The SEC Disclosure Requirement and Directors' Turnover Around Stock Repurchase

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Abstract

The aim of this research is to outline board turnover when firms repurchase their own shares. Indeed, to control insiders' short-swing trading during repurchase events and protect outsiders against speculation, it is useful to know how boards are changed. We examine the introduction of the SEC 2004 disclosure requirement effectiveness on repurchase announcement returns and director's turnover in a sample of 764 companies over 1998 to 2013. In a broad cross-section of US firms, we argue that the SEC 2004 Rule appears to receive greater weight in turnover decision. However, the more insiders are entrenched into the board, the more they cannot be replaced easily even though 2004 disclosure Rule is adopted. We also find that a large number of board independencecontinue to explain the variation of board turnover.

Keywords: stock repurchase, firm performance, director's turnover, SEC rules

1. Introduction

Over the last century, many stock repurchase programs occurred and become a significant component of payout policies in the US. From 1980 to 1990 the value of stocks repurchased was about one-third of the value distributed as cash dividends (Ikenberry, Lakonishok, & Vermaelen, 1995). Historically, in 1998 and for the first time, U.S firms distributed more cash to investors through share repurchases than through cash dividends. According to aggregate data from Compustat, expenditures on repurchase programs increased from 4.8% in 1980 to 41.8 percent in 2000 (Grullon & Michaely, 2002). Signaling and the free cash-flow hypothesis are suggested as the primarly reasons for firms to repurchase their stocks. In this context, empirical evidence shows a positive and significant abnormal returns after announcements or a price support as a motivation (Liu & Swanson, 2016). For instance, Ikenberry et al. (1995) found that the average abnormal four-year buy-and-hold return is 12.1%. Also, Comment and Jarrell (1991) showed an average announcement return of 2,3% for open market repurchase and that dutch-auctions and fixed-price offers have an average return of 7.7% and 11.9%, respectively. However, unlike most of the corporate events (i.e. Dividend), repurchase announcement is not a mandatory decision. Thus, market will not capture the information content of the repurchase announcement for all repurchase.

Prior to 2004, no rules bind a firm to announce a repurchase programs nor to execute it or disclose its size, its duration or its motivation. In fact, the only legal and regulatory framework surrounding open market share repurchases is the rule 10b-18 safe harbor promulgated under the securities and exchange act of 1934. This rule describes a code of conduct that, if followed, protects firms against charges of share price manipulation. It gives repurchasing firms immunity from the anti-manipulation provisions of the Securities Exchange Act of 1934, provided that certain conditions are satisfied in accordance with the rule's manner, timing, price and volume conditions. In a narrow sense, not conforming to the provisions of 10b-18, does not make the firms action illegal or in violation of the anti-price manipulation law; however, a firm will no longer have the safe harbor protection or immunity. Hence, compliance with this rule is voluntary and disclosure of the repurchase activity need an approval by the board of directors andis not mandatory as explicitly stated in Paragraph (d) of Rule 10-18 (Kumar et al., 2017; Nikhil et al., 2004). Besides, this rule does not mention insiders' trading activity at all.

After 2004, the SEC required that firms disclose their repurchase activity for the past quarter in their 10-Q and 10-K filings. Stephens and Weisbach (1998) found that in the three years after announcing a repurchase program, 17% of the sample firms, repurchased less than 20% of their target. Drawing on this, after 2004, Simkovic (2009)

