

The Impact of Equity Incentives on Stock Repurchases

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Abstract: The relationship between the opportunistic motives of major shareholders or executives and stock repurchases has been a significant concern for scholars and regulators. This study, based on the perspective of equity incentives, utilizes a sample of Chinese A-share listed companies from 2007 to 2022, employing Tobit and Probit models for empirical analysis. The research reveals that exercisable equity incentives (unlocked) have a significantly positive impact on stock repurchases. Furthermore, through a mechanism study, it is found that media supervision and analyst supervision have a significant negative impact on the relationship between the two. These findings indicate that exercisable equity incentives (unlocked) lead executives to engage in stock repurchases with opportunistic characteristics. The study's findings are valuable for understanding the practice of stock repurchases in Chinese enterprises and implementing effective regulatory policies.

Keywords: Equity Incentives; Stock Repurchases; Executive Opportunism; Media Supervision; Analyst Oversight

1. Introduction

The relationship between incentives and stock repurchases has been a crucial topic in academic research. Existing studies have explained corporate stock repurchase behavior from various perspectives, such as signal transmission [1], optimizing capital structure [2], maintaining financial flexibility [3], property rights [4], and financing constraints [5]. From the perspective of government regulatory practices, regulatory authorities in Europe, the United States, and China imposed restrictions on corporate stock repurchases in the early stages of capital market development to prevent companies from manipulating stock

prices through stock repurchases [6].

On December 25, 2013, China issued the "Opinions on Further Strengthening the Protection of the Legitimate Rights and Interests of Small and Medium-sized Investors in the Capital Market," explicitly calling for the enhancement of the stock repurchase system. It guides listed companies to commit to repurchasing shares when the stock price falls below net asset value per share, aiming to better safeguard the interests of small and medium-sized shareholders. Under the guidance of national policy, an increasing number of listed companies are declaring the implementation of stock repurchase plans. As a crucial tool for market value management [7], stock repurchases can have both positive and negative effects [8]. Chinese regulatory authorities are deeply concerned about whether the stock repurchases of Chinese listed companies are manipulated opportunistically by these companies, and there is no dedicated literature on this issue in the domestic context.

Based on data from Chinese A-share listed companies, this study empirically examines the impact of exercisable stock incentives (unlocked) on stock repurchases by listed companies. It enriches research results on the economic consequences of stock incentives and the factors influencing stock repurchases.

2. Theoretical Analysis and Research Hypotheses

Because of the division between ownership and control and the information asymmetry between executives and shareholders, shareholders need to use equity incentive mechanisms to mitigate the moral hazard issue of executives and incentivize their risk-taking, thereby maximizing corporate value [9].

Based on the optimal contract theory, equity incentive plans are conducive to mitigating the moral hazard issue of executives and encouraging them to undertake behaviors

beneficial to maximizing corporate value, including but not limited to stock repurchases. Due to the information asymmetry between executives and external shareholders, when executives possess information indicating undervaluation of the firm, they may signal undervaluation to external shareholders through stock repurchases. Additionally, stock repurchases can consume the company's free cash flow, reducing the principal-agent problem caused by free cash flow and thus contributing to maximizing corporate value. Stock options generally consist of four stages: grant, vesting, exercisable, and post-exercise restricted (the main difference from restricted stock is the absence of restrictions on transferability). Before the restriction period expires, stock options maintain strong incentive effects. Therefore, the exercisable stock incentives (unlocked) can effectively motivate executives to implement stock repurchases that favor maximizing corporate value.

Based on the managerial power theory, executives may engage in opportunistic behaviors, such as cutting R&D (Research and Experimental Development) investment and earnings management, to meet the requirements of exercising (unlocked) equity incentives [10]. They may also influence stock prices by releasing (suppressing) good (bad) news to maximize their own utility. The special attributes of stock repurchases make it a significant tool for managerial opportunism. On the one hand, stock repurchases can diminish the quantity of outstanding shares consequently raises the company's EPS (Earnings Per Share) to meet the exercise requirements of the incentivized party. On the other hand, the announcement and actual implementation of stock repurchases can boost stock prices and maintain a high stock price level for a certain period, thus benefiting the post-exercise divestiture of equity incentives. Therefore, exercisable equity incentives (unlocked) also have a positive impact on stock repurchases through executive opportunistic motives.

Accordingly, this paper puts forward the following hypothesis:

Hypothesis 1: Holding other conditions constant, there is a positive correlation between exercisable equity incentives (unlocked) and stock repurchases.

