retirement benefits won't be suspended because of the bankruptcy of firms or quitting

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

the job. Besides, it's much more fair mechanism than one of DB plans. But the cons would be that the benefits contributed period by period are extremely vulnerable to be affected by inflation risk, which might erode the real benefits after retirement. In short, if the performance of portfolio built by participants cannot meet the required return, they have to take all the consequences. In the United States, examples of defined contribution plans include 401(k) plans, 403(b) plans, employee stock ownership plans, and profit-sharing plans. In the next several section, I will introduce some of well-known subcategories of DC plans.

A Simplified Employee Pension Plan (SEP) is a relatively straightforward and simple retirement savings vehicles. A SEP allows employees to make contributions on a tax-favored basis to individual retirement accounts (IRAs) owned by the employees. SEPs are subject to minimal reporting and disclosure requirements. Under a SEP, the employees need to build an IRA to receive the contributions from employers. Employers may no longer set up Salary Reduction SEPs. However, employers are permitted to establish SIMPLE IRA plans with salary reduction contributions. If an employer had a salary reduction SEP, the employer may continue to allow salary reduction contributions to the plan.

An Employee Stock Ownership Plan (ESOP) is a form of defined contribution plan in which the investments are primarily in employer stock. A Profit Sharing Plan or Stock Bonus Plan is a defined contribution plan under which the plan may provide, or the employer may determine, annually, how much will be contributed to the plan (out of profits or otherwise). The plan contains a formula for allocating to each participant a portion of each annual contribution. A profit sharing plan or stock bonus plan include a 401(k) plan.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

2.2 The 401(k) Plans

A 401(k) Plan is a defined contribution plan that is a cash or deferred arrangement. There are special rules governing the operation of a 401(k) plan. For example, there is a dollar limit on the amount an employee may choose to defer each year. An employer must inform employees of any limits that may apply. Employees who participate in 401(k) plans take responsibility for their retirement benefits by contributing part of their salary and, in many instances, by assigning their own investments.

401(k) plans are named for the section of the tax code that governs them and arose during the 1980s as a supplement to pensions. Pension funds were managed by the employer and they paid out a steady income over the course of the retirement. (If you have a government job or a strong union, you may might still be eligible for a pension.) However, as the cost of running pensions escalated, employers started replacing them with 401(k)s.

Based on the moment the contribution being taxed, I could further divide the 401(k) plans into two categories: traditional 401(k) plans and Roth 401(k) plans. The latter form of 401(k) is less common, but I still make a simple comparison as Table I.

(Insert Table I Here)

According to Table I, I find that the contribution of traditional 401(k) is pre-taxed before the participants withdraw them from the plans. The participants of Roth 401(k) would receive the taxed contribution. The different tax rule and withdrawal rule allow the participant to select the appropriate 401(k) plans based on

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

their individual marginal tax burden. For instances, if participants expect their tax rate to rise with aging tenure, they would prefer to adopt the Roth 401(k) plan to smooth the effect of increasing tax rate.

401(k) plans also provide another flexible investment option. Compared to usual individual retirement accounts (IRA), 401(k) plans could be used to finance the participants' budget as collateral.

According to the Table II published by the Department of Labor in the United States, for 2018, the limit for elective 401(k) contributions is increasing by $500 from its 2017 level to $18,500, not including any matching contributions from your employer, any non-elective employee contributions, or any allocations of forfeitures, in order to keep up with the rising cost of living. However, the catch-up contribution limit for 2018, which allows savers aged 50 or older to contribute even more, remains constant at $6,000 for a total maximum of $24,500. Keep in mind that these limits only apply to elective 401(k) deferrals. In other words, these are the limits for contributions that you choose to have withheld from your paycheck and contributed to your account. It does not include any matching contributions from your employer, any non-elective employee contributions, or any allocations of forfeitures. With that in mind, the overall contribution limit from all sources is rising by $1,000 in 2018 to $55,000. For savers aged 50 and up who are eligible for a catch-up contribution, the $6,000 limit is in addition to this maximum, for a total maximum possible 2018 401(k) contribution of $61,000.

(Insert Table II Here)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Then, how large are the 401(k) plans? According to the research published by the Investment Company Institute, as of December 31, 2017, 401(k) plans held an estimated $5.3 trillion in assets and represented 19 percent of the $27.9 trillion in US retirement assets, which includes employer-sponsored retirement plans (both defined benefit (DB) and defined contribution (DC) plans with private- and public-sector employers), individual retirement accounts (IRAs), and annuities. In comparison, 401(k) assets were $3.0 trillion and represented 17 percent of the US retirement market in 2007. In the aspect of numbers of plan participants, in 2015, about 54 million American workers were active 401(k) participants, and there were nearly 550,000 401(k) plans. According to my original collected data illustrated in Figure II, I find that the size of the 401(k) plans is about $1.3 trillion as the end of 2015. In addition, I could observe that the total size of the 401(k) plans shrank badly around 1998 and 2008, which are the moment that dot com bubble and sub-prime mortgage financial crisis smashed the financial market. Interestingly, I could find that bounce of the total value of 401(k) plan after 2008 financial crisis is much greater than that of the partial 401(k) plans, which I exclude the financial and utility, and thinly traded firms. I think that the difference is caused by the well-recovery of financial firms, which are in the center of the 2008 financial crisis.

(Insert Figure II Here)

Even if the booming of the 401(k) plans enhances the significance in the pension plans market in the U.S, they are still not invincible. During the 2008 financial crisis, the stock market tumbled and had wiped out about $2 trillion in the Americans retirement saving. According to the report of Washington Post, even the traditional

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

pension plans, which are known as DB plans and broadly considered more stable and concrete, had been crashed seriously by the volatility if the stock market, losing about 15 percent of their assets.

Surely, the 401(k) plans would not be the exceptions. In addition, according to the statistics, the nominal value of 401(k) plans might decline slightly more than that of assets in DB plans. The result comes from a couple of reasons. Firstly, the federal government had pushed the 401(k) plans heavily and complemented a law to make employers easier to automatically enroll their employees in them and other similar retirement plans, which hugely increase the value size of 401(k) plans. according to the report published by ICI, the average participants account balances in 1996 is just $37,723, but the that in 2015 has already hit $73,357. Secondly, that DC plans tend to heavily weight their portfolios in stocks compared to DB plans, either through individual holdings, target-date funds, commingled funds, or the mutual funds. Based on the research of ICI, in the past eight years, participants allocate about 40 percent of 401(k) plan assets in the equity fund, 7 percent of those in company stock, and 20 percent of those in balanced fund. In comparison, participants only allocate approximately 10 percent in bond funds, 9 percent in GIC and other stable value funds, and 4 percent in money funds. Interestingly, if I take a closer look at the damage situation in the different ages, I could find that the younger workers tend to hold more stocks in their portfolios, while the older employees put lots of weight on safer investment tool such as bonds.

Because millions of 401(k) plans had been damaged thoroughly by the plunge of the stock market and the weak economy, putting plenty of families into a dangerous situation, such as more restricted budgets, more credit card debt, or even less access to loans. Besides, the reason that many American workers, pensions and 401(k) plans might be their only way of retirement savings had made the thing even worse. For

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

example, more and more workers are delaying retirement. The people age 55 and older who work full time grew from about 22 percent in 1990 to nearly 30 percent in 2007, according to the Bureau of Labor Statistics.

3. Literature Reviews

In this paper, I try to examine the relation between the company stocks held by the employees in the 401(k) plans and the employees' forecasting ability toward revenue and earnings surprises, business performance and the stock returns of the company stocks. Based on Benartzi (2001), there are two main reasons why the allocation to company stocks is an attractive topic to study. First, the cost of insufficient diversification can be quite substantial. Specifically, the stocks of the company where the employees work are high correlated with their human capital. Therefore, either employees' companies go bankruptcy or lay off them would cause them bare both the loss of retirement savings and their human capital. Secondly, there is a general trend toward investment autonomy, which is the main characteristic I have been discussed in the last section. The autonomy of DC plans allows the participants to set the retirement portfolios based on their risk preference.

Unfortunately, the recent literature finds plenty of conclusions about the allocation biases participants shown in the 401(k) plans. The first allocation biases would be that the majority of the 401(k) plans portfolios are not well diversified. According to the Agnew (2006), there are three types of studied diversification heuristics. The first, the framing 1/n heuristics, is considered a naïve strategy because participants distribute their contributions equally among the n choices available. Benartzi and Thaler (2001) show that the strategy might cause large ex-ante welfare losses when the portfolio chosen could not match to the participants' risk preference. The second type of diversification heuristic would be the modified version of framing

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

heuristic, which means that participants choose their company stock allocation, then divide the remaining funds among the remaining option available. And the final one is the conditional 1/n heuristic, referring to the practice of dividing allocations evenly among the chosen funds. But number of the chosen fund might be less than the number of available fund. Huberman and Jiang (2006) argue that the conditional 1/n heuristic can be more rational than the framing 1/n heuristic and is consistent with k-fund separation theories. The Huberman and Jiang (2006) shows that less than 4 percent follow the framing 1/n heuristic, 5 percent follow the modified 1/n heuristic, and nearly 8 percent follow the conditional 1/n heuristic, which is done by excluding all company stock holders and one-fund holders. Besides, the literature finds that most participants (35%) allocate their entire contribution to only one fund and that a majority (66%) of those participants invest their entire contribution in company stock.

Furthermore, the Agnew (2006) takes the salary and gender into consideration. The literature reports that with higher salaries and longer tenures participants are less likely to follow the potentially irrational framing 1/n rule, and more likely to follow the potential rational conditional 1/n rule. This possible explanation to the result might be that the higher salaried are more educated and therefore less likely to depend on simple rules for investing. As for the effect of gender toward diversification, the literature also shows that 24 percent the men allocate their whole contribution to company stock compared to 22 percent of the women, which is consistent with the previous empirical findings that male are more prone to invest in riskier financial assets or trade more in riskier assets than female.

In addition to the problem of under-diversification, there are still some allocation biases regarding the phenomenon of contribution matching. Benartzi (2001) find that once the match is invested abroad, participants would invest more of their retirement abroad, which is consistent with an endorsement effect. Similarly, the literature also

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

shows that there are another two behavior-biased phenomenon about endorsement effect. When the employer's contributions are automatically directed to company stock, participants would invest more of their own contributions in company stock. If I take a closer look at the conclusion, I would find that when the match is in cash, employees invest 18 percent of their own contribution in company stocks; when the match is in the company stock, employees invest more (29 percent) of their own contributions in company stocks. In other word, employees follow the allocation of the employers' contribution as implicit investment advice.

Jegadeesh and Livnat (2006) examine the relation between the stock price reaction on the earnings announcement date and the contemporaneous and past revenue surprises. After controlling for earnings surprises, they find great abnormal stock returns in the post-announcement period for stocks that have large revenue surprises. In addition, they also find that earnings surprises accompanied with revenue surprises would signal more persistent earnings growth than similar levels of earnings surprises not accompanied with matching revenue surprises. In the paper, I also try to examine if that the employees increase or decrease the company stocks that they serve is related to the subsequent stock return performance or business performance of the company. I conjecture that the employees might think that the workload become much heavier has a positive relation with that the performance of company has been strengthened, so they would purchase the company stocks through 401(k) plans to capture the potential capital gain. Based on the conclusion of Jegadeesh and Livnat (2006), if our results of regression do prove our expectation, then the company stock held by employees in 401(k) plans would be a leading variable to predict the future stock returns or business performance.

Recent literature find that people would put too much emphasize on the past returns of the investments as their criteria to allocate their investment. In the aspects

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

of mutual fund investments, Patel, Zeckhauser, and Hendricks (1991) and Jain and Wu (2000) both report that purchases of mutual funds are overly affected by recent good performance, even though performance shows no persistence. Benartzi (2001) concludes that the participants of 401(k) have behavior bias to extrapolate the past performance, which means that participants see trends and patterns even when the sequence is truly random. In addition, the literature even shows that the positive relationship between past returns and subsequent allocations to company stocks would come stronger as the return-accumulation period lengthens indicating that the employees search for a long-term track record before they invest in company stocks.

To make things even worse, Benartzi (2001) points out that only 16.4 percent of the observations realize that company stocks are risker than the overall stock market. The literature shows that employees do not pay much attention to the standard deviation of returns, even though they invest in a single security, which is consistent with the finding of John Hancock Financial Service (1999) that majority of employees think their own company stock is safer than a diversified portfolio. In the view of behavior finance, the phenomenon might be motivated by the participants' optimistic or overconfidence about the future prospect of company stocks, unless the employees really are able to detect the insider information through the daily routine work. Nevertheless, according to the conclusion of Benartzi (2001), the participants could not predict the future performance of company stock, indicating that an information-based explanation for company stock holdings seems unlikely to hold. But they use the survey of the UCLA and Morningstar.com and the allocation to company stock as independent variable, I further broaden our data to the panel data, and use the difference of the allocation to company stocks and the allocation to company stock over the allocation to the plan as independent variables to examine if the employees can precisely predict the performance of their companies in the future.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

4. Data and Methodology

4.1 Measures of Revenue and Earnings Surprises

There is already lots of literature that offers the definition of revenue surprises and earnings surprises. I would follow this literature and use standard unexpected earnings (SUE) as main measure of earnings surprises. I define SUE for firm *i* in quarter *t* as：

$$SUE_{i,t}=\frac{Q_{i,t}-E(Q_{i,t})}{\sigma_{i,t}}\ , \tag{1}$$

where $Q_{I,t}$ is the quarterly EPS from continuing operations, $E(Q_{i,t})$ is the expected quarterly EPS prior to earnings announcement, and $\sigma_{i,t}$ is the standard deviation of quarterly earnings growth.

I assume that $Q_{i,t}$ follows a seasonal random walk with drift. This assumption is based on the evidence in Bernard and Thomas (1989) that post-announcement drift following earnings surprises is not so sensitive to specification of the statistical model for estimating earnings expectation. I calculate the drift $\partial_{i,t}$ and $E(Q_{i,t})$ as：

$$\partial_{i,t}=\frac{\sum_{j=1}^{8}(Q_{i,t-j}-Q_{i,t-j-4})}{8} \tag{2}$$

and

$$E(Q_{i,t})=Q_{i,t-4}+\partial_{i,t}. \tag{3}$$

Because of the definition of the drift term, I choose to include the firms only if that their data is available to compute the past eight seasonal differences in quarterly earnings.

Lastly, I estimate $\sigma_{i,t}$ using the first difference of quarterly earnings growth over the previous eight quarters. The estimator for $\sigma_{i,t}$ is：

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

$$\sigma_{i,t}=\frac{1}{7}\sqrt{\sum_{j=1}^{8}(Q_{i,t-j}-Q_{i,t-j-4}-\partial_{i,t})^2}. \quad (4)$$

Then, I use a similar formula to measure revenue surprises. The difference would be replacing the earnings terms by revenue terms. In specification, I define standardized unexpected revenue growth estimator (SURGE) as

$$SURGE_{i,t}=\frac{REV_{i,t}-E(REV_{i,t})}{\zeta_{i,t}}\ , \quad (5)$$

where $REV_{i,t}$ is the quarterly revenue per share, $E(REV_{i,t})$ is the expected quarterly revenue per share prior to earnings announcement, $\zeta_{i,t}$ is the standard deviation of quarterly revenue growth. Same as the procedure of earnings, I assume that REV also follows a seasonal random walk with a drift. By the same token, I calculate the expectation and the standard deviation of revenue per share in a manner similar to that for quarterly EPS.

4.2 Data

I use North America Fundamental Annual and Quarterly file from COMPUSTAT to collect the data regarding income statement and balance sheet, including total assets, total liabilities, revenue per share, earnings per share, and so on. Then, I get the stock prices and returns excluded dividends from CRSP database. Finally, I collect the 401(k) plans data, such as total investments of the plans (TTIVM) and the company stocks held by employees in the plans (COMSTK), from the 11-K with SEC EDGAR.

The calculation of market value of company stocks is quite straightforward. The PRC is defined as daily close price or bid/ask average price of stocks. The data collected from the CRSP database sometimes might be negative value. According to the note from the CRSP, if the closing price is not available on any given trading day, the number in the price field has a negative sign to indicate that it is a bid/ask average

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

and not an actual closing price. To eliminate the problem, I would directly adjust the negative value data by taking the absolute value. The SHROUT stands for the number of the outstanding shares of company stocks, which are recorded thousands. To unify the unit of variables as recorded in million, I would divide the SHROUT by 1,000. Therefore, the formula of MKV is as following:

$$MKV = PRC \times SHROUT \ . \tag{6}$$

The definition of book equity (BE) follows Kayhan and Titman (2007). All the variables used to calculate the book equity would collect from the COMPUSTAT database. The formula would begin with SEQ or stockholder's equity, which is calculated by subtracting the total liabilities from total assets. And then I need to adjust the tax effect by adding TXDB (deferred taxes) and ITCB (investments tax credit) to the formula. As for BVPS, the processing comes a little bit complicated. The book value of preferred stock is defined as the redemption value (PSTKRV), the liquidating value (PSTKL), or the par value (PSTK), taken in the given order, as available. If all the related value of BVPS, TXDB, and ITCB is unavailable, I set the value as zero. Nevertheless, if I have missing data of either total assets or total liabilities, I would basically delete the datum. According to the indication mentioned above, the formula would be:

$$BE = SEQ + TXDB + ITCB + BVPS \ , \tag{7}$$

where

$$\begin{cases} PSTKRV \ , & \text{if available} \\ PSTKL \ , & \text{if available and PSTKRV not available} \\ PSTK \ , & \text{if available and PSTKRV, PSTKL not available} \\ 0, & \text{otherwise} \end{cases} . \tag{8}$$

To get the book-to-market ratio(*BMR*), I divided the book equity(BE) by market value of company stock(MKV).

$$BMR = \frac{BE}{MKV} \ , \tag{9}$$

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

The PER_COMSTK means the ratio of company stocks held by employees over the total investment of 401(K) plans. And the CHG_PER_COMSTK would be the growth rate of company stocks held by employees over the total investment of 401(K) plans in the year over year basis.

$$\begin{cases} PER\_COMSTK = \frac{COMSTK}{TTIVM} \\ CHG\_PER\_COMSTK = \left(\frac{COMSTK}{TTIVM}_{t} \div \frac{COMSTK}{TTIVM}_{t-1}\right) - 1 \end{cases}, \quad (10)$$

The holding period return is also straightforward. I calculate the variable by multiplying every pervious holding period returns, which is shown as:

$$HPR(n) = \prod_{k=0}^{n} (1 + HPR_{t-k}) - 1 \ , \quad (11)$$

which n stands for the period I want to get, and t is the time of the observation. For example, the holding period return for previous six month would be:

$$HPR(6) = \prod_{k=0}^{6} (1 + HPR_{t-k}) - 1$$

According to Fama and French (1995), the standard earnings before extraordinary items, but after depreciation, taxes, interest, and preferred dividends would be appropriate enough to form the ROE and ROA. Nevertheless, only if the post-depreciation adjusted earnings is a reasonable measure of the value of assets used to generate sales or economic benefits. Therefore, I choose to use different measures of probability of companies as proxies to make sure that the result of regression is economically reasonable.

$$\begin{cases} ROA\_NI_t = \frac{Net\ Earnings_t}{Total\ Assets_{t-1}} \\ ROA\_EBIT_t = \frac{EBIT_t}{Total\ Assets_{t-1}} \end{cases}, \quad (12)$$

and

$$\begin{cases} ROE\_NI_t = \frac{Net\ Earnings_t}{Book\ Equity_{t-1}} \\ ROE\_EBIT_t = \frac{EBIT_t}{Book\ Equity_{t-1}} \end{cases}, \quad (13)$$

and

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

$$\begin{cases} Asset\ Turnover_t = \dfrac{Revenue_t}{Book\ Equity_{t-1}} \\ Equity\ Turnover_t = \dfrac{Revenue_t}{Book\ Equity_{t-1}} \end{cases}, \tag{14}$$

After defining the data and variables, I insert the SIC code to each sample data. Basically, the SIC codes of the companies might be different from time to time because the companies might switch their business development to the whole new fields. But the SIC code from the COMPUSTAT would only be shown in the last change basis. Namely, I cannot detect the historical industrial classification of the companies, which might affect the result of filtering and regressions. Consequently, I collect both the SIC and historical SIC (SICH). Replace the contemporary SIC by SICH if the two codes are unmatched. I would fill the missing data before the development switch with SICH, or one after the development switch with SIC. Then, I use the Fama French 17 industrial classification to categorize the data sample into 17 different industry, including the Food, the Mines, the Oil, the Clothes and the Durables, and so on. The specific definition of Fama French 17 industrial classification would be put at the Appendix A.