shows on the countrary, that firms are more likely to complete their announced repurchase programs after the introduction of this disclosure rule. Hence, the 2004 SEC disclosure requirement become a more reliable indicator of actual repurchases and has substantially reduced the danger to investors of false signaling or bargain repurchases (Bonaimé, 2015). In fact, previous studies have shown that insiders (managers and directors) may opportunistically enrich themselves through open market repurchase announcements regardless of Section 16 of the Securities Exchange Act of 1934 which prohibits managers from making short swing profits and that they were less likely to trade immediately after repurchase announcements (Hamouda & Ben Arab, 2013; Leng & Zhao, 2014). Short swings give insiders the opportunity to trade undetected, on inside information, because firms aren't required to disclose daily buyback activity when repurchases programs are in place. This will allow insiders to sell stock immediately after option are exerciced. In such setting, when approving repurchase and stock-based pay for top executives, directors believe they're acting in the interests of shareholders. However, they didn't in reality because, as suggested by (Lazonick, 2014), the vast majority of shareholders are taxpayers investing in outstanding shares, who sell their stocks when they want to lock in gains or minimize losses. As a consequence, they should have seats on boards and have the insights and incentives to ensure that insiders allocate resources to generate innovations and value. To control short-swing trading and protect "outside" stockholders against short-swing speculation by "insiders" with advanced information, it is important to know how boards are changed. In other words, because of the mandatory disclosure rule of SEC 2004 law which limit insiders opportunistic trading, in what extent corporate insiders are replaced according to insiders trading enforcement laws after 2004 in repurchasing firms. Thus, given the lack of downside penalty or less risk of insider trading before 2004 amendment law (Note 1), we hypothesize that:

H0: directors' turnover is higher after the introduction of the 2004 SEC disclosure requirement. That is:

> **H01**: directors' turnover is higher after the introduction of the 2004 SEC disclosure requirement when companies announce repurchases.

> **H02**: directors' turnover is more pronounced with dependent directors after the 2004 SEC disclosure requirement than with independent directors.

We will evaluate the effectiveness of the SEC's regulation by measuring whether 2004 disclosure requirements have encouraged insider's turnover around stock repurchase announcement. This study also shed some light on the desirability of the recently enacted insider-trading regulations. In fact, despite the potential importance of management turnover made in corporation, there is a very little direct evidence of directors' turnover after repurchase announcement

This paper is organized as follows. Section 2 develops our sample selection and Research Methodology and details descriptive statistics on our variables of interest. Section 3 discusses our results and describes several tests of the robustness of our results. Section 4 concludes.

2. Method

2.1 Sampling Procedures

The sample. Open-market repurchase announcements is obtained from two sources: The Wall Street Journal and the Lexis-Nexis Academic, over period 1998 to 2012. we only include repurchase announcements that are not preceded by other announcements in the same year in order to avoid frequently programs. Besides, firms can repurchases shares either through tender offers or through open market transactions. In this study, we only examined announcements with open market repurchase (OMRs). This procedure left us with 2881 announcements dates. Based on the information reported by Thomson financial database, we collected turnover data sets by tracking each director before and after repurchase announcements. Using start and termination dates from Thomson financial database has enabled us to identify instances of directors' turnover and to compute directors' tenure. That is, we build a measure of director turnover at the firm level. For any given announcement date, turnover is the number or the percentage of board member who left the board as suggested by (Daily & Dalton, 1995). In sum, director turnover was updated for each announcement. We further excluded firms where start and end directorship was not available and firms with missing data (lack of start and termination date) (Note 2). This procedure left us with a final sample of 764 firms.

2.2 Research Design

Weisbach (1988) documented a stronger association between prior performance and the probability of a resignation for firms with outsider-dominated boards stronger than for firms with insider-dominated boards. In this study, we looked for inside and outside directors' turnover.

As to Dah et al. (2014) we looked for three board structure changes. we create two categorical variables

(dependent and independent) which can take the values of [-1, 0, 1]. The negative value corresponds to a loss in dependents (independent directors), whereas the positive value corresponds to an increase in dependents (independent directors). The zero value corresponds to no change before and after announcement. To check the increase or the decrease in independent (dependent) director, we used the mean change in these categorical variables from the pre to the post repurchase announcement.

Because of nature of the dependent variable, we used the least square and logistic regressions methodologies for each possible change in directors. We estimate the following regression:

$$Turnover_t = \propto + \beta_1 perf_{i,t-1} + \beta_2 volatility_{perfo_{i,t-1}} + \delta_{i,t} + \mu_{i,t} \qquad (1)$$

Our dependent variable (Turnover) is an indicator variable equal to one if there is a director change in the quarter following the fiscal quarter-end for each repurchase announcement for the logistic regression.

To capture firm performance, we measure it in several ways. We estimate several measures of abnormal stock performance prior the repurchase announcements. Indeed, an extensive literature documents an inverse relation between the likelihood of turnover and firm performance (Murphy & Zimmerman, 1993; Weisbach, 1988). In this view, we use an accounting and market based measure of performance. The accounting measure capture the value created by the existing manager and the market measure fully capitalize the expected value created (Engel, Hayes, & Wang, 2003). The choice of these two measures is that accounting and market based measure of performance reflect both the impact of the economic shock to the firm and the firm's anticipated response to the shock (Easterwood, Ince, & Raheja, 2012). We begin by computing the operating return on assets (ROA) for each firm-year as the ratio of earnings before interest and taxes (EBIT) to the last year's total assets from the Worldscope database. Next, we subtract the industry median value of the operating ROA from this value to compute an industry-adjusted operating ROA for each firm-year. The industry median is computed using all firms with the same two digit SIC code for each year (Note 3). The second measure is the four quarters industry-adjusted abnormal returns (Ret). However, to increase the robustness of our findings, we also employ a 3 months Buy-and-hold abnormal return as a third measure of performance. The Buy-and-hold abnormal returns are calculated as each firm's buy and hold return minus the buy and hold return on the portfolio of firms from the same size decile (Note 4). Volatility is the standard deviation of firms' stock returns over the previous 60 months. Gamma in the equation (1) represents a set of control variables representing age of directors, insider holdings, number of independent and board size. Like (Engel et al., 2003), we added a dummy variable equal 1 if a director age is between 64-66 to control for the standard retirement age effect and a dummy year indicators as controls. Our empirical performance measures, however, are computed over the preceding four quarters. Each measure is calculated for the most recent fiscal year ending prior to the year of the turnover.

3. Results

3.2 Repurchase Announcements and Turnover Frequencies

Table 1 reports the distribution of repurchasing firms by calendar year. Panel A shows that repurchase announcements are most often equaly-distibuted but with a peak in 2007 and 2011 (Note 5). The largest concentration of firm distribution (panel B) is centered around 58% in one to two announces. Due to the passage the SEC disclosure requirement, we expect an increase in the percentage of turnover in firms after 2004. Figure 1a shows the distribution of directors' turnover before and after 2004. It's clear that turnover measured as the frequency of quit or the number of director who left the board is larger after 2004. In the pre-2004 period, the mean percentage (number) of directors who left the board is 17.478% (4.38). After 2004 period, it become 37.47% (9.23). Figure 1 also shows that (in 2b) dependent (independent) directors experience a significant decline (raise) after 2004. This result shows that, after 2004, repurchasing firms increased the number of independent directors serving on their boards at the expense of dependent. However, these statistics do not address the turnover performance sensitivity as discussed by previous studies (Denis, Denis, & Sarin, 1997; Martin & McConnell, 1991; Weisbach, 1988).

Table 1. Descriptive statistics for open-market share repurchases from 1997 to 2012

Panel A : share repurchase announcements by calendar year			
1997	5	5	0.002
1998	146	151	0.051
1999	129	280	0.045
2000	131	411	0.045
2001	96	507	0.033
2002	105	612	0.036
2003	108	720	0.037
2004	174	894	0.06
2005	201	1095	0.07
2006	240	1335	0.083
2007	376	1711	0.131
2008	267	1978	0.093
2009	96	2074	0.033
2010	229	2303	0.079
2011	327	2630	0.114
2012	251	2881	0.087
Total	2881	19587	0.999
Panel B : Firm distribution by number of repurchase announcements			
Announces	Freq		%
1	350		0.359
2	216		0.222
3	132		0.135
4	83		0.085
5	64		0.066
6	48		0.049
7	31		0.032
8	16		0.016
9	19		0.019
10	4		0.004
11	3		0.003
12	5		0.005
13	2		0.002
17	1		0.001
25	1		0.001
Total	975		0.999

Note. The sample consists of firms that announced open market share repurchase from 1997 to 2012. Panel A present the time distribution of publicly held corporations that announced open market share repurchase programs as listed in Lexis-Nexis database. Panel B report firm distribution by number of repurchase announced.