I exclude financials from the sample because the revenue of financial firms are not comparable with those of industrial firms caused from totally different business and financial risk. Besides, I exclude utilities from the sample since their revenue growth pattern are basically more predictable than those for industrial firms. Finally, I also exclude all firms with stock prices below $5 on the day before the earnings announcement date to avoid the small, thinly traded stocks which investors are unlikely to notice and have the potential problem of illiquidity. And the change of sample data amount would be shown as Table III. Besides, to eliminate the effect of outliers, I winsorize the sample data of for top and bottom 2.5%. The sample period is 1993-2016.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

(Insert Table III Here.)

4.3 Summary Statistics

Firstly, I take a view on the yearly data, which is shown as panel A of the Table IV. The minimum of the total investment of 401(k) plans and the company stock could be zero. This is mostly because several 401(k) plans sample data has been suspended or thoroughly withdrawn in certain year, causing the figure of total investment and company stock come to be zero. In addition, I could find that maximum of the total investment of 401(k) plans and the company stock are still quite larger than 95 percentage of figures, and the difference could be about 20 times of standard deviation.

(Insert Table IV Here.)

As I have mentioned above, to eliminate the effect of outliers, I have already winsorize the related variable PER_COMSTK, and CHG_PER_COMSTK.

In the aspect of capitalization, I take the log of MKV for the purpose of easy interpretation. And I use the capitalization and book equity to shape the book-to-market ratio (BMR). The minimum, median and maximum of the BMR are 7.28 percent, 48.04 percent and 185.60 percent, respectively. I could tell that the variation in the sample above median might be little larger because the difference between minimum and median is just about 40%; however, the one between median and maximum could be as large as 130%. At most 25 percent of the BMR data is smaller than 100 percent, which means that the book value is smaller than market

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

value and the operating performance of these companies might be poor.

The Benartzi (2001) show that the mean of the PER_COMSTK falls at the 33 percent, but I only get 19 percent. Therefore, I try to illustrate the distribution of PER_COMSTK in different year. According to the Figure II, I find that the PER_COMSTK gradually decrease since 1994. Similarly, based on the research of ICI, new 401(k) participants tend not to hold high concentration on company stocks. Before 2001, these new 401(k) participants allocate approximately 22 percent of the accounts in company stock, but the percentage has gradually decreased ever after. The accounts allocation in company stocks in 2015 is 8.9 percent, which decrease greatly from the peak at 23.8 percent in 1999. Interestingly, PER_COMSTK decreased sharply around 1998, but it seemed to be not affected by 2008's financial crisis, which I refer that some firms had been suspended or bankrupted around 1998 and eliminated a part of the 401(k) plans. However, the prevailing automatic contribution mechanism seemed to stabilize the contribution rate and the percentage of company stock over total 401(k) plan size, and also smoothed the damage of 2008 financial crisis. The median of the variable CHG_PER_COMSTK is negative value, showing that half of the sample data is decreasing in the change of the PER_COMSTK and consistent with the pattern observed in the Figure III. Nevertheless, compared to the pattern of PER_COMSTK, I find the fact that both CHG_PER_COMSTK slumped deeply during the 1999's dot com bubble and 2008's financial crisis.

(Insert Figure III Here.)

The means of the holding period return for 3 months, 6 months, 9 month, and 1 year are 3.25 percent, 6.51 percent, 5.14 percent, and 10.53 percent; the standard deviation of the holding period return would be 17.13 percent, 23.83 percent, 31.30

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

percent, and 38.54 percent. All the statistic above is intuitive as the rising pattern shown by the standard deviation and the return, which means that the long-term holding period return and standard deviation could be larger than the short-term ones.

Finally, the mean of ROA_NI, ROA_EBIT, ROE_NI, and ROE_EBIT falls at 6.04 percent, 11.82 percent, 14.07 percent and 29.46 percent. The standard deviation of the four variables would be 8.17 percent, 10.43 percent, 25 percent and 38.06 percent. Consequently, the maximum and the minimum of the four variables are all at the range of three standard deviations. The mean of the Asset Turnover and Equity Turnover are 128.61 percent and 346.01 percent, and the standard deviation of the two variables would be 78.34 percent and 314.07 percent. Even though I have winsorize the data, the maximum of the two variables would be 373.62% and 1557.79%, and the latter is three times larger standard deviation than mean.

As for the quarterly data in the panel B of the table, the patterns of the data are quite similar with those in the yearly data. Except for the HPR_PRE_3MON and the quarterly-specific data, SUE and SURGE. The maximum of HPR_PRE_3MON could reach as high as 302.70 percent, which is already winsorize. In order to see the pattern of SUE and SURGE, I divide the two variables into different quarterly data based on the interval between them and yearly data. Because most of the yearly data is ended in December, I can broadly view Q+1, Q+2, Q+3 and Q+4 as first, second, third and fourth quarter in the year. Namely, according to the panel B, I can find that the SUE and SURGE basically increase from the first quarter to fourth quarter, but both of the two variables would slightly decrease in the third quarter. In my personal opinion, I think the positive SUE and SURGE are partially because the negative sample data in the previous three quarter has lowered the expected earnings and revenue, which means that the possibility to beat the expectation would be higher.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

4.4 Hypothesis Development

I root the paper examination on the story that employee could detect the revenue and earnings surprises, and operating performance through their change of work load. And they might make use of the insider information to buy or sell the company stocks in 401(k) plans. The improvement or recession of the proxies above might further transfer into the stock return performance. I illustrate the predicted signs of coefficients in the Table V. Based on the hypothesis, the two independent variables PER_COMSTK and CHG_PER_COMSTK should have positive and significant relationship with SURGE. But I doubt the variables above have the same relationship with SUE as that with SURGE because the gap between the earnings and revenue might be broaden by the effect of earnings management, complex cost structure, or any other possible mechanism. In addition, I presume that the relationship between the two variables and SUE and SURGE would decay as the time goes. Consequently, the pattern of mean-reverting will be observed. According to the Jegadeesh and Livnat (2006), contemporary SUE and abnormal returns have a positive and significant relationship with the SUE and SURGE in the previous one quarter, but it shows a negative and significant relationship with the SUE and SURGE in the previous fourth quarter. Therefore, I would predict to see the similar results in our examination.

(Insert Table V Here.)

As for operating performance, I have few literature talk about the relationship

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

between operating performance and PER_COMSTK or CHG_PER_COMSTK. But I do see some literature show the connection between revenue, earnings and operating performance. Based on the Ghosh et al. (2005), with respect to earnings quality, firms with revenue-supported increases in earnings have more persistent earnings, demonstrate less susceptibility to earnings management, and have higher future operating performance. Consequently, if I find the positive and significant relationship with SUE, SURGE and the two independent variables, the participants might embrace the possibility to further forecast the positive and robust operating performance.

I believe that the two independent variables have relatively stronger and more robust relationship with the revenue-based and equity-based operating performance proxies. The reason of the former hypothesis is the same as I presume in the last section. According to formula of accounting, the assets of firms are composed of liabilities and equities, and liabilities could further divide into the financing and operating liabilities, which further increase the complication of capital structure and difficulty for participants to forecast the revenue or earnings on the basis of assets. Due to the hypothesis I made above, I believe that ROE and Equity Turnover would show a positive and significant relationship with PER_COMSTK and CHG_PER_COMSTK, but the sign of ROA still remains unknown. The revenue-based and asset-based effects might be mixed in the result of Asset Turnover, making the sign unpredictable either.

Because I believe the connection between SUE, SURGE and the two independent variables is solid enough to be well transferred into positive stock returns. Therefore, the two independent variables should also show positive and robust relationship with holding period returns in the short run, but the ones in the long run might show the insignificant or negative relationship, which is the characteristic of mean-reverting or over-shooting model.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

I further separate the sample into two sub-sample by type and firm sizes. In this case, I presume that participants in the small and value firms might own higher possibility to precisely forecast the SUE, SURGE, operating performance and stock returns performance in the future. The cost, organizational and capital structure in the small firms should be more simple and flatter, making the relationship between the three independent variables and the dependent variables more predictable. Furthermore, value firms have the characteristic of stable cash inflow and limited investment opportunity, which offer the clues that the relationship in the value firms might also be more predictable than that in the growth firms.

5. Empirical Results

In this section, I basically use two types of model to capture different effects. In each of the result, the model shown on the left-hand side only include book-to-market ratio (BMR) and market value of firms (LN_MKV) as control variables.

I add another several control variables into the model on the right-hand side. According to Jegadeesh and Livnat (2006), the previous SUE and SURGE have relationship with the contemporary and future ones, so I add SUE_PRE_1QR to SUE_PRE_4QR and SURGE_PRE_1QR to SURGE_PRE_4QR as control variables only in the SUE and SURGE related examination. The reason why I exclude the eight variables in the examination of operating performance and stock return performance is that if I add them into the model, the relationship would exclude the effect of previous SUE and SURGE. In this way, the story, which the connection between SUE, SURGE and the two independent variables is solid enough to be well transferred into operating performance or stock returns, would be undermined.

I also put control variables HPR_PRE_1YR into each second model on the

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

right-hand side. Why I need to add the control variable? Think about that, if CHG_PER_COMSTK has positive and significant relationship with the dependent variables, it might implicate that the extra allocation to company stocks done by 401(k) participants. But, in the different dimension, the reason of CHG_PER_COMSTK rising might be triggered by the fact that the value of company stock appreciates more than that of total plans size. The latter one might not be the effect I want to examine in the paper, so I choose to make it control variables in the model to get rid of that noise. Namely, I try to examine if participant would contribute more fund into the company stock if they have any insider information without the intervention of the securities appreciation or depreciation.

5.1 Earnings and Revenue Surprises

Firstly, I show the relationship between the SUE, SURGE and PER_COMSTK. The Table VI demonstrate the result for SURGE(Q) to SURGE(Q+4). In Panel A, PER_COMSTK fail to predict the contemporary SURGE(Q), which is quite insignificant, but the SUE(Q+2) and SUE(Q+4) show the negative and significant coefficient. In Panel B, PER_COMSTK in small firms seem to show a clearer pattern of SURGE, which is that PER_COMSTK in the small firms is positive and significant in SURGE(Q) and then turn negative and significant in SURGE(Q+2), than that in large firms. In Panel C, the value and growth show the significant coefficient at SURGE(Q+2) and SURGE(Q+4), respectively, which means that either the value or the growth firms might have little effect for using PER_COMSTK to predict SURGE. Interestingly, it seems that SUE_PRE_4QR and SURGE_PRE_1QR to SURGE_PRE_4QR all have positive and significant impact to SURGE. The control variable HPR_PRE_1YR shows statistical significance and a clear pattern that

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

relationship is positive and significant in the next few quarters and then turns negative.

(Insert Table VI Here.)

Unfortunately, I also observe a result inconsistent with the hypothesis I made in the previous section. For example, the result of Panel C that coefficients in the value firms show weak significance. I also find that majority of the coefficients of SURGE(Q) to SURGE(Q+4) are negative.

Then, In the Panel A of Table VII, I find that SUE(Q) is 1.7047, which is positive and statistically significant. But not until SUE(Q+3), which is negative and significant, the SUE(Q+1) and SUE(Q+2) are negative and insignificant. The pattern shows that the participant precisely forecast the earnings surprises in the next quarter, but the precision of predicting earnings seems to decline as the time goes to SUE(Q+3). Besides, even if I use the model two to examine the relationship, the pattern remains. In my personal opinion, I think the phenomenon is triggered by the fact that the first couple of earnings not only beat the expected figures, but also increase the expected figures in the next few quarters, which might further raise the difficulty to possess the earnings surprises.

(Insert Table VII Here.)

Then I try to divide the sample data into two sub-sample by firm size. In the large firms of sub-sample, SUE(Q) is 2.8301 and statistically significant, but the SUE(Q) for small firms are quite insignificant. The result shows that if the ratio of company stock to plan size in the large firms increase 1 percent, SUE(Q) would also increase

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

about $0.0283 (2.8301×0.01). Besides, I could see that the SUE(Q+3) also has the opposite results in the large and small firms. Obviously, the effect of SUE(Q+3) in large firms has dominated that in small firms.

In Panel C, the value and growth firms show the similar result in the Panel A, which increase in the near quarter and then gradually decrease in the third quarter. Interestingly, no matter SUE(Q+4) in the growth or value firms, the coefficients are all positive, and that in the value firms is even statistically significant.

There are few things here inconsistent with the hypothesis I made and result in the Jegadeesh and Livnat (2006). For example, not only the SUE_PRE_1QR has positive and significant relationship with SUE(Q) to SUE(Q+4), but also the SUE_PRE_2QR to SUE_PRE_4QR show the significance. Furthermore, the relationship between SUE_PRE_4QR and SUE(Q+2), SUE(Q+3) is positive rather than negative one. At last, the pattern I discuss above is inconsistent with the hypothesis either.

Secondly, based on the result of Table VIII and Table IX, I use the independent variable CHG_PER_COMSTK to examine the SUE and SURGE.

In the Panel A of Table VIII, in the second model, which add the SUE_PRE_1QR to SUE_PRE_4QR, SURGE_PRE_1QR to SURGE_PRE_4QR and HPR_PRE_1YR as new control variables, CHG_PER_COMSTK are all insignificant. In addition, I could also realize that SURGE in the previous quarter have relationship with SURGE(Q) to SURGE(Q+4) as I observed in the Panel of the Table VI. Except for the SUE_PRE_4QR, however, the SUE in the previous quarter is relatively insufficient to predict the next few couple of SUE.

(Insert Table VIII Here.)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

The significance in SURGE(Q) to SURGE(Q+2) become insignificant in the model two, and I only find result in small firms has statistical significance in SURGE(Q+2). The result indicate that the relationship seems to be partially explained by SUE and SURGE in the previous quarter and HPR_PRE_1YR in the Panel B. According to the result of the Panel C, I could also find that the significance has been decreased in the model two, which is much like the result in the Panel B. Only the coefficients of SURGE(Q+1) and SURGE(Q+3) are significant in this situation.

In the Panel A of the Table IX, all the coefficients turn insignificant from model one to model two. Then, I turn the spotlight on the Panel B, only CHG_PER_COMSTK in the small firms embrace the positive and significant relationship with SUE(Q+2). After further controlling for the previous SUE, SURGE and stock returns, the result of Panel C shows that only relationship with SUE(Q+3) in the value firms is negative and significant.

(Insert Table IX Here.)

In short, PER_COMSTK has some sort of capacity of predicting the SURGE(Q+2), SURGE (Q+4), SUE(Q) and SUE(Q+3), which means that the participants likely own some kinds of insider information to contribute more in the company stock. The relationship with SURGE in the Panel A is negative, but that with SUE in the Panel A shows an ambiguous pattern that relationships are positive and significant in the next few quarters and then turns negative.

In addition, I could also find a conclusion that the if I use CHG_PER_COMSTK as independent variable, the significance of the coefficient in SURGE is a little bit greater in that of in SUE after I control for the effect of previous SURGE, SUE, and the stock returns. The second conclusion is consistent with the expectation because

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

SURGE is much easier to predict for participants, but the SUE might be more likely inconsistent with participants' prediction under the circumstance of existing earnings management, complex cost structure, or any other factor that broadens the gap between earnings and revenue.

The results of PER_COMSTK and CHG_PER_COMSTK indicate that participants in the value and small firms have the ambiguous pattern I have mentioned above and coefficients that are quite significant, which means that participants in the small or value firms possess the good forecasting performance in the contemporary or following SUE and SURGE.

5.2 Operating Performance

In this section, I want to examine if the capability of forecasting SUE and SURGE could pass to the capability of forecasting operating performance in the asset and equity basis as ROA, ROE, Asset Turnover, Equity Turnover.

I examine the relationship between PER_COMSTK and the operating performance variables in the Table X. In Panel A, the coefficient of ROA_NI, ROA_EBIT and Asset Turnover is 0.0407, 0.0524 and 0.2402, respectively. The significance of these coefficients, whose p-value is <0.0001, is also quite obvious. However, if I turn the spotlight to the equity-based variables like ROE_NI, ROE_EBIT and Equity Turnover, the coefficients are all insignificant. The results are inconsistent with the hypothesis because it seems that the participants are obsessed with stronger predicting capacity to asset-based operating performance proxies.

(Insert Table X Here.)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

In the Panel B, the result in the large firms mixed that the coefficient of ROA _NI and ROE_EBIT keep positive and significant, but that of Equity Turnover turns negative and significant. In the result in the small firms, the estimators of ROA_NI, ROA_EBIT, ROE_NI, Asset Turnover and Equity Turnover are all significant and positive. The result implicates, in a certain sense, that the participant in the small firms could predict the improvement of operating performance of companies, or that effect could transfer into the enhanced operating performance. The result in the Panel B that coefficient in the small firms has stronger significance than in the large ones also meet our expectation because the structural simplicity of small firms obviously decreases the difficulty of forecasting the change of operating performance for participants.

Then I turn our focus to the different type of the firms. ROA_NI, ROA_EBIT, ROE_NI, ROE_EBIT, Asset Turnover and Equity Turnover in the value firms is 0.0514, 0.0555, 0.1199, 0.1027, 0.2580 and 0.3150, respectively. Except for the Equity Turnover, even in the model two, the rest of the relationship between independent and dependent variables is positive and significant. Nevertheless, only the coefficient of ROA_NI, ROA_EBIT and Equity Turnover in the growth firms is statistically significant. Surprisingly, Equity Turnover in the growth firms is negative, indicating that PER_COMSTK becomes an inverse variable.

In the Table XI, I find that only the relationship between CHG_PER_COMSTK and operating performance proxies like ROA_NI is still significant in the model two. The rest of the coefficients turn insignificant from model one to model two. I observe the similar result with that in the Panel A in the sub-sample of large or small firms. The result implicates that the firm size is large or not has not much to do with the operating performance proxies. According to the result of Panel C in the model two, the coefficient of ROA_NI, ROA_EBIT, ROE_NI, ROE_EBIT, Asset Turnover and

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Equity Turnover in the value firms and model two is 0.0002, 0.0033, -0.0009, 0.0069, 0.0115 and 0.0501, and all of them are statistically insignificant. Interestingly, I find that the only exception in the sub-sample of growth firms is the coefficient of ROA_EBIT, which is negative and significant.

(Insert Table XI Here.)

In summary, I find PER_COMSTK has positive and significant relationship with most of the operating performance, especially those proxies calculated on the basis of asset, like ROA_NI, ROA_EBIT and Asset Turnover. In surprises, a little bit different from the full sample model, the relationships with the operating performance in the small or value firms not only embrace significance of the asset-based proxies, but also that of equity-based proxy like ROE_EBIT.

As for the result of CHG_PER_COMSTK, in the model one, I find that relationship is significant with revenue-based and equity-based operating performance proxies as I expect in the previous section.

Unfortunately, after I control for the effect of past returns, I find no obvious evidence to prove the relationship between extra allocation to company stock and operating performance in Table XI. Due to the result of Panel B and Panel C, the situation has no any difference, even if I further examine the relationship by two class of firm size and book-to-market ratio.

5.3 Stock Return Performance

At last section of empirical result, I am desired to examine if the effect of positive revenue surprises, earnings surprises and operating performance could be

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

further turned into positive company stock returns. Consequently, I use the HPR_FOL_3MON to HPR_FOL_1YR to demonstrate the holding period return from 3 months to 1 year.