(a) Density distribution of dependent and independent directors   (b) Number and frequency of directors who left the board
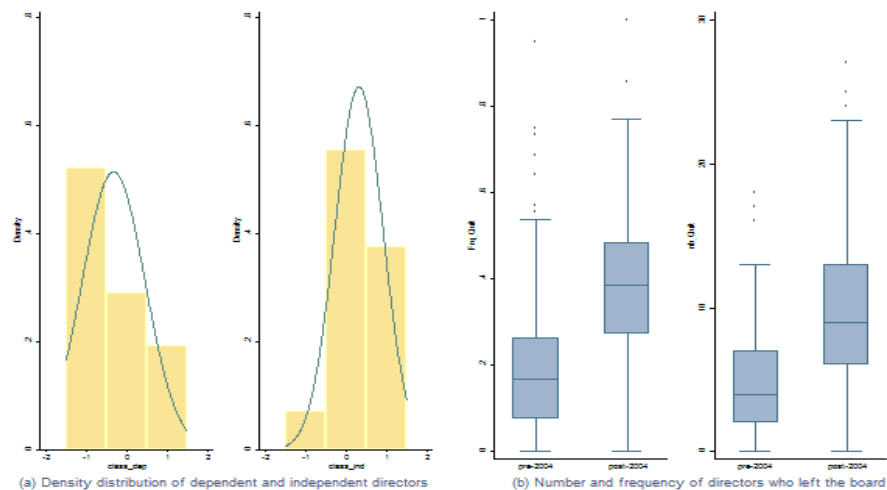
Figure 1. Directors' turnover before and after 2004

Table 2 present summary statistics of the board of directors and turnover before and after SEC disclosure requirement. We provide a univariate analyses of board characteristics before and after SEC disclosure requirement. The board size during the pre-2004 period (panel A) ranges from 11,52 to 20,36 before and after announcement with an overall director's quit equal to 4,38 (17,4%). Panel B presents the corresponding information for the post-2004 period with board size ranging from 17,36 to 14,64 and an overall of 9,23 (37,47%). Results highlight that, for all firms that announce shares repurchase, board characteristics are significantly different before and after announcement. This is also true for pre-post 2004. These findings support the idea that after 2004, the increasing rate of turnover in the post 2004 is indicative of more effective monitoring for some firms. This is consistent with more independent directors than insider from pre to post announcement (Panel A).

Table 2. Comparison of board characteristics and turnover before and after SEC disclosure requirement

	pre2004			post2004			p-Value	
Panel A	Before announce	After announce	p-Value for before/after	before announce	after announce	p-Value for before/after	before pre-post	after pre-post
Tenure	9.02	6.47	0.0000	11.15	3.66	0.0000	0.0000	0.0000
# insiders	9.29	10.01	0.0000	10.95	4.80	0.0000	0.0000	0.0000
% insider	0.76	0.50	0.0000	0.60	0.32	0.0000	0.0000	0.0000
#independent -	2.90	9.99	0.0000	6.71	9.42	0.0000	0.0000	0.0000
% independent	0.23	0.49	0.0000	0.39	0.67	0.0000	0.0000	0.0000
Board size	11.52	20.36	0.0000	17.36	14.64	0.0000	0.0000	0.0000

	pre-2004			post-2004		p-Value		
Panel B						pre-post		pre-post
	mean	median		mean	median	mean		median
%Quit	.1748032	.1666667		.3747973	.3846154	0.0000		0.000
#Quit	4.387795	4		9.234481	9	0.0000		0.0000

Note. This table summarize board characteristics for 764 firms that announce repurchase programs from 1998-2012. The sample means presented are determined for the pre-2004 and post-2004 period when SEC disclosure requirement was adopted-Values are provided for the differences in before and after announcement subsamples as well as between the pre-2004 and post-2004 period for within subsamples.

3.3 Turnover and SEC Rule 2004

We first estimate our most basic specification, allowing the probability of turnover in year t to depend on year t-1 stock performance. On Table 3, we present regressions of the turnover on firm performance and firm characteristics, including year fixed effects. The dependent variable is director's turnover, measured over two periods (before and after 2004). The first measure is a dummy variable equal one if on average the number of directors who left the board are larger than those who stay on it after 2004. The second measure is the percentage of directors who left the board after 2004. The third measure identifies the number of directors who have left the board after 2004.

Table 3. Logit and OLS regression of director turnover regressed on performance measures and control variables

dependent variable	dummy variable=1			% of directors			# of directors		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	Logit	Logit	Logit	OLS	OLS	OLS	OLS	OLS	OLS
Return t-1	-0.0137*			-0.000350			-0.000901		
	(0.00785)			(0.000225)			(0.00527)		
Volatility -60 month	-0.579			-0.0137			-1.130***		
	(0.611)			(0.0184)			(0.433)		
ROA		5.36e-05			4.81e-05			-0.00650	
		(0.00937)			(0.000381)			(0.00897)	
BHAR -3 month			0.00678			0.000378			0.00954
			(0.0112)			(0.000456)			(0.0106)
Age	-0.107***	-0.114***	-0.122***	-0.000814	-0.000340	-0.00165	-0.123***	-0.114***	-0.129***
	(0.0259)	(0.0250)	(0.0296)	(0.00104)	(0.00101)	(0.00119)	(0.0244)	(0.0238)	(0.0276)

age 64-66	0.305	0.311	0.148	0.0137	0.00952	0.0199	0.704***	0.631**	0.755**
	(0.270)	(0.266)	(0.313)	(0.0112)	(0.0111)	(0.0131)	(0.264)	(0.262)	(0.304)
Size	-0.0460	-0.0471	-0.0763	-0.0191***	-0.0192***	-0.0201***	-0.135**	-0.153***	-0.183***
	(0.0583)	(0.0566)	(0.0655)	(0.00241)	(0.00235)	(0.00270)	(0.0567)	(0.0553)	(0.0629)
Board size	0.0801***	0.0792***	0.0893***	0.0204***	0.0206***	0.0209***	0.843***	0.848***	0.849***
	(0.0175)	(0.0170)	(0.0205)	(0.000709)	(0.000689)	(0.000824)	(0.0166)	(0.0162)	(0.0192)
SEC 2004 Rule	1.315*	0.977**	0.795	0.333***	0.146***	0.216***	7.724***	2.511***	4.029***
	(0.672)	(0.456)	(0.540)	(0.0475)	(0.0226)	(0.0267)	(1.116)	(0.532)	(0.622)
insider ownership	-0.227***	-0.231***	-0.320***	-0.0163***	-0.0146***	-0.0158***	-0.482***	-0.445***	-0.468***
	(0.0702)	(0.0687)	(0.0810)	(0.00290)	(0.00284)	(0.00331)	(0.0681)	(0.0670)	(0.0770)
independent	-0.148***	-0.145***	-0.163***	-0.0173***	-0.0163***	-0.0170***	-0.560***	-0.543***	-0.547***
	(0.0367)	(0.0353)	(0.0419)	(0.00149)	(0.00143)	(0.00167)	(0.0348)	(0.0337)	(0.0390)
Constant	7.306***	5.747***	5.929***	0.0884	0.0996*	0.107*	2.563*	1.572	0.972
	(2.398)	(1.373)	(1.615)	(0.0651)	(0.0558)	(0.0641)	(1.527)	(1.315)	(1.492)
Observations	1,057	1,121	820	1,057	1,121	820	1,057	1,121	820
R-squared				0.695	0.695	0.701	0.826	0.824	0.830
year dummies	yes	yes	yes	Yes	yes	yes	yes	yes	yes

Note. This table reports regressions of the relative director's turnover on firm performance and repurchasing characteristics . Board change is measured first as a dummy variable equal one if on average the number of directors who left the board are larger than those who stay on it after 2004. The second measure is the percentage of directors who left the board before and after 2004. The third measure identifies the number of directors who have left the board after 2004. The regression include year fixed effects. Performance measures are calculated at the fiscal year-end before the year of the turnover.