Unexpectedly, based on the result of Panel A of Table XII, PER_COMSTK seems not to be correlated with all the holding period returns. Besides, I also find no statistical significance in the coefficient in the Panel B and Panel C.

(Insert Table XII Here.)

Furthermore, I find that HPR_PRE_1YR shows no significance in all of the regression results, which means that the past return performance has no momentum effect. The conclusion that past returns performance is not a guarantee to the future returns performance is consistent with the Patel, Zeckhauser, and Hendricks (1991) and Jain and Wu (2000). Unfortunately, I do not further examine that if positive stock returns would lead to the increase of allocation to the company stocks.

In the Table XIII, I replace PER_COMSTK with CHG_PER_COMSTK to show the effect of ratio change. In the Panel A, I find that only the relationship with HPR_FOL_1YR turns larger and more significant, and the other coefficients stay insignificant from model one to model two. In the Panel B, all the coefficients in the small firms have no significance, and that in the large firms only show significance in the relationship with HPR_FOL_1YR, which resembles the result in the Panel A. Interestingly, in the Panel C, coefficients in the growth firms are significant in all the different length of holding period. On the contrary, the coefficients in the value firms show no statistical significance, which is inconsistent with the hypothesis.

(Insert Table XIII Here.)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Same as the model two I use in last examination, most of the stock performance in the past to capture the effect of momentum has not much significance, supporting the conclusion that the past return performance has little relationship with the future return performance again.

All these results above indicate the fact that even if the participants try to increase their holding of company stocks based on their insider information and precisely forecast the pattern of SUE and SURGE or the improvement of operating performance, they can mostly forecast the holding period return for one year. Unfortunately, most of the relationship of PER_COMSTK and CHG_PER_COMSTK in the small or value firms shows little significance, which means that the relationship with SUE, SURGE and operating performance I find in the previous section might fail to transfer into the positive and significant holding period return.

6. Conclusion

Given that the DC plans around the world gradually hit the road, the desire of how they work and what they contribute to our society turns critical for researchers and the authorities. I try to put another puzzle by the finding in the paper to further complete the whole picture of 401(k) plans to offer any idea usable for the lawmakers or the authorities.

I have several conclusions in the paper. First of all, I could observe a pattern that contemporary SUE(Q) are positive and significant, and SUE(Q+1), SUE(Q+2) become insignificant; at last, the SUE(Q+3) turn negative and significant.

Secondly, I also find a conclusion that the if I use CHG_PER_COMSTK as independent variable, the significance of the coefficient in SURGE is a little bit greater in that of in SUE, which is straightforward because the earnings management,

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

complexity of cost structure or any other related factor that broaden the gap between revenue and earnings could make the difficulty of forecasting earnings higher than that of forecasting revenue for participants. Furthermore, the result of CHG_PER_COMSTK also indicates that participants in the value and small firms have the pattern I have mentioned above and coefficient quite significant, which means that these participants possess the good forecasting performance in the contemporary or following SUE and SURGE.

Thirdly, I find PER_COMSTK in small or value firms have positive and significant relationship with most of the operating performance, especially those proxies calculated on the basis of asset, like ROA_NI, ROA_EBIT and Asset Turnover. However, I find no clear relationship between CHG_PER_COMSTK and all the operating performance proxies.

Lastly, the results indicate the fact that even if the participants try to increase their holding of company stocks (CHG_PER_COMSTK) based on their insider information and precisely forecast the pattern of SUE and SURGE or the improvement of operating performance, they can only forecast the holding period return for one year. Unfortunately, majority of the relationship of PER_COMSTK and CHG_PER_COMSTK in the small or value firms shows little significance, which means that the relationship with SUE, SURGE and operating performance I find in the previous section might fail to transfer into the positive and significant holding period return.

Obviously, there is still large space to improve in the paper that might be the clues for future research. Under the circumstances that the position of participants is available, if I could further examine the different effect to employers and employees, I believe the story would be a little bit different and interesting. Besides, I utilize CHG_PER_COMSTK controlled for one-year return to exclude the effect of past

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

returns. If I could substitute the market return for the real return or cash inflow if the plans, the conclusion might be much more robust.

Recently, I observe that more and more retirement plans are on the path toward defined contribution in Taiwan. For example, the newly amended labor pension plans and retirement plans in the private school have been implemented, and the other retirement plans are still drawn up by the authorities. As I have mentioned above, defined contribution offers autonomy and flexibility, but I disagree that defined contribution plans are substitute for defined benefit plans. In the previous literature, lots of investment behavior biases have been observed, even though the participants who follow the recommendation of financial advisors are still under the attack of sub-prime mortgage financial crisis and dot com bubble. Consequently, the autonomy of defined contribution plans is a two-edged sword.

In my opinion, the DC plans should be the complement to DB plans. The participants should balance their contribution to DC and DB plans based on their risk preference and tolerance. As for the authorities, they should not set aside all the risk of promised returns only because they fear to take the responsibility of DB plans defaulted or suspended, which would put the participants in extreme danger of losing retirement plans and social problems. Besides, the authorities should enhance the financial knowledge of the participants and transparentize the related information. After all, the autonomy based on the misunderstanding or incomprehension is meaningless and unnecessary.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

7. References

Agnew, J. (2006). Do Behavioral Biases Vary across Individuals? Evidence from Individual Level 401(k) Data. *Journal of Financial and Quantitative Analysis, 41* (4), 939-962.

Benartzi, S. (2001). Excessive Extrapolation and the Allocation of 401(k) Accounts to Company Stock. *The Journal of Finance, 56* (5), 1747-1764.

Benartzi, Shlomo, and Richard H. Thaler. (2001). Naive Diversification Strategies in Defined Contribution Saving Plans. *American Economic Review, 91* (1), 79-98.

Ghosh, A., Gu, Z., and Jain, P. C. (2005). Sustained Earnings and Revenue Growth, Earnings Quality, and Earnings Response Coefficients. *Review of Accounting Studies, 10* (1), 33-57.

Huberman, G., and Jiang, W. (2006). Offering versus Choice in 401(k) Plans: Equity Exposure and Number of Funds. *The Journal of Finance, 61* (2), 763-801.

John Hancock Financial Services. (1999). *The Sixth Defined Contribution Plan Survey.*

Jain, P. C., and Wu, J. S. (2000). Truth in Mutual Fund Advertising: Evidence on Future Performance and Fund Flows. *The Journal of Finance, 55* (2), 937-958.

Kayhan, A., and Titman, S. (2007). Firms' Histories and Their Capital Structures. *Journal of Financial Economics, 83* (1), 1-32.

Jagadeesh, N., and Livnat, J. (2006). Revenue Surprises and Stock Returns. *Journal of Accounting and Economics, 41* (1-2), 147-171.

Patel, J., Zeckhauser, R., and Hendricks, D. (1991). The Rationality Struggle: Illustrations from Financial Markets. *The American Economic Review, 81* (2), 232-236.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table I

Comparison of traditional 401(k) and Roth 401(k) plans

	Traditional 401(k)	Roth 401(k)
Tax Rule	Wages are contributed before taxes from each paycheck, like a deferred salary. Taxable income drops by the amount you contribute. You pay income taxes on contributions and earnings upon withdrawal.	Contributions are made with money that's already been taxed. No taxes paid upon withdrawal.
Withdrawal Rule	No access to your funds before age 59.5 or if you leave your employer at age 55 or older. If you dip in early, expect a 10% penalty — on top of the usual tax bill.	Better flexibility: free access to your money as long as you've held the account for 5 years.
Loans	When still employed with employer setting up the 401(k), loans may be available depending upon the plan, not more than 50% of balance or $50,000	

Table II

Contribution Limit Over Time

	2018 Tax Year	2017 Tax Year	2016 Tax Year
Elective Deferrals	**$18,500**	$18,000	$18,000
Total Contributions	**$55,000**	$54,000	$53,000
Catch-up Contributions (in addition to the above limits)	**$6,000**	$6,000	$6,000

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table III

Data Selection

The original number of yearly sample data is 20,337, and that of quarterly sample data is 55,006. I exclude financials from the sample because the revenue of financial firms are not comparable with those of industrial firms caused from totally different business and financial risk. Besides, I exclude utilities from the sample since their revenue growth pattern are basically more predictable than those for industrial firms. Finally, I also exclude all firms with stock prices below $5 on the day before the earnings announcement date to avoid the small, thinly traded stocks which investors are unlikely to notice and have the potential problem of illiquidity. The adjusted number of yearly and quarterly sample data would be 11,595 and 35,170, respectively.

Yearly data	
Original 401(k) plans	20,337
Financials	(5,974)
Utilities	(1,105)
Thinly traded	(1,663)
Adjusted 401(k) plans	11,595
Quarterly data	
Original 401(k) plans	55,006
Financials	(12,988)
Utilities	(2,798)
Thinly traded	(4,050)
Adjusted 401(k) plans	35,170

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table IV
Summary Statistics

I use North America Fundamental Annual and Quarterly file from COMPUSTAT to collect the data regarding income statement and balance sheet, including total assets, total liabilities, earnings per share, and so on. Then, I get the stock prices and returns excluded dividends from CRSP database. I collect the 401(k) plans data, such as total investments of the plans(TTIVM) and the company stocks held by employees in the plans(COMSTK), from the 11-K with SEC EDGAR. The LN_MKV is calculated by taking log of MKV, which is defined as daily close price or bid/ask average price of stocks times the shares of outstanding. To get the book-to-market ratio(BMR), I divided the book equity(BE) by market value of company stock(MKV). The total book equity is calculated by subtracting the total liabilities from total assets, and then I need to adjust the tax effect by adding TXDB(deferred taxes) , ITCB(investments tax credit) and BVPS(book value of preferred stocks) to the formula. The PER_COMSTK means the ratio of company stocks held by employees over the total investment of 401(K) plans. And the CHG_PER_COMSTK would be the growth rate of company stocks held by employees over the total investment of 401(K) plans in the year over year basis. The holding period return is also straightforward. I calculate the variable by multiplying each of pervious or following holding period returns ROA_NI and ROA_EBIT is calculated by net earnings and EBIT divided by the total assets in the previous one year-ended data, respectively. As for ROE_NI and ROE_EBIT, I switch the denominator to the previous one year-ended total book equity that I defined in the BMR. The Asset Turnover and Equity Turnover, I use the formula as revenue divided by the total assets and total book equities in the previous one ended data. SUE and SURGE are defined as revenue surprises and earnings surprises. To eliminate the effect of outliers, I winsorize the sample data of for top and bottom 2.5%. The sample period is 1993-2016.

Variable		N	Mean	Std. Dev	Minimum	Q1	Median	Q3	Maximum
					Yearly Data				
TTIVM		11,595	916,372,105	2,967,948,417	0	44,414,571	150,838,504	527,788,352	48,480,685,000
COMSTK		11,595	221,218,480	1,018,539,886	0	3,398,235	16,687,876	83,689,202	24,079,309,397
LN_MKV		11,595	7.48	1.76	4.11	6.25	7.37	8.63	11.40
BMR		11,584	58.26%	40.38%	7.28%	29.82%	48.04%	75.65%	185.60%
PER_COMSTK		11,570	19.00%	19.24%	0.00%	5.50%	12.81%	26.02%	100.00%
CHG_PER_COMSTK		9,749	2.97%	38.00%	-59.50%	-17.38%	-2.91%	13.40%	148.17%
HPR_FOL_3MON		11,588	3.25%	17.13%	-34.94%	-7.13%	2.97%	13.50%	44.30%
HPR_FOL_6MON		11,574	6.51%	23.83%	-41.87%	-8.58%	4.81%	19.65%	70.74%
HPR_FOL_9MON		11,520	5.14%	31.30%	-56.72%	-15.27%	3.33%	22.64%	88.19%
HPR_FOL_1YR		11,283	10.53%	38.54%	-65.57%	-14.41%	8.54%	31.50%	112.95%
HPR_PRE_3MON		11,594	6.91%	19.46%	-36.82%	-4.63%	6.42%	17.66%	56.39%
HPR_PRE_6MON		11,594	5.65%	27.13%	-49.05%	-12.18%	4.82%	21.02%	76.13%
HPR_PRE_9MON		11,594	11.46%	37.84%	-52.57%	-13.21%	6.47%	28.43%	127.90%
HPR_PRE_1YR		11,594	15.14%	41.81%	-56.52%	-12.50%	10.41%	34.99%	141.14%
ROA_NI		11,594	6.04%	8.17%	-13.92%	1.57%	5.45%	9.70%	30.75%
ROA_EBIT		11,594	11.82%	10.43%	-5.75%	5.55%	10.11%	15.69%	49.62%
ROE_NI		11,582	14.07%	25.00%	-45.21%	3.57%	11.65%	20.31%	109.23%
ROE_EBIT		11,582	29.46%	38.06%	-30.06%	11.45%	22.13%	35.12%	195.93%
Asset Turnover		11,575	128.61%	78.34%	26.20%	74.08%	111.48%	160.92%	373.62%
Equity Turnover		11,575	346.01%	314.07%	28.17%	157.42%	254.03%	403.00%	1557.79%
					Quarterly data				
SUE	Q+1	8,824	-1.44	4.82	-12.68	-4.13	-1.04	1.28	11.43
	Q+2	8,788	-0.02	4.24	-12.68	-2.42	0.11	2.35	11.43
	Q+3	8,693	-0.12	4.73	-12.68	-2.76	0.11	2.63	11.43
	Q+4	8,584	0.49	5.13	-12.68	-2.30	0.62	3.34	11.43
	Total	34,889	-0.28	4.79	-12.68	-2.95	-0.07	2.40	11.43

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table IV—*Continued*

SURGE	Q+1	8,843	-1.77	5.43	-14.71	-4.90	-1.64	1.42	13.14
	Q+2	8,804	-0.11	4.59	-14.71	-2.89	0.03	2.66	13.14
	Q+3	8,698	-1.04	5.27	-14.71	-3.82	-0.77	2.10	13.14
	Q+4	8,580	0.65	5.88	-14.71	-2.49	0.81	3.97	13.14
	Total	34,925	-0.57	5.39	-14.71	-3.58	-0.40	2.50	13.14
TTIVM		35,170	937,884,379	3,041,878,002	0	45,925,471	156,107,290	527,774,140	48,480,685,000
COMSTK		35,170	230,841,324	1,020,617,651	0	3,765,958	17,605,176	87,865,167	24,079,309,397
LN_MKV		35,170	7.45	1.77	4.05	6.21	7.36	8.60	11.36
BMR		35,170	57.43%	39.84%	7.22%	29.29%	47.59%	74.25%	183.65%
PER_COMSTK		35,093	19.71%	19.88%	0.00%	5.74%	13.19%	26.97%	100.00%
CHG_PER_COMSTK		29,723	1.73%	33.06%	-55.25%	-16.85%	-2.81%	12.43%	120.33%
HPR_FOL_3MON		35,158	2.96%	16.84%	-34.48%	-7.19%	2.77%	13.16%	42.86%
HPR_FOL_6MON		35,147	6.15%	23.25%	-41.59%	-8.59%	4.48%	19.05%	68.52%
HPR_FOL_9MON		35,067	4.93%	30.48%	-54.88%	-14.98%	3.19%	22.22%	86.40%
HPR_FOL_1YR		34,646	10.74%	37.80%	-63.30%	-13.71%	8.63%	30.92%	112.39%
HPR_PRE_3MON		35,166	7.43%	22.63%	-83.93%	-4.48%	6.37%	17.40%	302.70%
HPR_PRE_6MON		35,166	5.56%	26.66%	-48.03%	-11.95%	4.78%	20.71%	75.06%
HPR_PRE_9MON		35,166	11.23%	36.91%	-51.99%	-12.83%	6.56%	27.85%	123.42%
HPR_PRE_1YR		35,166	14.64%	40.55%	-55.11%	-12.00%	10.01%	33.62%	136.71%
ROA_NI		35,170	6.07%	7.75%	-12.90%	1.74%	5.61%	9.72%	28.87%
ROA_EBIT		35,170	11.67%	9.40%	-4.72%	5.74%	10.33%	15.65%	42.86%
ROE_NI		35,150	14.42%	24.05%	-39.43%	4.08%	11.95%	20.53%	107.22%
ROE_EBIT		35,150	29.56%	36.48%	-26.49%	11.85%	22.48%	35.43%	188.52%
Asset Turnover		35,152	128.82%	74.07%	28.77%	78.19%	113.33%	159.46%	362.31%
Equity Turnover		35,127	348.64%	312.18%	33.97%	164.79%	258.56%	401.80%	1566.03%

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table V

Table of Sign Predicted

Based on the hypothesis, the two independent variables PER_COMSTK and CHG_PER_COMSTK should have positive and significant relationship with SURGE. But I doubt the variables above have the same relationship with SUE as that with SURGE because the gap between the earnings and revenue might be broaden by the effect of earnings management, complex cost structure, or any other possible mechanism. In addition, according to the Jegadeesh and Livnat (2006), contemporary SUE and abnormal returns have a positive and significant relationship with the SUE and SURGE in the previous one quarter, but it shows a negative and significant relationship with the SUE and SURGE in the previous fourth quarter. As for the operating performance, I believe that the two independent variables have relatively stronger and more robust relationship with the revenue-based and equity-based operating performance proxies, like ROE and Equity Turnover. But The revenue-based and asset-based effects might be mixed in the result of Asset Turnover, making the sign unpredictable. I believe the connection between SUE, SURGE and the two independent variables is solid enough to be well transferred into positive stock returns. Therefore, the two independent variables should show positive and robust relationship with holding period returns in the short run, but the ones in the long run might show the insignificant or negative relationship, which is the characteristic of mean-reverting.

	SURGE	SUE	ROA	ROE	Asset Turnover	Equity Turnover	HPR
PER_COMSTK	+	?	?	+	?	+	+
CHG_PER_COMSTK	+	?	?	+	?	+	+
SUE_PRE_1QR	?	+	?	?	?	?	+
SUE_PRE_4QR	?	-	?	?	?	?	-
SURGE_PRE_1QR	?	+	?	?	?	?	+
SURGE_PRE_1QR	?	-	?	?	?	?	-

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VI
Revenue Surprises and the Percentage of Company Stock / Total Investment in the Plans

The dependent variables in the regression are contemporary revenue surprises, or SURGE(Q), to the next fourth quarterly revenue surprises, or SURGE(Q+4). The main independent variable that I want to examine would be the percentage of company stock / total investment in the plans (PER_COMSTK). The model shown on the left-hand side in each of the regression include book-to-market ratio (BMR) and market value of firms (LN_MKV) as control variables. According to Jegadeesh and Livnat (2006), the previous SUE and SURGE have relationship with the contemporary and future ones, so I add SUE_PRE_1QR to SUE_PRE_4QR and SURGE_PRE_1QR to SURGE_PRE_4QR as control variables in this regression. I also put control variables HPR_PRE_1YR into the second model on the right-hand side to exclude the effect of past stock returns performance.