*** p <0:01, **p <0:05, *p <0:1.

The results show that board changes are associated with the size of the board. All measures of board change are positively related to changes in board size at the 1% significance level. However, the negative relationship between change in board independence and directors turnover are consistent with corporate governance theory. The more independent directors into the board, the less is the board change. Market and accounting returns are surprisingly independent of directors' turnover for repurchasing firms. This result suggest that underperforming return did not affect board structure. However, the introduction of 2004 law increase board changes. All SEC 2004 Rule coefficients are positive and significant at 1% level. This suggests that, on average, a director is more likely to be replaced during the post-SEC 2004 Rule period after repurchase announcement. This result confirm those found in Figure 1a.

Also, we observe a negative link between insider ownership, independence, director's age and turnover. As in prior research, (Dah et al., 2014; Engel et al., 2003; Murphy & Zimmerman, 1993) the age variables appear to be the most important factors in predicting turnover. However the negative sign shows that after SEC 2004 rule, directors tend to stay more into the board when the retirement age is not reached. On the contrary, it appears that retirement age is positively significant and directors are asked to leave the board at this limit. In the post repurchase announcement, firms with more independent directors are less likely to change their members after repurchase. These finding support the idea that the more independent seats on the board, the less is the directors' turnover.

The last factor we examined is the increase in insider ownership. As in many firms, the level of monitoring by adding independent directors has a negative impact on board change, in some firms insider ownership is an entrenchment measure that brake turnover. All coefficients are significant at 1% level. However, ownership coefficients had more impact on the board change variable.

In Table 4, a logit model is used to study the impact of SEC requirement disclosure on change in dependent and independent directors. we divide the group of firms into three sub-groups, Decrease, no Change and Increase. The results highlight that, the estimated coefficient of the sought independent variables are significant. On average, the introduction of the SEC 2004 Rule has a different impact when the new board members are dependent or independent. For the subgroup that reduced the number of independent directors, board turnover is significantly explained by the introduction of the Rule 2004. The coefficient is positive and significant. On the opposite, when there is an increase in independent directors, the effect of this rule become negative. For these firms, Rule 2004 appears to have led to lower board turnover. However, for the subgroup that increased or decreased the number of dependent variable, there is no effect of the Rule 2004. In general, Rule 2004 explain

Board turnover and increases the probability of directors' replacement following repurchase announcement. In terms of the other variables, it appears that in many firms insider ownership and director's age have significant impact on directors' turnover.