	Panel A									
	SURGE (Q)		SURGE (Q+1)		SURGE (Q+2)		SURGE (Q+3)		SURGE (Q+4)	
PER_COMSTK	1.0231	0.3900	-0.5885	-0.9096	-1.1632 **	-0.9352 *	-0.8546	-0.4477	-1.3804 **	-1.0635 *
	(0.1361)	(0.5371)	(0.3264)	(0.105)	(0.0386)	(0.0627)	(0.1618)	(0.4116)	(0.0274)	(0.0661)
BMR	-0.7696 ***	-0.1350	-1.0812 ***	-0.5829 **	-0.7964 ***	-0.1667	-0.2936	0.1044	0.2265	-0.0835
	(0.0031)	(0.5897)	(<.0001)	(0.0113)	(0.0003)	(0.4218)	(0.2226)	(0.6422)	(0.3624)	(0.7288)
LN_MKV	-0.6757 ***	-0.6424 ***	-0.8264 ***	-0.7272 ***	-1.0571 ***	-0.7329 ***	-0.9951 ***	-0.6617 ***	-1.0121 ***	-0.7449 ***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
SUE_PRE_1QR		0.0354 **		0.0128		-0.0155		-0.0094		0.0122
		(0.0239)		(0.3362)		(0.1992)		(0.5103)		(0.3986)
SUE_PRE_2QR		0.0124		-0.0214		-0.0034		0.0395 ***		0.0102
		(0.4633)		(0.1059)		(0.7699)		(0.0031)		(0.5021)
SUE_PRE_3QR		-0.0323 **		-0.0201		-0.0120		0.0041		-0.0110
		(0.0451)		(0.1676)		(0.3137)		(0.7421)		(0.4396)
SUE_PRE_4QR		0.0420 ***		0.0548 ***		0.0312 **		0.0404 ***		0.0319 **
		(0.0069)		(0.0001)		(0.0166)		(0.0017)		(0.025)
SURGE_PRE_1QR		0.2672 ***		0.2364 ***		0.3973 ***		0.3788 ***		0.2657 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_2QR		0.1307 ***		0.1514 ***		0.0605 ***		0.0979 ***		0.1290 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_3QR		-0.3452 ***		-0.2975 ***		-0.2542 ***		-0.3015 ***		-0.3348 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_4QR		0.1983 ***		0.1774 ***		0.1577 ***		0.1531 ***		0.1951 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
HPR_PRE_1YR		0.9317 ***		0.6659 ***		0.3534 ***		0.1417		-0.4598 ***
		(<.0001)		(<.0001)		(0.0067)		(0.3096)		(0.0016)
Year effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2	0.62	0.68	0.64	0.69	0.55	0.66	0.61	0.69	0.69	0.74

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VI—*Continued*

Panel B

		SURGE (Q)	SURGE (Q+1)	SURGE (Q+2)	SURGE (Q+3)	SURGE (Q+4)
PER_COMSTK	Large	0.1878 (0.8457)	-0.7215 (0.3971)	-0.7767 (0.3637)	-0.6806 (0.3768)	-0.2864 (0.7142)	-0.2865 (0.6674)	0.1675 (0.8482)	-0.1742 (0.8152)	-2.1060 ** (0.0202)	-2.1435 *** (0.0078)
	Small	2.0088 * (0.0923)	2.1341 ** (0.0347)	0.8413 (0.4287)	-0.7865 (0.382)	-2.8047 *** (0.0057)	-3.2631 *** (<.0001)	-1.0870 (0.312)	-0.5662 (0.5141)	-0.9995 (0.3594)	0.1010 (0.9116)
BMR	Large	0.4918 (0.3701)	0.5929 (0.1496)	-0.2994 (0.5638)	0.1380 (0.7267)	-0.9087 * (0.0564)	-0.2098 (0.5402)	-0.6901 (0.194)	-0.0086 (0.982)	0.7225 (0.1938)	0.1372 (0.7444)
	Small	-1.3416 *** (0.0024)	-0.9954 *** (0.0049)	-1.2874 *** (0.0009)	-0.9633 *** (0.0022)	-0.4378 (0.2403)	-0.0398 (0.8911)	0.0805 (0.8364)	0.1491 (0.6281)	0.8325 ** (0.0398)	-0.1099 (0.7373)
LN_MKV	Large	-0.5178 ** (0.0299)	-0.3419 * (0.0882)	-0.9249 *** (<.0001)	-0.8241 *** (<.0001)	-1.1794 *** (<.0001)	-0.8627 *** (<.0001)	-1.3532 *** (<.0001)	-0.9242 *** (<.0001)	-0.8798 *** (0.0003)	-0.5372 *** (0.0095)
	Small	-1.2709 *** (<.0001)	-1.1751 *** (<.0001)	-0.8546 *** (0.0003)	-0.7198 *** (0.0003)	-1.0164 *** (<.0001)	-0.5987 *** (0.0011)	-0.6723 *** (0.0052)	-0.5325 *** (0.0062)	-0.8996 *** (0.0003)	-0.7952 *** (0.0001)
SUE_PRE_1QR	Large		0.0371 * (0.078)		0.0159 (0.3777)		-0.0067 (0.6768)		-0.0192 (0.328)		0.0238 (0.2443)
	Small		0.0478 * (0.0514)		0.0033 (0.874)		-0.0266 (0.1634)		-0.0052 (0.8121)		-0.0037 (0.8655)
SUE_PRE_2QR	Large		0.0013 (0.9555)		-0.0296 (0.1028)		0.0083 (0.5824)		0.0481 *** (0.0086)		0.0211 (0.3236)
	Small		0.0267 (0.3163)		-0.0103 (0.6204)		0.0000 (0.9999)		0.0296 (0.15)		0.0186 (0.4219)
SUE_PRE_3QR	Large		-0.0473 ** (0.0289)		-0.0378 * (0.0638)		-0.0179 (0.2542)		0.0190 (0.2594)		-0.0266 (0.1787)
	Small		-0.0333 (0.1918)		-0.0155 (0.4881)		0.0007 (0.9701)		-0.0130 (0.5147)		-0.0171 (0.4303)
SUE_PRE_4QR	Large		0.0309 (0.1377)		0.0516 *** (0.009)		0.0341 ** (0.0483)		0.0345 ** (0.047)		0.0290 (0.1433)
	Small		0.0552 ** (0.0241)		0.0569 *** (0.0091)		0.0152 (0.4575)		0.0307 (0.1244)		0.0203 (0.3518)
SURGE_PRE_1QR	Large		0.2330 *** (<.0001)		0.2039 *** (<.0001)		0.3880 *** (<.0001)		0.3962 *** (<.0001)		0.2442 *** (<.0001)
	Small		0.3392 *** (<.0001)		0.2961 *** (<.0001)		0.4161 *** (<.0001)		0.3877 *** (<.0001)		0.3027 *** (<.0001)
SURGE_PRE_2QR	Large		0.1496 *** (<.0001)		0.1746 *** (<.0001)		0.0454 *** (0.0045)		0.0789 *** (<.0001)		0.1414 *** (<.0001)
	Small		0.0954 *** (0.0005)		0.1145 *** (<.0001)		0.0751 *** (<.0001)		0.0953 *** (<.0001)		0.1195 *** (<.0001)
SURGE_PRE_3QR	Large		-0.3540 *** (<.0001)		-0.2844 *** (<.0001)		-0.2297 *** (<.0001)		-0.3064 *** (<.0001)		-0.3389 *** (<.0001)
	Small		-0.3285 *** (<.0001)		-0.3051 *** (<.0001)		-0.2801 *** (<.0001)		-0.2815 *** (<.0001)		-0.3264 *** (<.0001)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VI—*Continued*

SURGE_PRE_4QR	Large		0.1948 *** (<.0001)		0.1739 *** (<.0001)		0.1314 *** (<.0001)		0.1581 *** (<.0001)		0.1882 *** (<.0001)
	Small		0.1683 *** (<.0001)		0.1617 *** (<.0001)		0.1377 *** (<.0001)		0.1179 *** (<.0001)		0.1742 *** (<.0001)
HPR_PRE_1YR	Large		1.4348 *** (<.0001)		1.0214 *** (<.0001)		0.8060 *** (<.0001)		0.0368 (0.8646)		-0.2044 (0.3723)
	Small		0.3715 * (0.0945)		0.4516 ** (0.0224)		0.1589 (0.3822)		0.2693 (0.1565)		-0.5346 *** (0.0064)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2(L/S)		0.68 / 0.66	0.70 / 0.69	0.71 / 0.65	0.72 / 0.68	0.61 / 0.61	0.67 / 0.67	0.67 / 0.65	0.72 / 0.69	0.75 / 0.70	0.77 / 0.72

Panel C

		SURGE (Q)		SURGE (Q+1)		SURGE (Q+2)		SURGE (Q+3)		SURGE (Q+4)	
PER_COMSTK	Value	0.5316 (0.616)	-0.2699 (0.7781)	-0.0894 (0.9285)	-0.6104 (0.5063)	-1.8374 ** (0.0471)	-1.7394 ** (0.0342)	-0.2159 (0.8307)	0.4108 (0.6489)	-0.8347 (0.4129)	-0.4239 (0.6509)
	Growth	1.0189 (0.3344)	0.8846 (0.3697)	-0.3744 (0.6777)	-0.9399 (0.2716)	-0.8898 (0.291)	-0.7399 (0.3232)	-0.2529 (0.7845)	0.0703 (0.9321)	-1.8177 * (0.0579)	-1.6474 * (0.0653)
BMR	Value	-0.3011 (0.4196)	0.5226 (0.1407)	-0.7511 ** (0.0266)	-0.5598 * (0.0889)	-0.1540 (0.6273)	0.3341 (0.2582)	0.0746 (0.8278)	0.2749 (0.3936)	1.0084 *** (0.004)	0.5684 * (0.0932)
	Growth	-3.2305 *** (0.0035)	-1.8921 * (0.0756)	-2.8815 *** (0.0039)	-1.7899 * (0.0668)	-3.7402 *** (<.0001)	-1.9884 ** (0.0209)	-0.7981 (0.4347)	0.6822 (0.4672)	-0.0369 (0.9727)	-0.2091 (0.8402)
LN_MKV	Value	-0.9015 *** (0.0005)	-0.9037 *** (0.0001)	-0.6746 *** (0.0034)	-0.7366 *** (0.0005)	-1.0258 *** (<.0001)	-0.6534 *** (0.0006)	-0.4467 * (0.0551)	-0.1255 (0.5464)	-0.9874 *** (<.0001)	-0.8391 *** (0.0001)
	Growth	-0.8600 *** (0.0007)	-0.7676 *** (0.0012)	-1.1454 *** (<.0001)	-0.9393 *** (<.0001)	-1.2248 *** (<.0001)	-0.8266 *** (<.0001)	-1.5233 *** (<.0001)	-1.1667 *** (<.0001)	-0.9307 *** (0.0004)	-0.6700 *** (0.007)
SUE_PRE_1QR	Value		0.0274 (0.2403)		-0.0011 (0.9577)		-0.0126 (0.5019)		0.0122 (0.5743)		0.0319 (0.1286)
	Growth		0.0478 ** (0.0413)		0.0188 (0.3374)		-0.0050 (0.7708)		-0.0288 (0.1786)		0.0057 (0.8027)
SUE_PRE_2QR	Value		-0.0186 (0.4686)		-0.0346 * (0.0864)		-0.0404 ** (0.0259)		0.0646 *** (0.002)		-0.0064 (0.7758)
	Growth		0.0135 (0.5909)		-0.0121 (0.5439)		0.0415 ** (0.0127)		0.0176 (0.3643)		0.0295 (0.2152)
SUE_PRE_3QR	Value		-0.0086 (0.7247)		-0.0107 (0.631)		0.0192 (0.2885)		-0.0063 (0.7504)		-0.0076 (0.7242)
	Growth		-0.0587 ** (0.0144)		-0.0243 (0.2678)		-0.0203 (0.2478)		0.0172 (0.346)		-0.0336 (0.115)
SUE_PRE_4QR	Value		0.0535 ** (0.0232)		0.0733 *** (0.0008)		-0.0059 (0.7648)		0.0213 (0.2775)		0.0470 ** (0.0295)
	Growth		0.0395 * (0.0844)		0.0180 (0.4025)		0.0509 *** (0.0074)		0.0488 *** (0.0096)		0.0237 (0.2695)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VI—*Continued*

SURGE_PRE_1QR	Value	0.3339 *** (<.0001)		0.2884 *** (<.0001)		0.4131 *** (<.0001)		0.4106 *** (<.0001)		0.2942 *** (<.0001)	
	Growth	0.2216 *** (<.0001)		0.2049 *** (<.0001)		0.4084 *** (<.0001)		0.3876 *** (<.0001)		0.2550 *** (<.0001)	
SURGE_PRE_2QR	Value	0.1386 *** (<.0001)		0.1475 *** (<.0001)		0.0957 *** (<.0001)		0.0874 *** (<.0001)		0.1446 *** (<.0001)	
	Growth	0.1461 *** (<.0001)		0.1638 *** (<.0001)		0.0189 (0.2853)		0.0775 *** (0.0002)		0.1239 *** (<.0001)	
SURGE_PRE_3QR	Value	-0.3407 *** (<.0001)		-0.3512 *** (<.0001)		-0.2547 *** (<.0001)		-0.2755 *** (<.0001)		-0.3376 *** (<.0001)	
	Growth	-0.3333 *** (<.0001)		-0.2484 *** (<.0001)		-0.2527 *** (<.0001)		-0.3141 *** (<.0001)		-0.3246 *** (<.0001)	
SURGE_PRE_4QR	Value	0.1156 *** (<.0001)		0.1570 *** (<.0001)		0.1295 *** (<.0001)		0.1163 *** (<.0001)		0.1425 *** (<.0001)	
	Growth	0.1973 *** (<.0001)		0.1574 *** (<.0001)		0.1208 *** (<.0001)		0.1322 *** (<.0001)		0.1819 *** (<.0001)	
HPR_PRE_1YR	Value	1.3646 *** (<.0001)		0.4178 * (0.0693)		0.3764 * (0.0682)		0.1304 (0.5567)		-0.2753 (0.2228)	
	Growth	0.5978 ** (0.0142)		0.9140 *** (<.0001)		0.3796 * (0.0517)		0.3422 (0.1054)		-0.1777 (0.4326)	
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj.R^2(V/G)		0.65 / 0.69	0.72 / 0.73	0.60 / 0.71	0.71 / 0.74	0.61 / 0.61	0.70 / 0.70	0.62 / 0.68	0.70 / 0.75	0.71 / 0.75	0.75 / 0.79

*, ** and *** present the significance level at 10%, 5% and 1%, respectively.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VII

Earnings Surprises and the Percentage of Company Stock / Total Investment in the Plans

The dependent variables in the regression are contemporary earnings surprises, or SUE(Q), to the next fourth quarterly earnings surprises, or SUE(Q+4). The main independent variable that I want to examine would be the percentage of company stock / total investment in the plans (PER_COMSTK). The model shown on the left-hand side in each of the regression also include book-to-market ratio (BMR) and market value of firms (LN_MKV) as control variables. In the same manner, I add SUE_PRE_1QR to SUE_PRE_4QR and SURGE_PRE_1QR to SURGE_PRE_4QR as control variables. I also put control variables HPR_PRE_1YR into the second model on the right-hand side to exclude the effect of past stock returns performance.

Panel A

	SUE (Q)		SUE (Q+1)		SUE (Q+2)		SUE (Q+3)		SUE (Q+4)	
PER_COMSTK	1.7047 **	2.2113 ***	-0.6825	-0.7357	-0.7802	-0.7668	-2.7070 ***	-1.6451 ***	0.2994	0.8720
	(0.0151)	(0.0019)	(0.2598)	(0.1963)	(0.1718)	(0.1409)	(<.0001)	(0.0027)	(0.6369)	(0.1379)
BMR	-0.2579	-0.1391	-0.3103	-0.2592	0.5011 **	0.5370 **	1.0649 ***	0.6349 ***	0.9844 ***	0.0983
	(0.3315)	(0.6707)	(0.191)	(0.2671)	(0.0265)	(0.0125)	(<.0001)	(0.005)	(<.0001)	(0.6876)
LN_MKV	-0.5406 ***	-0.6979 ***	-0.4338 ***	-0.3475 ***	-0.4449 ***	-0.2347 **	-0.2807 **	-0.1842	-0.5507 ***	-0.3809 ***
	(0.0002)	(<.0001)	(0.0009)	(0.0047)	(0.0003)	(0.0382)	(0.0357)	(0.1238)	(<.0001)	(0.0033)
SUE_PRE_1QR		0.2838 ***		0.1424 ***		0.3205 ***		0.2853 ***		0.2457 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SUE_PRE_2QR		0.0459 **		0.0983 ***		0.0217 *		0.1083 ***		0.0614 ***
		(0.0135)		(<.0001)		(0.0709)		(<.0001)		(<.0001)
SUE_PRE_3QR		-0.3363 ***		-0.3209 ***		-0.2638 ***		-0.3665 ***		-0.3151 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SUE_PRE_4QR		0.2311 ***		0.2477 ***		0.1931 ***		0.1802 ***		0.2346 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_1QR		0.0534 ***		0.0318 **		0.0301 **		0.0309 **		0.0642 ***
		(0.0027)		(0.0217)		(0.0193)		(0.0382)		(<.0001)
SURGE_PRE_2QR		-0.0122		0.0096		0.0256 **		-0.0089		-0.0158
		(0.539)		(0.4975)		(0.0414)		(0.5318)		(0.3373)
SURGE_PRE_3QR		-0.0152		-0.0208		-0.0331 **		0.0223 *		-0.0055
		(0.406)		(0.1923)		(0.0117)		(0.0907)		(0.7163)
SURGE_PRE_4QR		-0.0334 *		-0.0032		0.0367 ***		0.0239 **		-0.0022
		(0.0545)		(0.8275)		(0.0091)		(0.0716)		(0.8791)
HPR_PRE_1YR		0.4297 **		-0.0690		-0.3935 ***		-0.7401 ***		-0.8981 ***
		(0.0161)		(0.6377)		(0.0036)		(<.0001)		(<.0001)
Year effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2	0.49	0.62	0.53	0.59	0.46	0.55	0.50	0.61	0.59	0.65

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VII—*Continued*

		Panel B									
		SUE (Q)		SUE (Q+1)		SUE (Q+2)		SUE (Q+3)		SUE (Q+4)	
PER_COMSTK	Large	2.8301 ***	2.3123 **	-1.3266	-1.1431	-0.1548 ***	-0.1438	-3.3097 ***	-2.5665 ***	1.4031	1.5552 *
		(0.0031)	(0.0144)	(0.1061)	(0.1398)	(0.0019)	(0.8392)	(0.0001)	(0.0007)	(0.1144)	(0.059)
	Small	0.7396	1.2422	0.1022	-0.6411	-2.8170 ***	-2.6718 ***	0.0252 **	-0.0990	-1.1227	0.1146
		(0.5058)	(0.2573)	(0.9167)	(0.4853)	(0.0019)	(0.0012)	(0.0252)	(0.9092)	(0.2505)	(0.8993)
BMR	Large	0.3116	0.4891	-0.3248	-0.0903	0.1226 **	0.3089	0.9286 **	0.8380 **	1.5593 ***	0.6716
		(0.4827)	(0.3709)	(0.4228)	(0.82)	(0.0185)	(0.3963)	(0.0273)	(0.0296)	(0.0005)	(0.1187)
	Small	-1.0292 ***	-0.9147 **	-0.4992	-0.4673	0.7325 **	0.7469 **	0.0002 ***	0.4652	0.6666 **	-0.3002
		(0.0058)	(0.0291)	(0.1278)	(0.1461)	(0.0185)	(0.0111)	(0.0002)	(0.1308)	(0.0487)	(0.3571)
LN_MKV	Large	-0.4756 **	-0.4591 **	-0.1908	-0.1572	-0.3821 ***	-0.3630 **	-0.2876	-0.1538	-0.5712 **	-0.3038
		(0.035)	(0.0482)	(0.3541)	(0.4186)	(0.0032)	(0.0415)	(0.1784)	(0.4172)	(0.0117)	(0.1511)
	Small	-1.0541 ***	-1.0825 ***	-0.8660 ***	-0.6380 ***	-0.5988 ***	-0.1449	0.1328	-0.2384	-0.4634 **	-0.3715 *
		(<.0001)	(<.0001)	(<.0001)	(0.0016)	(0.0032)	(0.4342)	(0.1328)	(0.2202)	(0.0361)	(0.0715)
SUE_PRE_1QR	Large		0.2583 ***		0.1092 ***		0.3237 ***		0.2787 ***		0.2216 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Small		0.3339 ***		0.1843 ***		0.3309 ***		0.3133 ***		0.2829 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SUE_PRE_2QR	Large		0.0448 *		0.1027 ***		0.0246		0.1220 ***		0.0860 ***
			(0.0706)		(<.0001)		(0.1244)		(<.0001)		(<.0001)
	Small		0.0413		0.1057 ***		0.0335 *		0.0950 ***		0.0371
			(0.1435)		(<.0001)		(0.0763)		(<.0001)		(0.1067)
SUE_PRE_3QR	Large		-0.3387 ***		-0.3173 ***		-0.2463 ***		-0.3640 ***		-0.3250 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Small		-0.3218 ***		-0.3391 ***		-0.2868 ***		-0.3811 ***		-0.3096 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SUE_PRE_4QR	Large		0.2666 ***		0.2572 ***		0.1876 ***		0.1738 ***		0.2645 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Small		0.1663 ***		0.1953 ***		0.1692 ***		0.1581 ***		0.1613 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_1QR	Large		0.0493 **		0.0164		0.0203		0.0560 ***		0.0700 ***
			(0.0377)		(0.3883)		(0.2419)		(0.0078)		(0.0009)
	Small		0.0557 **		0.0534 **		0.0381 *		0.0129		0.0556 **
			(0.0399)		(0.0123)		(0.0538)		(0.5618)		(0.0109)
SURGE_PRE_2QR	Large		-0.0047		0.0205		0.0313 *		0.0036		-0.0154
			(0.8645)		(0.2902)		(0.065)		(0.8533)		(0.5208)
	Small		-0.0238		-0.0067		0.0270		-0.0514 **		-0.0059
			(0.4071)		(0.764)		(0.165)		(0.0182)		(0.8052)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VII—*Continued*

SURGE_PRE_3QR	Large		-0.0192		0.0037		-0.0497 ***		0.0151		-0.0055
			(0.4268)		(0.8721)		(0.0056)		(0.4023)		(0.7969)
	Small		-0.0134		-0.0442 *		-0.0307		0.0588 ***		-0.0131
			(0.6337)		(0.0617)		(0.1302)		(0.004)		(0.5692)
SURGE_PRE_4QR	Large		-0.0416 *		-0.0013		0.0429 **		0.0463 **		-0.0214
			(0.076)		(0.9505)		(0.0313)		(0.0105)		(0.3022)
	Small		-0.0129		0.0076		0.0244		-0.0069		0.0085
			(0.6192)		(0.7351)		(0.237)		(0.735)		(0.6967)
HPR_PRE_1YR	Large		0.7429 ***		0.3028		-0.1066		-0.4884 **		-0.6465 ***
			(0.006)		(0.1812)		(0.607)		(0.0248)		(0.0058)
	Small		0.1182		-0.1061		-0.5368 ***		-0.9553 ***		-1.0342 ***
			(0.6182)		(0.5993)		(0.0036)		(<.0001)		(<.0001)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2 (L/S)		0.54 / 0.49	0.63 / 0.62	0.58 / 0.42	0.63 / 0.59	0.47 / 0.50	0.56 / 0.60	0.54 / 0.52	0.64 / 0.62	0.63 / 0.57	0.69 / 0.64

Panel C

		SUE (Q)		SUE (Q+1)		SUE (Q+2)		SUE (Q+3)		SUE (Q+4)	
PER_COMSTK	Value	2.3613 **	2.2587 **	0.5701	0.1763	-1.2306	-1.4611 *	-2.4547 **	-0.9042	0.8047	1.8249 *
		(0.0257)	(0.0206)	(0.5649)	(0.85)	(0.1898)	(0.0891)	(0.0177)	(0.3303)	(0.4376)	(0.0562)
	Growth	2.2447 **	2.0675 **	-2.0094 **	-1.9926 **	-0.6012	-0.4923	-3.4056 ***	-2.1618 ***	1.3706	1.3017
		(0.0427)	(0.0465)	(0.0293)	(0.0226)	(0.4807)	(0.5237)	(0.0002)	(0.008)	(0.1583)	(0.1498)
BMR	Value	-0.3586	0.1746	-0.2053	-0.3342	1.2364 ***	1.0832 ***	0.9758 ***	0.3364	0.9836 ***	-0.1120
		(0.3355)	(0.6286)	(0.5424)	(0.3167)	(0.0001)	(0.0005)	(0.0055)	(0.3105)	(0.0057)	(0.7455)
	Growth	1.1192	0.1317	-1.3188	-1.5175	-2.3938 **	-1.8133 **	1.1383	2.2492 **	2.7348 **	1.4033
		(0.3344)	(0.9064)	(0.1971)	(0.1282)	(0.0119)	(0.041)	(0.2664)	(0.0154)	(0.0125)	(0.1809)
LN_MKV	Value	-0.9053 ***	-0.8432 ***	-0.5699 **	-0.4855 **	-0.2971	-0.0445	-0.4327 *	-0.3919 *	-0.5017 **	-0.4034 *
		(0.0005)	(0.0004)	(0.013)	(0.0242)	(0.1729)	(0.8236)	(0.0696)	(0.0673)	(0.0369)	(0.0686)
	Growth	-0.6309 **	-0.5656 **	-0.4259 *	-0.3469	-0.7538 ***	-0.5200 **	-0.0383	0.1209	-0.6211 **	-0.4043
		(0.0176)	(0.0234)	(0.078)	(0.1317)	(0.0008)	(0.0115)	(0.8752)	(0.5775)	(0.019)	(0.1076)
SUE_PRE_1QR	Value		0.3131 ***		0.1798 ***		0.3376 ***		0.2839 ***		0.3040 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Growth		0.2540 ***		0.1196 ***		0.3291 ***		0.3095 ***		0.2024 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SUE_PRE_2QR	Value		-0.0020		0.0963 ***		0.0295		0.1205 ***		0.0337
			(0.939)		(<.0001)		(0.1198)		(<.0001)		(0.1404)
	Growth		0.0755 ***		0.1092 ***		0.0270		0.1031 ***		0.0923 ***
			(0.0043)		(<.0001)		(0.1152)		(<.0001)		(0.0001)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VII—*Continued*

SUE_PRE_3QR	Value	-0.3108 ***		-0.3052 ***		-0.2689 ***		-0.3674 ***		-0.3253 ***	
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
	Growth	-0.3482 ***		-0.3356 ***		-0.2476 ***		-0.3642 ***		-0.3247 ***	
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
SUE_PRE_4QR	Value	0.1795 ***		0.1859 ***		0.1304 ***		0.1316 ***		0.1796 ***	
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
	Growth	0.2645 ***		0.2367 ***		0.1867 **		0.1806 ***		0.2395 ***	
		(<.0001)		(<.0001)		(0.0206)		(<.0001)		(<.0001)	
SURGE_PRE_1QR	Value	0.0575 **		0.0565 ***		0.0143		0.0428 *		0.0489 **	
		(0.0204)		(0.0079)		(0.4714)		(0.0674)		(0.027)	
	Growth	0.0516 **		-0.0061		0.0390 **		0.0366 *		0.0742 ***	
		(0.0436)		(0.7693)		(0.0345)		(0.0971)		(0.001)	
SURGE_PRE_2QR	Value	0.0029		0.0510 **		0.0296		-0.0033		-0.0243	
		(0.9169)		(0.0193)		(0.1278)		(0.8801)		(0.3281)	
	Growth	-0.0252		-0.0134		0.0268		-0.0319		-0.0064	
		(0.3699)		(0.5312)		(0.1426)		(0.1259)		(0.8003)	
SURGE_PRE_3QR	Value	-0.0401		-0.0549 **		0.0084		0.0286		0.0004	
		(0.1245)		(0.0216)		(0.6768)		(0.1732)		(0.987)	
	Growth	0.0057		0.0045		-0.0797 ***		0.0232		0.0102	
		(0.824)		(0.8536)		(<.0001)		(0.2261)		(0.6589)	
SURGE_PRE_4QR	Value	-0.0215		-0.0055		0.0366 *		0.0162		0.0032	
		(0.3732)		(0.8052)		(0.0883)		(0.4342)		(0.8839)	
	Growth	-0.0329		0.0075		0.0415 **		0.0328 *		-0.0243	
		(0.1889)		(0.74)		(0.0445)		(0.0897)		(0.2782)	
HPR_PRE_1YR	Value	0.9420 ***		-0.3289		-0.4212 *		-0.8231 ***		-1.2511 ***	
		(0.0003)		(0.1587)		(0.0513)		(0.0003)		(<.0001)	
	Growth	0.1124		0.2407		-0.3150		-0.6107 ***		-0.4517	
		(0.6611)		(0.2881)		(0.1174)		(0.0035)		(0.0486)	
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2 (V/G)		0.55 / 0.57	0.62 / 0.63	0.57 / 0.61	0.62 / 0.65	0.53 / 0.52	0.61 / 0.62	0.55 / 0.58	0.65 / 0.68	0.61 / 0.66	0.68 / 0.71

*, ** and *** present the significance level at 10%, 5% and 1%, respectively.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VIII
Revenue Surprises and the Change of Company Stock/Total Investment in Plans

The dependent variables in the regression are contemporary revenue surprises, or SURGE(Q), to the next fourth quarterly revenue surprises, or SURGE(Q+4). The main independent variable that I want to examine would be the change of percentage of company stock / total investment in the plans (CHG_PER_COMSTK). The model shown on the left-hand side in each of the regression also include book-to-market ratio (BMR) and market value of firms (LN_MKV) as control variables. In the same manner, I add SUE_PRE_1QR to SUE_PRE_4QR and SURGE_PRE_1QR to SURGE_PRE_4QR as control variables in this regression. I also put control variables HPR_PRE_1YR into the second model on the right-hand side to exclude the effect of past stock returns performance, which can lead to the result that the extra allocation to company stocks done by 401(k) participants without the noise of past returns.

Panel A

	SURGE (Q)		SURGE (Q+1)		SURGE (Q+2)		SURGE (Q+3)		SURGE (Q+4)	
CHG_PER_COMSTK	0.5179 ***	-0.0581	0.6710 ***	0.1502	0.4360 ***	0.0498	0.1162	-0.1206	-0.2271	-0.0888
	(<.0001)	(0.6455)	(<.0001)	(0.3801)	(0.0025)	(0.7464)	(0.454)	(0.4649)	(0.1497)	(0.6082)
BMR	-0.6066 **	-0.1389	-0.8617 ***	-0.5615 **	-0.6351 ***	-0.1468	-0.2364	0.1099	0.1972	-0.0665
	(0.0206)	(0.5786)	(0.0003)	(0.0146)	(0.0049)	(0.4788)	(0.3333)	(0.6244)	(0.435)	(0.7823)
LN_MKV	-0.6547 ***	-0.6161 ***	-0.8867 ***	-0.7854 ***	-1.1489 ***	-0.7938 ***	-1.0573 ***	-0.6928 ***	-1.0989 ***	-0.8160 ***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
SUE_PRE_1QR		0.0349 **		0.0124		-0.0154		-0.0091		0.0135
		(0.0258)		(0.3527)		(0.2045)		(0.5244)		(0.3513)
SUE_PRE_2QR		0.0126		-0.0206		-0.0038		0.0395 ***		0.0102
		(0.4548)		(0.1202)		(0.7414)		(0.0031)		(0.5034)
SUE_PRE_3QR		-0.0324 **		-0.0202		-0.0111		0.0038		-0.0108
		(0.044)		(0.166)		(0.3535)		(0.7612)		(0.4446)
SUE_PRE_4QR		0.0419 ***		0.0545 ***		0.0312 **		0.0410 ***		0.0319 **
		(0.0069)		(0.0001)		(0.0165)		(0.0014)		(0.0252)
SURGE_PRE_1QR		0.2677 ***		0.2366 ***		0.3976 ***		0.3790 ***		0.2654 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_2QR		0.1302 ***		0.1506 ***		0.0606 ***		0.0980 ***		0.1297 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_3QR		-0.3450 ***		-0.2974 ***		-0.2550 ***		-0.3013 ***		-0.3348 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_4QR		0.1985 ***		0.1779 ***		0.1581 ***		0.1530 ***		0.1953 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
HPR_PRE_1YR		0.9883 ***		0.5689 ***		0.3093 **		0.1980		-0.4313 **
		(<.0001)		(0.0009)		(0.0442)		(0.2297)		(0.0121)
Year effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2	0.62	0.68	0.64	0.69	0.55	0.65	0.61	0.69	0.69	0.74

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VIII—*Continued*

Panel B

		SURGE (Q)		SURGE (Q+1)		SURGE (Q+2)		SURGE (Q+3)		SURGE (Q+4)	
CHG_PER_COMSTK	Large	0.4840 ***	-0.2053	0.7233 ***	-0.0353	0.5863 ***	-0.0830	0.3013	0.0721	-0.1494	-0.1873
		(0.0034)	(0.2632)	(0.0024)	(0.8946)	(0.007)	(0.7181)	(0.2132)	(0.7762)	(0.5491)	(0.4903)
	Small	0.4899 ***	-0.0003	0.7931 ***	0.4773 **	0.3806 *	0.1282	0.0550	-0.2527	-0.2620	0.0126
		(0.0024)	(0.9988)	(0.0001)	(0.0387)	(0.0547)	(0.5464)	(0.7893)	(0.2573)	(0.2111)	(0.9569)
BMR	Large	0.0333	0.6448	-0.1805	0.1608	-0.6294 *	-0.1995	-0.3380	-0.0039	0.3019	0.1978
		(0.9382)	(0.1169)	(0.6575)	(0.6832)	(0.0905)	(0.5595)	(0.4161)	(0.9918)	(0.4932)	(0.6384)
	Small	-1.3657 ***	-1.0312 ***	-1.2004 ***	-0.9194 ***	-0.5141	0.0269	-0.0970	0.1452	0.2441	-0.1113
		(0.0003)	(0.0036)	(0.0003)	(0.0035)	(0.1075)	(0.9265)	(0.7711)	(0.637)	(0.4798)	(0.7339)
LN_MKV	Large	-0.4264 **	-0.3791 **	-0.9665 ***	-0.8766 ***	-1.1652 ***	-0.8845 ***	-1.4267 ***	-0.9386 ***	-0.9979 ***	-0.7045 ***
		(0.04)	(0.0477)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0004)
	Small	-1.1086 ***	-1.0633 ***	-0.8814 ***	-0.7487 ***	-1.2023 ***	-0.7689 ***	-0.8619 ***	-0.5674 ***	-1.0791 ***	-0.7898 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0027)	(<.0001)	(<.0001)
SUE_PRE_1QR	Large		0.0373 *		0.0156		-0.0065		-0.0192		0.0275
			(0.076)		(0.3892)		(0.6853)		(0.3271)		(0.1783)
	Small		0.0460 *		0.0019		-0.0260		-0.0036		-0.0037
			(0.0608)		(0.9281)		(0.1736)		(0.869)		(0.8647)
SUE_PRE_2QR	Large		0.0014		-0.0288		0.0080		0.0483 ***		0.0199
			(0.9519)		(0.1122)		(0.5956)		(0.0084)		(0.3525)
	Small		0.0256		-0.0113		-0.0025		0.0292		0.0184
			(0.337)		(0.587)		(0.8955)		(0.1553)		(0.425)
SUE_PRE_3QR	Large		-0.0470 **		-0.0379 *		-0.0176		0.0191		-0.0253
			(0.0297)		(0.0628)		(0.2605)		(0.2572)		(0.2012)
	Small		-0.0318		-0.0153		0.0025		-0.0131		-0.0171
			(0.2127)		(0.4933)		(0.8971)		(0.5107)		(0.431)
SUE_PRE_4QR	Large		0.0304		0.0516 ***		0.0342 **		0.0348 **		0.0290
			(0.1441)		(0.0091)		(0.0478)		(0.0451)		(0.1438)
	Small		0.0540 **		0.0558 **		0.0174		0.0324		0.0204
			(0.0273)		(0.0104)		(0.3971)		(0.1049)		(0.3517)
SURGE_PRE_1QR	Large		0.2323 ***		0.2045 ***		0.3880 ***		0.3962 ***		0.2430 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Small		0.3410 ***		0.2948 ***		0.4156 ***		0.3886 ***		0.3027 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_2QR	Large		0.1495 ***		0.1738 ***		0.0456 ***		0.0789 ***		0.1428 ***
			(<.0001)		(<.0001)		(0.0043)		(<.0001)		(<.0001)
	Small		0.0919 ***		0.1143 ***		0.0740 ***		0.0956 ***		0.1194 ***
			(0.0008)		(<.0001)		(0.0001)		(<.0001)		(<.0001)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VIII—*Continued*

SURGE_PRE_3QR	Large		-0.3534 ***		-0.2845 ***		-0.2299 ***		-0.3063 ***		-0.3392 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Small		-0.3279 ***		-0.3039 ***		-0.2820 ***		-0.2812 ***		-0.3264 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_4QR	Large		0.1948 ***		0.1743 ***		0.1315 ***		0.1578 ***		0.1892 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Small		0.1698 ***		0.1626 ***		0.1414 ***		0.1177 ***		0.1742 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
HPR_PRE_1YR	Large		1.6036 ***		1.0316 ***		0.8452 ***		-0.0031		-0.1376
			(<.0001)		(0.0001)		(0.0002)		(0.9903)		(0.6091)
	Small		0.4207		0.1722		0.0084		0.3955 *		-0.5393 **
			(0.1161)		(0.4598)		(0.9689)		(0.0796)		(0.021)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2 (L/S)		0.65 / 0.63	0.70 / 0.69	0.69 / 0.62	0.72 / 0.58	0.58 / 0.57	0.67 / 0.67	0.64 / 0.61	0.72 / 0.69	0.73 / 0.67	0.77 / 0.72

Panel C

		SURGE (Q)		SURGE (Q+1)		SURGE (Q+2)		SURGE (Q+3)		SURGE (Q+4)	
CHG_PER_COMSTK	Value	0.6570 ***	-0.0456	0.6475 ***	0.4079 *	0.3438 *	-0.0932	-0.2247	-0.4185 *	-0.1024	0.0936
		(0.0001)	(0.8034)	(0.0038)	(0.0934)	(0.0994)	(0.6692)	(0.3142)	(0.0747)	(0.6468)	(0.6983)
	Growth	0.3504 **	-0.0261	0.9450 ***	0.1645	0.4578 **	-0.0172	0.5196 **	0.2667	-0.2123	-0.2974
		(0.0414)	(0.8951)	(0.0001)	(0.5602)	(0.0464)	(0.9444)	(0.0376)	(0.3209)	(0.4123)	(0.3051)
BMR	Value	-0.0639	0.5264	-0.5281	-0.5249	0.0152	0.3577	0.0076	0.2480	0.9976 ***	0.5782 *
		(0.8652)	(0.1376)	(0.1265)	(0.1105)	(0.9626)	(0.2264)	(0.9825)	(0.441)	(0.0052)	(0.0876)
	Growth	-2.9443 ***	-1.9642 *	-2.2669 **	-1.7009 *	-3.3808 ***	-1.9256 **	-0.4686	0.6791	-0.0123	-0.0900
		(0.0084)	(0.0645)	(0.024)	(0.0806)	(0.0004)	(0.0249)	(0.6487)	(0.4679)	(0.991)	(0.9307)
LN_MKV	Value	-0.9193 ***	-0.9167 ***	-0.6798 ***	-0.7532 ***	-1.1154 ***	-0.7377 ***	-0.4551 **	-0.1180	-1.0270 ***	-0.8567 ***
		(0.0003)	(<.0001)	(0.0025)	(0.0003)	(<.0001)	(<.0001)	(0.0458)	(0.563)	(<.0001)	(<.0001)
	Growth	-0.8097 ***	-0.7012 ***	-1.2132 ***	-1.0157 ***	-1.3165 ***	-0.8895 ***	-1.5664 ***	-1.1584 ***	-1.0810 ***	-0.8186 ***
		(0.0008)	(0.0019)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0005)
SUE_PRE_1QR	Value		0.0277		-0.0015		-0.0128		0.0131		0.0325
			(0.2357)		(0.9439)		(0.4955)		(0.5467)		(0.1219)
	Growth		0.0463 **		0.0184		-0.0044		-0.0293		0.0087
			(0.0477)		(0.3488)		(0.8002)		(0.1707)		(0.7004)
SUE_PRE_2QR	Value		-0.0183		-0.0345 *		-0.0419 **		0.0642 ***		-0.0066
			(0.4747)		(0.0878)		(0.0211)		(0.0021)		(0.7672)
	Growth		0.0143		-0.0107		0.0410 **		0.0174		0.0290
			(0.5678)		(0.5916)		(0.0137)		(0.3699)		(0.2239)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table VIII—*Continued*