Table 4. Logit regression for changes in independent and dependent directors

dependent variable	independent			dependent		
	increase	no change	decrease	increase	no change	decrease
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Logit	Logit	Logit	Logit	Logit	Logit
industry-adjusted Return t-1	0.0141	-0.00622	-0.0132	0.00897	-0.00171	-0.00820
	(0.0132)	(0.0156)	(0.0153)	(0.00901)	(0.00930)	(0.00782)
Volatility -60 month	0.641	0.612	-0.917	-0.531	3.507	-0.188
	(0.672)	(1.408)	(0.631)	(0.751)	(2.629)	(0.792)
Age	-0.115***	0.0678*	0.0954**	-0.0449	-0.0387	0.0550
	(0.0360)	(0.0407)	(0.0429)	(0.0498)	(0.0606)	(0.0448)
age 64-66	-0.254	0.410	-0.217	0.528		-0.367
	(0.297)	(0.302)	(0.322)	(0.879)		(0.856)
Size	0.0113	-0.130	0.125	0.0541	0.293*	-0.207*
	(0.0864)	(0.0995)	(0.106)	(0.128)	(0.160)	(0.113)
Board size	0.0227	-0.00285	-0.0326	-0.350***	-0.296***	0.437***
	(0.0230)	(0.0259)	(0.0274)	(0.0475)	(0.0576)	(0.0477)
SEC 2004 Rule	-4.416***		3.618***	-0.626	-4.631**	2.014
	(1.211)		(1.210)	(1.360)	(2.206)	(1.333)
insider ownership	-0.241**	0.155	0.169	-0.318**	0.529***	-0.0727
	(0.0968)	(0.108)	(0.115)	(0.162)	(0.168)	(0.134)
independent	-0.0387	-0.00697	0.0775	0.228***	-0.0298	-0.193***
	(0.0549)	(0.0639)	(0.0695)	(0.0780)	(0.100)	(0.0718)
Constant	7.627**	-6.025	-7.096**	4.317	-7.451	-5.043
	(3.063)	(6.051)	(3.252)	(3.669)	(8.479)	(3.583)
Observations	906	830	906	1,057	822	1,057
year dummies	yes	yes	yes	yes	yes	yes

Note. This table report Logit regression results for board turnover on firm performance and repurchasing characteristics for the subsample of firms who decreased, increased, or did not change board independence. WE create two categorical variables (dependent and independent) which can take the values of [-1, 0, 1]. The negative corresponds to a loss in dependents (independent), whereas the positive corresponds to an increase in dependents (independent directors). The zero value corresponds to no change before to after announcement. The regression includes year fixed effects. Standard errors in parentheses. *** $p < 0.01$, **$p < 0.05$, *$p < 0.1$

4. Discussion

This paper joins the literature describing the behavior of repurchasing firms surrounding board turnover. After controlling for both firm performance and SEC 2004 regulation Rule, we found, with a dataset of monthly shares repurchase programs for a full sample of U.S. publicly firms, that board changes significantly after the introduction of this rule. Many firms tend to change their board structure in response to the SEC new 2004 disclosure Rule and not to firm performance. To determine if board change is evident at the announcement, we examine turnover related to announcement return. The result shows no significant relation between the announcement return and director's changes. However, the SEC 2004 Rule have positive and significant effect on board turnover after repurchase announcement. Also, most studies begin with the assumptions that prior firms' performance explain board change. On the contrary, performance, as measured in long and short term in our study, was not a key variable of directors' change. In contrast, firms with high board number experience higher board turnover than those with less board members. However, those with higher ownership structure (precisely shares held by insiders) experience few or no change in board turnover after repurchase announcement. This result could indicate that the more insiders are entrenched into the board, the more they cannot be replaced easily even though 2004 disclosure Rule is adopted. Additionally, we find that a nontrivial proportion of repurchasing firms increase independent directors and decrease dependent directors post-2004 SEC Rule. SEC 2004 Rule appear to have opposite sign when independent directors increase or decrease. The effect is positively pronounced when independent directors decrease.

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Notes

Note 1. According to Hamouda and Ben Arab (2013); Leng and Zhao (2014) managers take advantage of

regulatory loopholes and enjoy short-term price benefits after announcing open-market repurchase.

Note 2. Unfortunately, this source does not allow us to identify the causes of turnover, e.g. forced resignation, voluntary quits, death, illness, retirement, etc.

Note 3. we also add a condition that firms total assets must be at least 75 million for each year.

Note 4. Equal Weighted Returns on monthly 5 Quintiles are availables in Fama and French web-site: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.Like (Barber & Lyon, 1997) Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics, 43*(3), 341-372. We define $BHAR_{i,\tau} = \prod_{t=1}^{\tau}(1 + R_{i,t}) - \prod_{t=1}^{\tau}(1 + E(R_{i,t}))$

Note 5. Dittmar and Field (2015) found that aggregate repurchases fluctuated greatly during this time, peaking in 2007 because of financial crise.

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