SUE_PRE_3QR	Value	-0.0087		-0.0113		0.0210		-0.0063		-0.0076	
		(0.7208)		(0.6113)		(0.2454)		(0.7515)		(0.7228)	
	Growth	-0.0592	**	-0.0247		-0.0191		0.0175		-0.0320	
		(0.0136)		(0.2611)		(0.2752)		(0.3361)		(0.1328)	
SUE_PRE_4QR	Value	0.0534	**	0.0728	***	-0.0051		0.0222		0.0468	**
		(0.0234)		(0.0008)		(0.7974)		(0.2574)		(0.03)	
	Growth	0.0398	*	0.0176		0.0509	***	0.0487	***	0.0238	
		(0.082)		(0.4126)		(0.0075)		(0.0096)		(0.2678)	
SURGE_PRE_1QR	Value	0.3337	***	0.2884	***	0.4137	***	0.4097	***	0.2942	***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
	Growth	0.2232	***	0.2047	***	0.4083	***	0.3876	***	0.2544	***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
SURGE_PRE_2QR	Value	0.1387	***	0.1471	***	0.0964	***	0.0886	***	0.1451	***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
	Growth	0.1444	***	0.1626	***	0.0191		0.0772	***	0.1249	***
		(<.0001)		(<.0001)		(0.2812)		(0.0003)		(<.0001)	
SURGE_PRE_3QR	Value	-0.3407	***	-0.3516	***	-0.2560	***	-0.2752	***	-0.3379	***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
	Growth	-0.3327	***	-0.2473	***	-0.2534	***	-0.3147	***	-0.3254	***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
SURGE_PRE_4QR	Value	0.1156	***	0.1578	***	0.1303	***	0.1160	***	0.1427	***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
	Growth	0.1976	***	0.1572	***	0.1215	***	0.1321	***	0.1826	***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
HPR_PRE_1YR	Value	1.3943	***	0.1746		0.3820		0.3784		-0.3388	
		(<.0001)		(0.5115)		(0.1096)		(0.1422)		(0.1993)	
	Growth	0.6290	**	0.8219	***	0.3838		0.2045		-0.0311	
		(0.0357)		(0.002)		(0.1004)		(0.4187)		(0.9086)	
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2 (V/G)		0.65 / 0.69	0.72 / 0.73	0.65 / 0.71	0.71 / 0.74	0.61 / 0.61	0.70 / 0.70	0.62 / 0.68	0.70 / 0.75	0.71 / 0.75	0.76 / 0.79

*, ** and *** present the significance level at 10%, 5% and 1%, respectively.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table IX
Earnings Surprises and the Change of Company Stock/Total Investment in Plans

The dependent variables in the regression are contemporary earnings surprises, or SUE(Q), to the next fourth quarterly revenue surprises, or SUE(Q+4). The main independent variable that I want to examine would be the change of percentage of company stock / total investment in the plans (CHG_PER_COMSTK). The model shown on the left-hand side in each of the regression also include book-to-market ratio (BMR) and market value of firms (LN_MKV) as control variables. In the same manner, I add SUE_PRE_1QR to SUE_PRE_4QR and SURGE_PRE_1QR to SURGE_PRE_4QR as control variables in this regression. I also put control variables HPR_PRE_1YR into the second model on the right-hand side to exclude the effect of past stock returns performance, which can lead to the result that the extra allocation to company stocks done by 401(k) participants without the noise of past returns.

Panel A

	SUE (Q)		SUE (Q+1)		SUE (Q+2)		SUE (Q+3)		SUE (Q+4)	
CHG_PER_COMSTK	0.2452 **	-0.0488	0.0718	0.1226	-0.1218	0.1522	-0.5075 ***	-0.1400	-0.4778 ***	-0.0087
	(0.0347)	(0.7084)	(0.6424)	(0.4801)	(0.4052)	(0.34)	(0.0013)	(0.4)	(0.0028)	(0.9604)
BMR	-0.2142	-0.2296	-0.2699	-0.2418	0.4873 **	0.5564 ***	0.9914 ***	0.6620 ***	0.8313 ***	0.0820
	(0.4247)	(0.3744)	(0.2635)	(0.3001)	(0.0335)	(0.0096)	(<.0001)	(0.0035)	(0.0012)	(0.7371)
LN_MKV	-0.4499 ***	-0.3852 ***	-0.4822 ***	-0.3945 ***	-0.4941 ***	-0.2830 ***	-0.4496 ***	-0.2946 ***	-0.5147 ***	-0.3238 ***
	(0.0013)	(0.0032)	(<.0001)	(0.0007)	(<.0001)	(0.0088)	(0.0004)	(0.0098)	(<.0001)	(0.0089)
SUE_PRE_1QR		0.2754 ***		0.1421 ***		0.3206 ***		0.2859 ***		0.2446 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SUE_PRE_2QR		0.0583 ***		0.0990 ***		0.0214 *		0.1085 ***		0.0615 ***
		(0.0009)		(<.0001)		(0.0752)		(<.0001)		(<.0001)
SUE_PRE_3QR		-0.3317 ***		-0.3210 ***		-0.2631 ***		-0.3675 ***		-0.3152 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SUE_PRE_4QR		0.2520 ***		0.2474 ***		0.1930 ***		0.1822 ***		0.2346 ***
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_1QR		0.0501 ***		0.0319 **		0.0302 **		0.0319 **		0.0644 ***
		(0.0027)		(0.021)		(0.0189)		(0.0329)		(<.0001)
SURGE_PRE_2QR		-0.0293		0.0090		0.0256 **		-0.0088		-0.0164
		(0.1185)		(0.5266)		(0.0412)		(0.5354)		(0.319)
SURGE_PRE_3QR		-0.0073		-0.0208		-0.0338 **		0.0228 *		-0.0054
		(0.673)		(0.1937)		(0.01)		(0.0841)		(0.7209)
SURGE_PRE_4QR		-0.0190		-0.0028		0.0370 ***		0.0231 *		-0.0023
		(0.2455)		(0.8483)		(0.0085)		(0.0812)		(0.8765)
HPR_PRE_1YR		0.4335 **		-0.1481		-0.4890 ***		-0.6958 ***		-0.8780 ***
		(0.0291)		(0.3922)		(0.0022)		(<.0001)		(<.0001)
Year effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N			6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2	0.49	0.57	0.53	0.59	0.46	0.55	0.50	0.61	0.59	0.65

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table IX—*Continued*

Panel B

		SUE (Q)	SUE (Q+1)	SUE (Q+2)	SUE (Q+3)	SUE (Q+4)
CHG_PER_COMSTK	Large	0.1941	-0.2787	0.1768	0.0412	0.0465	-0.0154	-0.1462	-0.0219	-0.3480	-0.0518
		(0.2585)	(0.1477)	(0.4602)	(0.8777)	(0.8369)	(0.9499)	(0.5546)	(0.932)	(0.1721)	(0.8519)
	Small	0.2379	0.0344	0.1729	0.3020	-0.1665	0.3737 *	-0.7779 ***	-0.2588	-0.6152 ***	0.1265
		(0.1433)	(0.8518)	(0.4068)	(0.2003)	(0.3977)	(0.082)	(0.0002)	(0.246)	(0.0032)	(0.5849)
BMR	Large	0.2532	0.2564	-0.2247	-0.0524	0.1408	0.3138	1.0269 **	0.9256 ***	1.4155 ***	0.6294
		(0.5703)	(0.5522)	(0.5826)	(0.8948)	(0.7154)	(0.3879)	(0.0157)	(0.0163)	(0.0017)	(0.1434)
	Small	-0.9460 **	-1.0579 ***	-0.4417	-0.4372	0.7593 **	0.8174 ***	1.0322 ***	0.4538	0.4939	-0.2960
		(0.0124)	(0.0033)	(0.1868)	(0.1738)	(0.0168)	(0.0055)	(0.0021)	(0.1403)	(0.1505)	(0.3633)
LN_MKV	Large	-0.2945	-0.1962	-0.3025	-0.2461	-0.3960 **	-0.3741 **	-0.5462 ***	-0.3553 **	-0.4432 **	-0.1808
		(0.1726)	(0.3287)	(0.1224)	(0.1834)	(0.0318)	(0.0273)	(0.0072)	(0.049)	(0.0395)	(0.3698)
	Small	-1.0322 **	-1.0142 ***	-0.8668 ***	-0.6640 ***	-0.7491 ***	-0.2775	-0.4132 **	-0.2493	-0.4984 **	-0.3627 *
		(<.0001)	(<.0001)	(<.0001)	(0.0007)	(0.0002)	(0.1242)	(0.0484)	(0.1877)	(0.0201)	(0.0711)
SUE_PRE_1QR	Large		0.2515 ***		0.1088 ***		0.3238 ***		0.2786 ***		0.2189 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Small		0.3280 ***		0.1833 ***		0.3311 ***		0.3145 ***		0.2830 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SUE_PRE_2QR	Large		0.0624 ***		0.1042 ***		0.0245 ***		0.1235 ***		0.0870 ***
			(0.0091)		(<.0001)		(0.1259)		(<.0001)		(<.0001)
	Small		0.0589 **		0.1052 ***		0.0312 *		0.0947 ***		0.0366
			(0.03)		(<.0001)		(0.0992)		(<.0001)		(0.1114)
SUE_PRE_3QR	Large		-0.3428 ***		-0.3178 ***		-0.2462 ***		-0.3653 ***		-0.3260 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Small		-0.3252 ***		-0.3389 ***		-0.2861 ***		-0.3809 ***		-0.3096 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SUE_PRE_4QR	Large		0.2774 ***		0.2571 ***		0.1876 ***		0.1767 ***		0.2640 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Small		0.1843 ***		0.1946 ***		0.1706 ***		0.1593 ***		0.1610 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SURGE_PRE_1QR	Large		0.0540 **		0.0174		0.0203		0.0566 ***		0.0711 ***
			(0.0178)		(0.3599)		(0.2413)		(0.0073)		(0.0007)
	Small		0.0575 **		0.0526 **		0.0369 *		0.0130		0.0557 **
			(0.0276)		(0.0138)		(0.0622)		(0.5578)		(0.0107)
SURGE_PRE_2QR	Large		-0.0256		0.0191		0.0314 *		0.0038		-0.0166
			(0.3347)		(0.3256)		(0.064)		(0.8441)		(0.4877)
	Small		-0.0336		-0.0069		0.0255		-0.0507 **		-0.0062
			(0.2278)		(0.7582)		(0.1907)		(0.02)		(0.7977)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table IX—*Continued*

SURGE_PRE_3QR	Large	-0.0026		0.0035		-0.0499 ***		0.0170		-0.0052	
		(0.9112)		(0.8772)		(0.0054)		(0.3445)		(0.8084)	
	Small	-0.0216		-0.0434 *		-0.0320		0.0593 ***		-0.0134	
		(0.4268)		(0.0667)		(0.1146)		(0.0037)		(0.5613)	
SURGE_PRE_4QR	Large	-0.0340		-0.0008		0.0429 **		0.0435 **		-0.0219	
		(0.128)		(0.9684)		(0.0312)		(0.0163)		(0.2911)	
	Small	-0.0038		0.0081		0.0277		-0.0073		0.0083	
		(0.8805)		(0.7183)		(0.179)		(0.7213)		(0.7022)	
HPR_PRE_1YR	Large	0.9979 ***		0.2674		-0.1006		-0.5101 **		-0.5975 **	
		(0.0012)		(0.3155)		(0.6787)		(0.046)		(0.0298)	
	Small	0.0077		-0.2864		-0.8070 ***		-0.8148 ***		-1.1016 ***	
		(0.9773)		(0.2289)		(0.0002)		(0.0003)		(<.0001)	
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2 (L/S)		0.53 / 0.49	0.60 / 0.57	0.58 / 0.52	0.63 / 0.59	0.47 / 0.50	0.56 / 0.60	0.53 / 0.52	0.64 / 0.62	0.63 / 0.57	0.68 / 0.64

Panel C

		SUE (Q)		SUE (Q+1)		SUE (Q+2)		SUE (Q+3)		SUE (Q+4)	
CHG_PER_COMSTK	Value	0.5283 ***	-0.0296	0.0517	0.2477	-0.1939	0.1665	-0.9776 ***	-0.5927 **	-0.7534 ***	-0.0399
		(0.0022)	(0.8741)	(0.8164)	(0.3154)	(0.3596)	(0.4656)	(<.0001)	(0.0142)	(0.0009)	(0.8713)
	Growth	0.0226	-0.0845	0.3921	0.2793	0.1280	0.2997	-0.1069	0.1773	-0.2857	-0.0380
		(0.9004)	(0.686)	(0.1189)	(0.3333)	(0.5824)	(0.239)	(0.6706)	(0.5049)	(0.2762)	(0.8969)
BMR	Value	-0.2170	0.1466	-0.2035	-0.3216	1.2068 ***	1.1177 ***	0.7292 **	0.3234	0.7158 **	-0.1397
		(0.5645)	(0.6849)	(0.5544)	(0.3354)	(0.0002)	(0.0003)	(0.041)	(0.3289)	(0.0478)	(0.6858)
	Growth	0.9435	-0.0385	-0.8853	-1.3301	-2.2623 **	-1.7640 **	1.3624	2.4285 ***	2.4262 **	1.2918
		(0.421)	(0.9726)	(0.3903)	(0.1813)	(0.0184)	(0.0462)	(0.1879)	(0.0088)	(0.028)	(0.2171)
LN_MKV	Value	-0.8167 ***	-0.7262 ***	-0.5419 **	-0.4696 **	-0.3568 *	-0.1074	-0.5409 **	-0.4485 **	-0.4520 *	-0.3190
		(0.0012)	(0.0018)	(0.0156)	(0.026)	(0.0942)	(0.5831)	(0.0202)	(0.0327)	(0.0538)	(0.142)
	Growth	-0.4627 *	-0.4105 *	-0.6092 ***	-0.5096 **	-0.8095 ***	-0.5573 ***	-0.3324	-0.0653	-0.4913 *	-0.2915
		(0.0671)	(0.0834)	(0.0079)	(0.0197)	(0.0002)	(0.0043)	(0.1496)	(0.7506)	(0.0504)	(0.222)
SUE_PRE_1QR	Value		0.3117 ***		0.1800 ***		0.3372 ***		0.2859 ***		0.3026 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
	Growth		0.2504 ***		0.1187 ***		0.3291 ***		0.3093 ***		0.2003 ***
			(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)
SUE_PRE_2QR	Value		-0.0035		0.0959 ***		0.0284		0.1192 ***		0.0337
			(0.8933)		(<.0001)		(0.135)		(<.0001)		(0.1409)
	Growth		0.0775 ***		0.1122 ***		0.0271		0.1050 ***		0.0932 ***
			(0.0034)		(<.0001)		(0.1146)		(<.0001)		(0.0001)

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table IX—*Continued*

SUE_PRE_3QR	Value	-0.3097 ***		-0.3058 ***		-0.2677 ***		-0.3687 ***		-0.3250 ***	
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
	Growth	-0.3494 ***		-0.3363 ***		-0.2468 ***		-0.3654 ***		-0.3258 ***	
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
SUE_PRE_4QR	Value	0.1803 ***		0.1859 ***		0.1306 ***		0.1344 ***		0.1806 ***	
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
	Growth	0.2653 ***		0.2360 ***		0.1862 ***		0.1840 ***		0.2394 ***	
		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
SURGE_PRE_1QR	Value	0.0588 **		0.0563 ***		0.0143		0.0427 *		0.0496 **	
		(0.0177)		(0.0082)		(0.4708)		(0.0678)		(0.0252)	
	Growth	0.0553 **		-0.0064		0.0388 **		0.0377 *		0.0751 ***	
		(0.0304)		(0.7598)		(0.0356)		(0.0874)		(0.0009)	
SURGE_PRE_2QR	Value	0.0021		0.0509 **		0.0301		-0.0018		-0.0263	
		(0.9396)		(0.0195)		(0.1221)		(0.9369)		(0.2905)	
	Growth	-0.0293		-0.0159		0.0262		-0.0334		-0.0076	
		(0.2972)		(0.4559)		(0.1511)		(0.1092)		(0.765)	
SURGE_PRE_3QR	Value	-0.0397		-0.0552 **		0.0074		0.0295		0.0010	
		(0.1289)		(0.0209)		(0.7143)		(0.1594)		(0.9665)	
	Growth	0.0071		0.0067		-0.0804 ***		0.0231		0.0112	
		(0.7834)		(0.7858)		(<.0001)		(0.2272)		(0.6276)	
SURGE_PRE_4QR	Value	-0.0212		-0.0051		0.0369 *		0.0153		0.0024	
		(0.3813)		(0.819)		(0.0864)		(0.4578)		(0.9115)	
	Growth	-0.0319		0.0071		0.0422 **		0.0314		-0.0239	
		(0.2024)		(0.7519)		(0.041)		(0.1051)		(0.2876)	
HPR_PRE_1YR	Value	1.0254 ***		-0.4626 *		-0.5530 **		-0.5088 *		-1.1858 ***	
		(0.0006)		(0.0865)		(0.0269)		(0.0551)		(<.0001)	
	Growth	0.2059		0.0815		-0.4742 **		-0.7133 ***		-0.4280	
		(0.5137)		(0.7645)		(0.049)		(0.0044)		(0.118)	
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		5,292	5,292	6,686	6,686	6,628	6,628	6,541	6,541	6,175	6,175
Adj. R^2 (V/G)		0.55 / 0.57	0.62 / 0.63	0.57 / 0.61	0.62 / 0.65	0.53 / 0.53	0.61 / 0.62	0.55 / 0.58	0.65 / 0.68	0.63 / 0.57	0.68 / 0.71

*, ** and *** present the significance level at 10%, 5% and 1%, respectively.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table X

Operating Performance and the Percentage of Company Stock/Total investment in the Plans

The dependent variables in the regression are operating performance proxies, like ROA_NI, ROE_NI, Asset Turnover, Equity Turnover. In addition, I add extra the ROA_EBIT and ROE_EBIT. The independent variable is the percentage of company stock / total investment in the plans (PER_COMSTK). The model shown on the left-hand side in each of the regression also include book-to-market ratio (BMR) and market value of firms (LN_MKV) as control variables. I also put control variables HPR_PRE_1YR into the second model to exclude the effect of past stock returns.

Panel A

	ROA_NI		ROA_EBIT		ROE_NI		ROE_EBIT		Asset Turnover		Equity Turnover	
PER_COMSTK	0.0407 ***	0.0490 ***	0.0524 ***	0.0663 ***	0.0534	0.0529	0.0570	0.0527	0.2402 ***	0.2335 ***	0.1673	0.0187
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.139)	(0.1088)	(0.213)	(0.2143)	(<.0001)	(<.0001)	(0.6271)	(0.9567)
BMR	-0.0181 ***	-0.0135 ***	-0.0313 ***	-0.0344 ***	-0.0780 ***	-0.0694 ***	-0.1899 ***	-0.2117 ***	-0.2781 ***	-0.2675 ***	-1.9674 ***	-1.7342 ***
	(<.0001)	(0.0004)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
LN_MKV	0.0327 ***	0.0323 ***	0.0342 ***	0.0362 ***	0.0676 ***	0.0575 ***	0.0219 ***	0.0216 **	-0.0272 ***	-0.0287 ***	-0.7594 ***	-0.7916 ***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0471)	(0.0152)	(0.0063)	(0.0041)	(<.0001)	(<.0001)
HPR_PRE_1YR		0.0073 ***		-0.0001		0.0412 ***		0.0460 ***		0.0217 *		0.4779 ***
		(0.0019)		(0.9494)		(<.0001)		(<.0001)		(0.0647)		(<.0001)
Year effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570
Adj. R^2	0.70	0.59	0.76	0.70	0.50	0.44	0.61	0.55	0.90	0.90	0.71	0.71

Panel B

		ROA_NI		ROA_EBIT		ROE_NI		ROE_EBIT		Asset Turnover		Equity Turnover	
PER_COMSTK	Large	0.0517 ***	0.0524 ***	0.0662 ***	0.0687 ***	0.0471	0.0396	0.0439	0.0309	0.0493	0.0482	-0.8216 *	-0.9599 **
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.3123)	(0.3968)	(0.4941)	(0.6302)	(0.3614)	(0.3734)	(0.0911)	(0.048)
	Small	0.0471 ***	0.0411 **	0.0563 ***	0.0525 ***	0.0980 **	0.0774	0.1128 **	0.0923 *	0.4506 ***	0.4343 ***	1.7645 ***	1.5905 ***
		(0.0049)	(0.0141)	(0.0001)	(0.0004)	(0.0455)	(0.1143)	(0.0339)	(0.0827)	(<.0001)	(<.0001)	(0.0005)	(0.0016)
BMR	Large	-0.0372 ***	-0.0387 ***	-0.0564 ***	-0.0621 ***	-0.1503 ***	-0.1335 ***	-0.3127 ***	-0.2839 ***	-0.3540 ***	-0.3515 ***	-2.1876 ***	-1.8810 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
	Small	-0.0082	-0.0018	-0.0279 ***	-0.0238 ***	-0.0445 ***	-0.0224	-0.1921 ***	-0.1702 ***	-0.2630 ***	-0.2456 ***	-1.8653 ***	-1.6786 ***
		(0.1435)	(0.7623)	(<.0001)	(<.0001)	(0.0067)	(0.1907)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
LN_MKV	Large	0.0272 ***	0.0273 ***	0.0351 ***	0.0356 ***	0.0503 ***	0.0487 ***	0.0271 *	0.0244	-0.0004	-0.0006	-0.5817 ***	-0.6101 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0738)	(0.1069)	(0.9742)	(0.9599)	(<.0001)	(<.0001)
	Small	0.0395 ***	0.0383 ***	0.0393 ***	0.0385 ***	0.0743 ***	0.0700 ***	0.0139	0.0096	-0.0615 ***	-0.0649 ***	-1.0127 ***	-1.0490 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.24)	(0.4164)	(0.0015)	(0.0008)	(<.0001)	(<.0001)
HPR_PRE_1YR	Large		-0.0030		-0.0113 ***		0.0337 **		0.0578 ***		0.0050		0.6148 ***
			(0.3684)		(0.0006)		(0.0107)		(0.0015)		(0.7455)		(<.0001)
	Small		0.0128 ***		0.0081 ***		0.0441 ***		0.0438 ***		0.0348 *		0.3721 ***
			(0.0003)		(0.0082)		(<.0001)		(<.0001)		(0.0568)		(0.0004)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Adj. R^2 (L/S)	0.70 / 0.60	0.61 / 0.60	0.72 / 0.72	0.72 / 0.72	0.43 / 0.45	0.44 / 0.45	0.53 / 0.62	0.53 / 0.62	0.90 / 0.90	0.90 / 0.90	0.68 / 0.79	0.69 / 0.79

Table X—*Continued*

Panel C

		ROA_NI		ROA_EBIT		ROE_NI		ROE_EBIT		Asset Turnover		Equity Turnover	
PER_COMSTK	Value	0.0514 ***	0.0477 ***	0.0555 ***	0.0536 ***	0.1199 ***	0.1040 ***	0.1027 ***	0.0876 **	0.2580 ***	0.2562 ***	0.3150	0.1988
		(0.0005)	(0.0013)	(<.0001)	(<.0001)	(0.0013)	(0.0051)	(0.0092)	(0.0264)	(0.0009)	(0.001)	(0.4045)	(0.5997)
	Growth	0.0245 *	0.0247 *	0.0364 ***	0.0382 ***	-0.0334	-0.0366	-0.0555	-0.0599	0.0669	0.0678	-1.1712 **	-1.2259 **
		(0.0812)	(0.078)	(0.0059)	(0.0038)	(0.5798)	(0.5443)	(0.4801)	(0.4455)	(0.2793)	(0.2728)	(0.0472)	(0.0376)
BMR	Value	-0.0202 ***	-0.0157 ***	-0.0334 ***	-0.0311 ***	-0.0669 ***	-0.0475 ***	-0.1336 ***	-0.1152 ***	-0.2584 ***	-0.2563 ***	-1.1047 ***	-0.9631 ***
		(0.0001)	(0.0041)	(<.0001)	(<.0001)	(<.0001)	(0.0005)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
	Growth	-0.0557 ***	-0.0579 ***	-0.1193 ***	-0.1327 ***	-0.3647 ***	-0.3406 ***	-0.9929 ***	-0.9591 ***	-0.6774 ***	-0.6846 ***	-6.7007 ***	-6.2875 ***
		(0.0002)	(0.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
LN_MKV	Value	0.0233 ***	0.0230 ***	0.0211 ***	0.0209 ***	0.0374 ***	0.0357 ***	-0.0015	-0.0031	-0.0774 ***	-0.0776 ***	-0.6565 ***	-0.6688 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.8765)	(0.747)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
	Growth	0.0399 ***	0.0401 ***	0.0428 ***	0.0439 ***	0.0859 ***	0.0839 ***	0.0212	0.0185	-0.0028	-0.0023	-0.7537 ***	-0.7872 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.2598)	(0.3283)	(0.848)	(0.8799)	(<.0001)	(<.0001)
HPR_PRE_1YR	Value		0.0095 **		0.0048		0.0412 ***		0.0391 ***		0.0045		0.3006 ***
			(0.0104)		(0.1589)		(<.0001)		(<.0001)		(0.8185)		(0.0016)
	Growth		-0.0019		-0.0120 ***		0.0215		0.0302		-0.0065		0.3692 ***
			(0.5717)		(0.0002)		(0.14)		(0.1113)		(0.6627)		(0.0095)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570	11,570
Adj. R^2 (V/G)		0.50 / 0.69	0.50 / 0.69	0.60 / 0.78	0.60 / 0.78	0.43 / 0.47	0.43 / 0.47	0.56 / 0.58	0.56 / 0.58	0.92 / 0.92	0.92 / 0.92	0.85 / 0.73	0.85 / 0.73

*, ** and *** present the significance level at 10%, 5% and 1%, respectively.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table XI
Operating Performance and the Change of Company Stock/Total Investment in Plans

The dependent variables in the regression are ROA_NI, ROE_NI, Asset Turnover, Equity Turnover. I add extra the ROA_EBIT and ROE_EBIT. The independent variable is the change of the percentage of company stock / total investment in the plans (CHG_PER_COMSTK). The model on the left-hand side in each of the regression include book-to-market ratio (BMR) and market value of firms (LN_MKV) as control variables. I also put control variables HPR_PRE_1YR into the model on the right-hand side to exclude the effect of past stock returns.

Panel A

	ROA_NI		ROA_EBIT		ROE_NI		ROE_EBIT		Asset Turnover		Equity Turnover	
CHG_PER_COMSTK	0.0005	-0.0034 *	-0.0007	-0.0013	0.0125 **	-0.0063	0.0243 ***	0.0047	0.0243 ***	0.0009	0.1647 ***	-0.0261
	(0.7451)	(0.0785)	(0.6306)	(0.4702)	(0.0337)	(0.3414)	(0.0011)	(0.5819)	(0.0011)	(0.9247)	(0.0038)	(0.7049)
BMR	-0.0187 ***	-0.0142 ***	-0.0325 ***	-0.0355 ***	-0.0741 ***	-0.0700 ***	-0.1814 ***	-0.2129 ***	-0.1814 ***	-0.2718 ***	-1.9113 ***	-1.7332 ***
	(<.0001)	(0.0002)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
LN_MKV	0.0354 ***	0.0355 ***	0.0378 ***	0.0405 ***	0.0702 ***	0.0611 ***	0.0237 ***	0.0249 ***	0.0237 ***	-0.0136	-0.7632 ***	-0.7900 ***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0257)	(0.0033)	(0.0257)	(0.1532)	(<.0001)	(<.0001)
HPR_PRE_1YR		0.0111 ***		0.0022		0.0475 ***		0.0430 ***		0.0253 *		0.5003 ***
		(0.0001)		(0.4171)		(<.0001)		(0.0007)		(0.0755)		(<.0001)
Year effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749
Adj. R^2	0.69	0.59	0.76	0.70	0.50	0.44	0.61	0.55	0.90	0.90	0.71	0.71

Panel B

		ROA_NI		ROA_EBIT		ROE_NI		ROE_EBIT		Asset Turnover		Equity Turnover	
CHG_PER_COMSTK	Large	-0.0030	-0.0033	-0.0057 ***	-0.0031	0.0135	0.0019	0.0246 **	0.0056	0.0093	0.0105	0.1542 *	-0.0853
		(0.1574)	(0.1964)	(0.0068)	(0.2245)	(0.106)	(0.8534)	(0.0326)	(0.688)	(0.3364)	(0.3669)	(0.0768)	(0.416)
	Small	0.0036	-0.0031	0.0033	-0.0007	0.0123 *	-0.0098	0.0233 ***	0.0069	0.0043	-0.0208	0.1944 ***	0.0434
		(0.145)	(0.3045)	(0.1232)	(0.7929)	(0.086)	(0.2672)	(0.0027)	(0.4694)	(0.7389)	(0.1887)	(0.0083)	(0.6325)
BMR	Large	-0.0403 ***	-0.0400 ***	-0.0610 ***	-0.0639 ***	-0.1480 ***	-0.1351 ***	-0.3068 ***	-0.2856 ***	-0.3531 ***	-0.3545 ***	-2.1040 ***	-1.8378 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
	Small	-0.0080	-0.0025	-0.0280 ***	-0.0247 ***	-0.0419 **	-0.0238	-0.1851 ***	-0.1717 ***	-0.2738 ***	-0.2533 ***	-1.8297 ***	-1.7061 ***
		(0.1624)	(0.6687)	(<.0001)	(<.0001)	(0.012)	(0.164)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
LN_MKV	Large	0.0313 ***	0.0313 ***	0.0406 ***	0.0408 ***	0.0520 ***	0.0514 ***	0.0272 *	0.0262 *	0.0020	0.0021	-0.6606 ***	-0.6727 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0602)	(0.0697)	(0.8694)	(0.8654)	(<.0001)	(<.0001)
	Small	0.0418 ***	0.0403 ***	0.0421 ***	0.0412 ***	0.0788 ***	0.0739 ***	0.0182	0.0146	-0.0370 *	-0.0426 **	-0.9310 ***	-0.9645 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.1109)	(0.2033)	(0.0503)	(0.025)	(<.0001)	(<.0001)
HPR_PRE_1YR	Large		0.0009		-0.0073 *		0.0327 **		0.0534 **		-0.0035		0.6730 ***
			(0.8287)		(0.0671)		(0.0395)		(0.0146)		(0.8496)		(<.0001)
	Small		0.0162 ***		0.0098 ***		0.0538 ***		0.0399 ***		0.0611 ***		0.3682 ***
			(0.0002)		(0.0098)		(<.0001)		(0.0035)		(0.0069)		(0.0045)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749
Adj. R^2 (L/S)		0.61 / 0.60	0.61 / 0.60	0.72 / 0.72	0.72 / 0.72	0.43 / 0.45	0.44 / 0.45	0.53 / 0.62	0.53 / 0.62	0.90 / 0.90	0.90 / 0.90	0.68 / 0.79	0.69 / 0.79

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table XI—*Continued*

Panel C

		ROA_NI		ROA_EBIT		ROE_NI		ROE_EBIT		Asset Turnover		Equity Turnover	
CHG_PER_COMSTK	Value	0.0038	0.0002	-0.0057 ***	0.0033	0.0135	-0.0009	0.0246 **	0.0069	0.0093	0.0115	0.1542 *	0.0501
		(0.1157)	(0.9565)	(0.0068)	(0.2098)	(0.106)	(0.9005)	(0.0326)	(0.3645)	(0.3364)	(0.4438)	(0.0768)	(0.4892)
	Growth	-0.0033	-0.0041	0.0033	-0.0049 *	0.0123 *	-0.0053	0.0233 ***	0.0023	0.0043	-0.0120	0.1944 ***	-0.1461
		(0.1457)	(0.1509)	(0.1232)	(0.0677)	(0.086)	(0.665)	(0.0027)	(0.8836)	(0.7389)	(0.3382)	(0.0083)	(0.2205)
BMR	Value	-0.0201 ***	-0.0164 ***	-0.0610 ***	-0.0319 ***	-0.1480 ***	-0.0489 ***	-0.3068 ***	-0.1164 ***	-0.3531 ***	-0.2599 ***	-2.1040 ***	-0.9664 ***
		(0.0001)	(0.0029)	(<.0001)	(<.0001)	(<.0001)	(0.0004)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
	Growth	-0.0615 ***	-0.0602 ***	-0.0280 ***	-0.1361 ***	-0.0419 **	-0.3381 ***	-0.1851 ***	-0.9541 ***	-0.2738 ***	-0.6910 ***	-1.8297 ***	-6.2019 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.012)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
LN_MKV	Value	0.0258 ***	0.0254 ***	0.0406 ***	0.0236 ***	0.0520 ***	0.0411 ***	0.0272 *	0.0013	0.0020	-0.0646 ***	-0.6606 ***	-0.6595 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0602)	(0.8895)	(0.8694)	(0.0005)	(<.0001)	(<.0001)
	Growth	0.0420 ***	0.0419 ***	0.0421 ***	0.0467 ***	0.0788 ***	0.0811 ***	0.0182	0.0140	-0.0370 *	0.0027	-0.9310 ***	-0.8808 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.1109)	(0.4351)	(0.0503)	(0.8504)	(<.0001)	(<.0001)
HPR_PRE_1YR	Value		0.0106 **		0.0034		0.0444 ***		0.0356 ***		0.0014		0.2644 **
			(0.0158)		(0.3906)		(<.0001)		(0.0023)		(0.9523)		(0.0181)
	Growth		0.0019		-0.0074 *		0.0259		0.0276		0.0046		0.4871 ***
			(0.6543)		(0.0625)		(0.1532)		(0.2405)		(0.8037)		(0.0059)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N		9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749
Adj. R^2 (V/G)		0.50 / 0.69	0.50 / 0.69	0.60 / 0.78	0.60 / 0.78	0.42 / 0.47	0.43 / 0.47	0.56 / 0.58	0.56 / 0.58	0.92 / 0.92	0.92 0.92	0.85 / 0.73	0.69 / 0.79

*, ** and *** present the significance level at 10%, 5% and 1%, respectively.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table XII

Holding Period Returns and the Percentage of Company Stock/Total investment in the Plans

The dependent variables are the holding period return from next three months to twelve months. The independent variable is the percentage of company stock / total investment in the plans (PER_COMSTK). The model on the left-hand side include book-to-market ratio (BMR) and market value of firms (LN_MKV) as control variables. I put control variables HPR_PRE_1YR into the second model on the right-hand side to exclude the effect of past stock returns performance.

Panel A

	HPR_FOL_3MON		HPY_FOL_6MON		HPR_FOL_9MON		HPR_FOL_1YR	
PER_COMSTK	0.0233	-0.0003	0.0073	-0.0161	0.0304	0.0033	0.0298	-0.0081
	(0.4322)	(0.9924)	(0.8648)	(0.6879)	(0.5552)	(0.945)	(0.6351)	(0.8899)
BMR	-0.0166	-0.0099	0.0117	0.0118	0.0571 **	0.0455 **	0.0453	0.0284
	(0.2099)	(0.3715)	(0.5415)	(0.4589)	(0.0131)	(0.0166)	(0.1057)	(0.2191)
LN_MKV	-0.0621 ***	-0.0558 ***	-0.1155 ***	-0.1037 ***	-0.1749 ***	-0.1601 ***	-0.2416 ***	-0.2125 ***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
HPR_PRE_1YR		0.0088		0.0000		-0.0008		-0.0141
		(0.2003)		(0.9972)		(0.943)		(0.3274)
Year effect	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect	YES	YES	YES	YES	YES	YES	YES	YES
N	11,283	11,283	11,283	11,283	11,283	11,283	11,283	11,283
Adj. R^2	0.44	0.34	0.38	0.27	0.48	0.40	0.51	0.43

Panel B

		HPR_FOL_3MON		HPY_FOL_6MON		HPR_FOL_9MON		HPR_FOL_1YR	
PER_COMSTK	Large	-0.0052	-0.0053	-0.0109	0.0025	-0.0202	-0.0052	-0.0056	-0.0213
		(0.8742)	(0.8691)	(0.8167)	(0.9551)	(0.723)	(0.9242)	(0.9347)	(0.7497)
	Small	0.0482	0.0042	-0.0146	-0.0420	0.0769	0.0267	0.0379	-0.0087
		(0.3789)	(0.9351)	(0.8564)	(0.5797)	(0.4241)	(0.7673)	(0.7473)	(0.9367)
BMR	Large	-0.0424 **	-0.0321 **	-0.0528 **	-0.0354	-0.0241	-0.0133	-0.0208	-0.0357
		(0.024)	(0.0384)	(0.0479)	(0.1066)	(0.4566)	(0.6157)	(0.5956)	(0.2692)
	Small	-0.0071	0.0014	0.0235	0.0199	0.0669 *	0.0498	0.0517	0.0321
		(0.7275)	(0.9388)	(0.4289)	(0.4533)	(0.0603)	(0.1145)	(0.2357)	(0.4011)
LN_MKV	Large	-0.0516 ***	-0.0555 ***	-0.0964 ***	-0.1044 ***	-0.1479 ***	-0.1554 ***	-0.2125 ***	-0.2068 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
	Small	-0.0737 ***	-0.0671 ***	-0.1402 ***	-0.1233 ***	-0.2142 ***	-0.1976 ***	-0.2838 ***	-0.2536 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
HPR_PRE_1YR	Large		0.0014		0.0060		0.0091		0.0007
			(0.8729)		(0.6378)		(0.5548)		(0.9724)
	Small		0.0140		-0.0004		-0.0005		-0.0182
			(0.1952)		(0.9818)		(0.9811)		(0.4268)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES
N		11,283	11,283	11,283	11,283	11,283	11,283	11,283	11,283
Adj. R^2 (L/S)		0.43 / 0.47	0.37 / 0.40	0.37 / 0.40	0.30 / 0.32	0.49 / 0.49	0.44 / 0.43	0.52 / 0.50	0.47 / 0.46

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table XII—*Continued*

		Panel C							
		HPR_FOL_3MON		HPY_FOL_6MON		HPR_FOL_9MON		HPR_FOL_1YR	
PER_COMSTK	Value	0.0038	-0.0031	0.0043	0.0051	0.0721	0.0662	0.0249	0.0212
		(0.9343)	(0.9478)	(0.9498)	(0.9405)	(0.3772)	(0.4199)	(0.8024)	(0.8323)
	Growth	0.0407	0.0413	0.0050	0.0050	-0.0146	-0.0127	0.0100	0.0139
		(0.2849)	(0.2783)	(0.9268)	(0.9261)	(0.8227)	(0.8452)	(0.8997)	(0.8603)
BMR	Value	-0.0106	-0.0022	0.0188	0.0179	0.0549 *	0.0621 **	0.0382	0.0427
		(0.5167)	(0.8982)	(0.4291)	(0.478)	(0.0563)	(0.0408)	(0.2761)	(0.2484)
	Growth	0.0108	0.0063	-0.0053	-0.0057	0.0546	0.0406	0.0676	0.0378
		(0.7868)	(0.879)	(0.926)	(0.9228)	(0.4219)	(0.5636)	(0.4135)	(0.6576)
LN_MKV	Value	-0.0571 ***	-0.0579 ***	-0.1098 ***	-0.1097 ***	-0.1796 ***	-0.1802 ***	-0.2373 ***	-0.2376 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
	Growth	-0.0665 ***	-0.0662 ***	-0.1199 ***	-0.1199 ***	-0.1742 ***	-0.1731 ***	-0.2499 ***	-0.2475 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
HPR_PRE_1YR	Value		0.0178		-0.0021		0.0153		0.0096
			(0.1289)		(0.9021)		(0.4578)		(0.7015)
	Growth		-0.0040		-0.0004		-0.0126		-0.0266
			(0.6615)		(0.9778)		(0.4241)		(0.1633)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES
N		11,283	11,283	11,283	11,283	11,283	11,283	11,283	11,283
Adj. R^2 (V/G)		0.45 / 0.46	0.45 / 0.46	0.38 / 0.40	0.38 / 0.40	0.49 / 0.49	0.50 / 0.49	0.52 / 0.51	0.52 / 0.51

*, ** and *** present the significance level at 10%, 5% and 1%, respectively.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table XIII
Holding Period Returns and the Change of Company Stock/Total Investment in Plans

The dependent variables in the regression are the holding period return from next three months to twelve months, or one year. The main independent variable here would be the change of the percentage of company stock / total investment in the plans (PER_COMSTK). The model shown on the left-hand side in each of the regression also include book-to-market ratio (BMR) and market value of firms (LN_MKV) as control variables. I put control variables HPR_PRE_1YR in the model two on the right-hand side to exclude the effect of past returns performance.

Panel A

	HPR_FOL_3MON		HPY_FOL_6MON		HPR_FOL_9MON		HPR_FOL_1YR	
CHG_PER_COMSTK	0.0063	0.0044	0.0049	0.0073	0.0088	0.0135	0.0116	0.0251 **
	(0.1695)	(0.4331)	(0.461)	(0.3608)	(0.2636)	(0.1606)	(0.2292)	(0.032)
BMR	-0.0119	-0.0101	0.0140	0.0117	0.0491 ***	0.0448 **	0.0399 *	0.0273
	(0.2632)	(0.3608)	(0.3603)	(0.4614)	(0.0072)	(0.0183)	(0.0731)	(0.237)
LN_MKV	-0.0556 ***	-0.0559 ***	-0.1052 ***	-0.1048 ***	-0.1608 ***	-0.1601 ***	-0.2153 ***	-0.2134 ***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
HPR_PRE_1YR		0.0051		-0.0065		-0.0121		-0.0354 *
		(0.54)		(0.5886)		(0.395)		(0.0419)
Year effect	YES	YES	YES	YES	YES	YES	YES	YES
Firm effect	YES	YES	YES	YES	YES	YES	YES	YES
N	9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749
Adj. R^2	0.34	0.34	0.27	0.27	0.40	0.40	0.43	0.43

Panel B

		HPR_FOL_3MON		HPY_FOL_6MON		HPR_FOL_9MON		HPR_FOL_1YR	
CHG_PER_COMSTK	Large	0.0004	-0.0001	0.0011	-0.0016	0.0122	0.0130	0.0220 *	0.0319 **
		(0.9432)	(0.9877)	(0.8939)	(0.8723)	(0.2147)	(0.2707)	(0.0651)	(0.0265)
	Small	0.0140 *	0.0125	0.0143	0.0225 *	0.0128	0.0194	0.0111	0.0284
		(0.0637)	(0.18)	(0.1953)	(0.0982)	(0.329)	(0.23)	(0.4852)	(0.1486)
BMR	Large	-0.0325 **	-0.0319 **	-0.0382 *	-0.0353	-0.0139	-0.0149	-0.0281	-0.0392
		(0.029)	(0.0394)	(0.0694)	(0.1076)	(0.5852)	(0.5748)	(0.3633)	(0.2239)
	Small	0.0002	0.0014	0.0275	0.0208	0.0549 *	0.0494	0.0466	0.0325
		(0.9929)	(0.9388)	(0.284)	(0.4331)	(0.0723)	(0.1165)	(0.2085)	(0.3956)
LN_MKV	Large	-0.0559 ***	-0.0559 ***	-0.1040 ***	-0.1041 ***	-0.1568 ***	-0.1567 ***	-0.2111 ***	-0.2106 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
	Small	-0.0663 ***	-0.0666 ***	-0.1268 ***	-0.1250 ***	-0.1972 ***	-0.1958 ***	-0.2572 ***	-0.2534 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
HPR_PRE_1YR	Large		0.0014		0.0075		-0.0025		-0.0279
			(0.8944)		(0.6286)		(0.8946)		(0.2179)
	Small		0.0037		-0.0201		-0.0162		-0.0421
			(0.7822)		(0.3022)		(0.4845)		(0.1336)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES
N		9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749
Adj. R^2 (L/S)		0.37 / 0.40	0.37 / 0.40	0.30 / 0.32	0.30 / 0.32	0.44 / 0.43	0.44 / 0.43	0.47 / 0.46	0.47 / 0.46

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table XIII—*Continued*

		Panel C							
		HPR_FOL_3MON		HPY_FOL_6MON		HPR_FOL_9MON		HPR_FOL_1YR	
CHG_PER_COMSTK	Value	0.0068	0.0009	0.0043	0.0069	0.0104	0.0064	0.0050	0.0021
		(0.3705)	(0.9156)	(0.6999)	(0.598)	(0.4333)	(0.6831)	(0.7578)	(0.9126)
	Growth	0.0127 **	0.0219 ***	0.0154 *	0.0240 **	0.0204 *	0.0392 ***	0.0289 **	0.0609 ***
		(0.0402)	(0.0045)	(0.0803)	(0.0285)	(0.0542)	(0.0028)	(0.0247)	(0.0001)
BMR	Value	-0.0081	-0.0022	0.0204	0.0177	0.0570 *	0.0611 **	0.0394	0.0424
		(0.6242)	(0.8995)	(0.399)	(0.4814)	(0.0502)	(0.044)	(0.2665)	(0.2516)
	Growth	0.0208	0.0047	0.0109	-0.0042	0.0778	0.0447	0.0977	0.0416
		(0.6047)	(0.908)	(0.8493)	(0.9431)	(0.2571)	(0.5226)	(0.2413)	(0.6241)
LN_MKV	Value	-0.0574 ***	-0.0580 ***	-0.1099 ***	-0.1096 ***	-0.1765 ***	-0.1769 ***	-0.2363 ***	-0.2366 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
	Growth	-0.0644 ***	-0.0628 ***	-0.1207 ***	-0.1192 ***	-0.1769 ***	-0.1735 ***	-0.2514 ***	-0.2457 ***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
HPR_PRE_1YR	Value		0.0170		-0.0076		0.0117		0.0084
			(0.2179)		(0.7053)		(0.6293)		(0.775)
	Growth		-0.0229 **		-0.0215		-0.0472 **		-0.0800 ***
			(0.0445)		(0.1869)		(0.0154)		(0.0007)
Year effect		YES	YES	YES	YES	YES	YES	YES	YES
Firm effect		YES	YES	YES	YES	YES	YES	YES	YES
N		9,749	9,749	9,749	9,749	9,749	9,749	9,749	9,749
Adj. R^2 (V/G)		0.45 / 0.46	0.45 / 0.46	0.38 / 0.40	0.38 / 0.40	0.49 / 0.49	0.49 / 0.49	0.52 / 0.51	0.52 / 0.51

*, ** and *** present the significance level at 10%, 5% and 1%, respectively.

DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Figure I Total Global Debt (All Sectors)

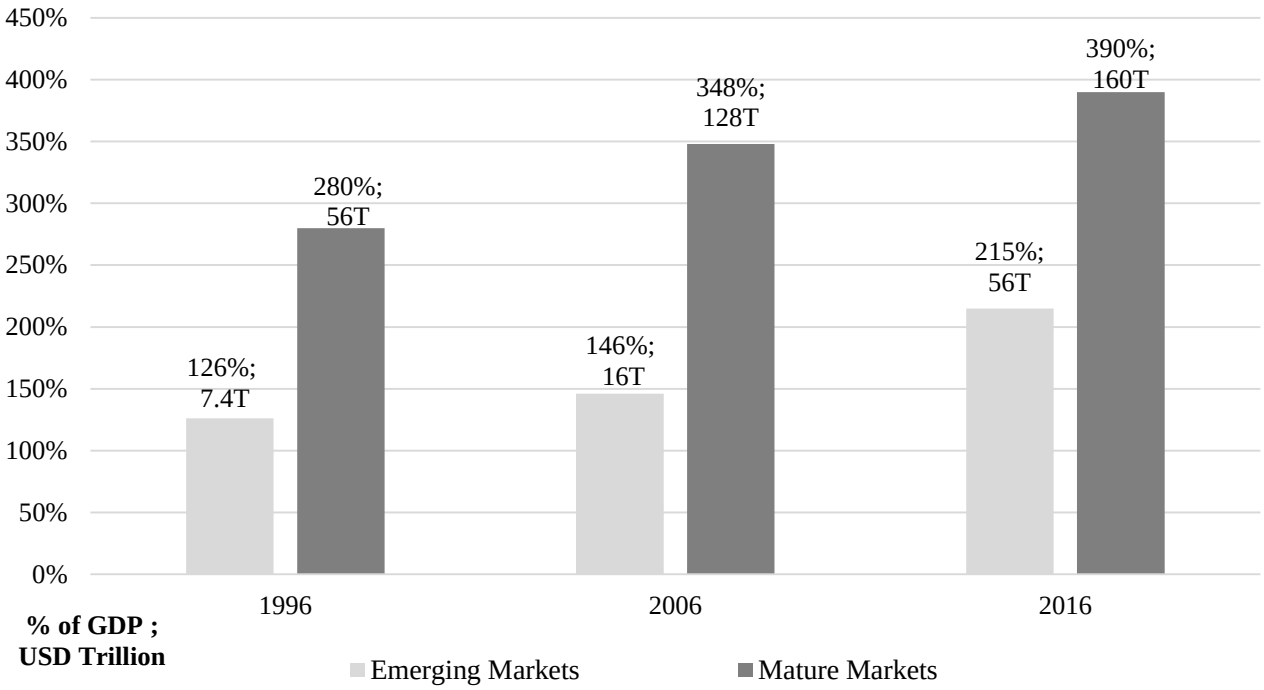
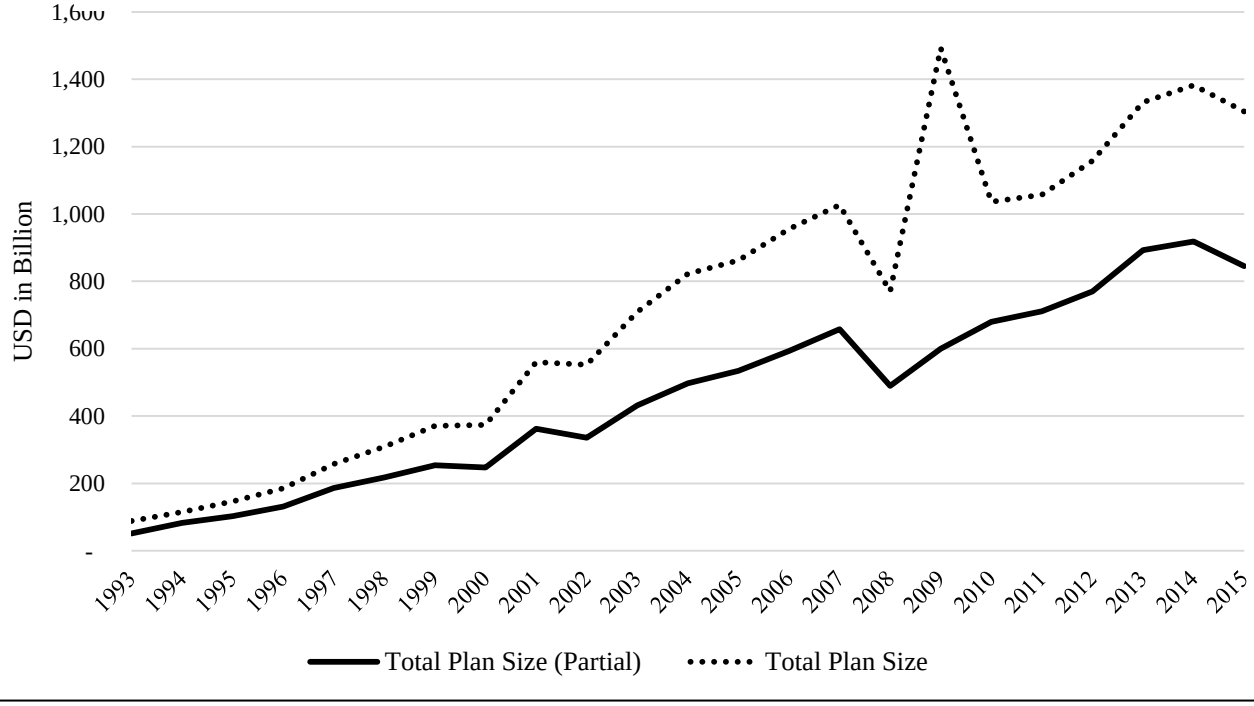
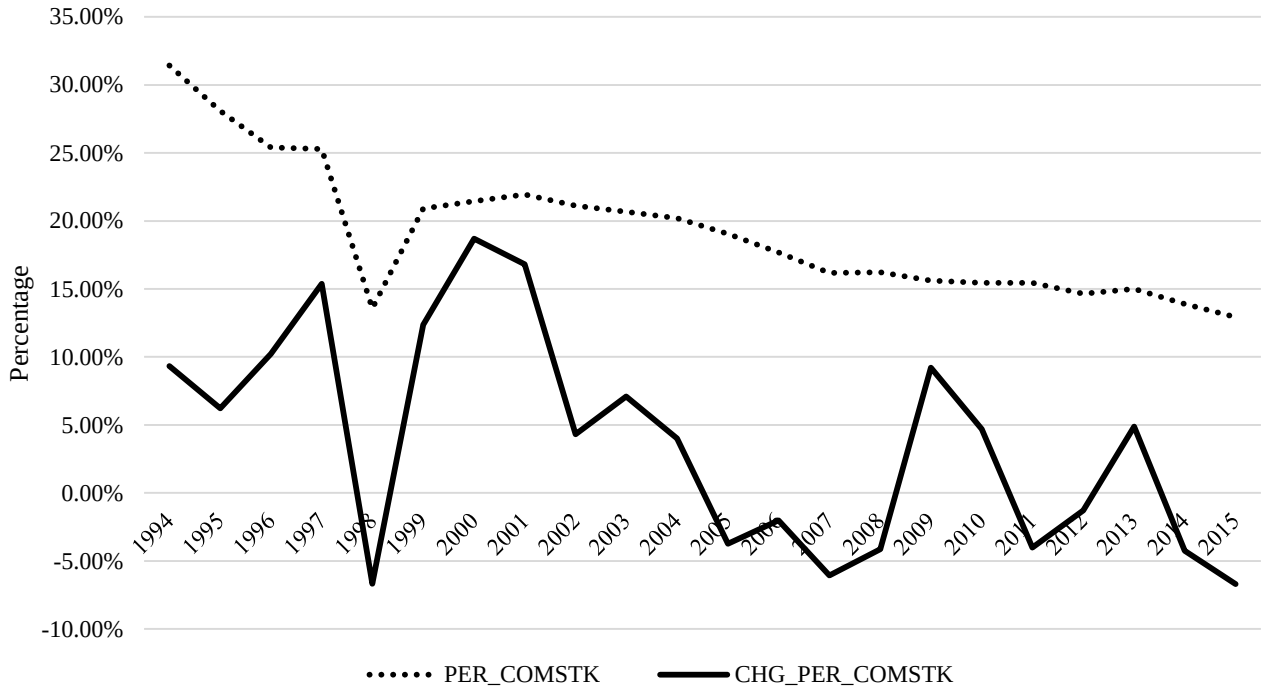


Figure II Trend of the 401(k) Plans Size



DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Figure III Company Stock Holdings Over Time



DOI:10.6814/THE.NCCU.Finance.014.2018.F07

Table XIV
Appendix A
Fama French 17 Industrial Classification Shown in SIC Codes

Classification	SIC Codes	Classification	SIC Codes
Food	100-299 700-799 900-999 2000-2048 2050-2068 2070-2080 2082-2087 2090-2092 2095-2099 5140-5159 5180-5182 5191	**FabPr**	3410-3412 3443-3444 3460-3499
Mines	1000-1049 1060-1069 1080-1099 1200-1299 1400-1499 5050-5052	**Machn**	3510-3536 3540-3582 3585-3586 3589-3600 3610-3613 3620-3629 3670-3679 3680-3695 3699 3810-3812 3820-3827 3829-3839 3950-3955 5060 5063 5065 5080-5081
Oil	1300-1329 1380-1382 1389 2900-2912 5170-5172	**Cars**	3710-1711 3714 3716 3750-3751 3792 5010-5015 5510-5521 5530-5531 5560-5561 5570-5571 5590-5599
Clths	2200-2284 2290-2399 3020-3021 3100-3111 3130-3131 3140-3151 3963-3965 5130-5139	**Trans**	3713 3715 3720-3721 3724-3725 3728 3730-3732 3740-3743 3760-3769 3790 3795 3799 4000-4013 4100 4110-4121 4130-4131 4140-4142 4150-4151 4170-4173 4190-4200 4210-4231 4400-4700 4710-4712
Durbl	2510-2519 2590-2599 3060-3099 3630-3639 3650-3652 3860-3861 3870-3873 3910-3911 3914-3915 3930-3931 3940-3949 3960-39622 5020-5023 5064 5094 5099	**Utils**	4900 4910-4911 4920-4925 4930-4932 4939-4942
Chems	2800-2829 2860-2879 2890-2899 5160-5169	**Rtail**	5260-5261 5270-5271 5300 5310-5311 5320 5330-5331 5334 5390-5400 5410-5412 5420-5421 5430-5431 5440-5441 5450-5451 5460-5461 5490-5499 5540-5541 5550-5551 5600-5722 5730-5736 5750 5800-5813 5890 5900 5910-5912 5920-5921 5930-5932 5940-5949 5960-5963 5980-5990 5992-5995 5999
Cnsum	2100-2199 2830-2831 2833 2834 2840-2844 5120-5122 5194	**Finan**	6010-6023 6025-6026 6028-6036 6040-6062 6080-6082 6090-6099 6100 6110-6112 6120-6129 6140-6163 6172 6199-6300 6310-6312 6320-6324 6330-6331 6350-6351 6360-6361 6370-6371 6390-6411 6500 6510 6512-6515 6517-6519 6530-6532 6540-6541 6550-6553 6611 6700 6710-6726 6730-6733 6790 6792 6794 6795 6798-6799
Cnstr	800-899 1500-1511 1520-1549 1600-1699 1700-1799 2400-2459 2490-2499 2850-2859 2950-2952 3200 3211 3240-3241 3250-3259 3261 3264 3270-3275 3280-3281 3290-3293 3420-3433 3440-3442 3446 3448 3452 5030-5039 5070-5078 5198 5210-5211 5230-5231 5250-5251	**Other**	2520-2549 2600-2659 2661 2670-2761 2770-2771 2780-2799 2835-2836 2990-3000 3010-3011 3041 3050-3053 3160-3161 3170-3172 3190-3221 3229-3231 3229-3231 3260 3262-3263 3269 3295-3299 3537 3640-3649 3660-3666 3669 3840-3851 3991 3993 3995-3996 4810-4813 4820-4822 4830-4841 4890-4892 4899 4950-4961 4970-4971 4991 5040-5049 5082-5088 5090-5093 5100 5110-5113 5199 7000 7010-7011 7020-7021 7030-7033 7040-7041 7200 7210-7213 7215-7221 7230-7231 7240-7241 7250-7251 7260-7269 7290-7291 7299-7300 7310-7323 7330-7338 7340-7342 7349-7353 7359-7385 7389-7395 7397 7399 7500 7510-7523 7530-7549 7600 7620 7622-7623 7629-7631 7640-7641 7690-7699 7800-7833 7840-7841 7900 7910-7911 7920-7933 7940-7949 7980 7990-8499 8600-8700 8710-8713 8720-8721 8730-8734 8740-8748 8800-8911 8920-8999
Steel	3300 3310-3317 3320-3325 3330-3341 3350-3357 3360-3369 3390-3399		

DOI:10.6814/THE.NCCU.Finance.014.2018.F07