3. Research Method

3.1 Sample Selection and Data Source

The initial research sample comprises all A-share listed companies spanning the period from 2007 to 2022. The sample is refined by excluding ST and *ST companies, those in the financial industry, samples with stock appreciation rights as the form of equity incentive, and samples with missing variables. A total of 29,523 annual samples of companies are obtained. The choice of 2007 as the starting year is primarily due to the implementation of the "Administrative Measures for Stock Incentives of Listed Companies (Trial)" in 2006. Stock incentive plans require at least a 1-year waiting period (lock-up period) before they can be exercised (unlocked).

3.2 Research Model

Following the research design of Edmans et al. (2017)[11], this study employs Model (1) to investigate the correlation between the exercise of stock incentives and stock repurchases.[11].

$$REPU = \beta_0 + \beta_1 INC + \beta_2 SIZE + \beta_3 LEV + \beta_4 ROE + \beta_5 CF + \beta_6 DIV + \beta_7 PE + \beta_8 MAR + \beta_9 SOE + \beta_{10} TOP1 + IND + YEAR + \varepsilon \quad (1)$$

In this study, the variable REPU reflects the stock repurchase situation of listed companies in the present year. It is measured using three indicators: REPU_R, representing the proportion of stock repurchases; REPU_A, representing the total amount paid for repurchased stocks; and REPU_D, indicating whether stock repurchases were conducted. As both REPU_R and REPU_A are left-censored variables, the Tobit model is employed for regression analysis. Meanwhile, since REPU_D is a dummy variable, the Probit model is used for regression analysis. The variable INC reflects the stock incentive situation of listed companies in the current year, taking the value of 1 if the stock incentive plan of the listed company is exercisable or unlocked in the current year, and 0 otherwise. Drawing on literature on factors influencing stock repurchases [12], Model (1) controls for variables reflecting financial characteristics such as company size, ratio of Debt to Equity, return on equity, and

cash flow. Considering that stock repurchases are also considered one of the dividend policies, this study includes the dividend payout ratio as one of the control variables. Since the "Company Law" in China only allows stock repurchases under specific circumstances, this study controls for the price-earnings ratio variable to reflect the motivation for stock repurchases due to undervalued stock prices, controls for the variable indicating whether there is a major asset restructuring to reflect the motivation for stock repurchases due to mergers and

acquisitions, and controls for variables indicating the proportion of shares held by the principal shareholder and property rights to reflect the motivation for stock repurchases due to the threat of mergers and acquisitions. Additionally, this study controls for industry fixed effects and annual fixed effects, and detailed definitions for each variable are outlined in Table 1. To eliminate the impact of outliers on research conclusions, this study truncates all continuous variables at the 1st and 99th percentiles.

Table 1. Variable Definition

Variable Symbol	Variable Name	Variable Definition
REPU_R	Stock Repurchase Ratio	Number of shares repurchased / Total shares
REPU_A	Total Amount Spent on Repurchased Stocks	Natural Logarithm of "1 + Total amount spent on repurchased stocks"
REPU_D	Whether Stock Repurchase Occurred	1 if stock repurchase occurred, 0 otherwise
INC	Feasibility of Stock Incentive Exercise or Unlocking	1 if stock incentive plan is exercisable or unlocked, 0 otherwise
SIZE	Firm Size	Natural logarithm of total assets at the end of the year
LEV	Debt-to-Equity Ratio	Total liabilities / Total assets
ROE	Return on Equity	After-tax profit / Net assets
CF	Cash Flow	Net cash flow from operating activities / Total assets
DIV	Dividend Payout Ratio	Dividend per share / Earnings per share
PE	Price-to-Earnings Ratio	Market price per share / Earnings per share
MAR	Significant Asset Restructuring	1 if significant asset restructuring occurred, 0 otherwise
SOE	Nature of Enterprise	1 for state-owned enterprise, 0 for non-state-owned enterprise
TOP1	Ownership Percentage of the Largest Shareholder	Ownership percentage of the principal shareholder / Total shares

4. Empirical Results and Analysis

4.1. Descriptive Statistics

Table 2 presents the descriptive statistics of the sample. The mean of the variable REPU_R is 0.0001, indicating that the average proportion of repurchased shares to total shares in the sample is 0.01%, suggesting a relatively small scale of stock repurchases. The maximum value of the variable REPU_A is 16.5869, with a mean of 0.6412, indicating significant variation in the amount spent on repurchasing stocks among sample companies. The mean of the variable REPU_D is 0.0483, indicating that approximately 4.83% of the total sample implemented stock repurchases. The mean of the variable INC is 0.0791, indicating that

about 8% of the total sample implemented stock incentive plans. For the variable SIZE, the minimum and maximum values are 19.7600 and 25.9357, with a difference of less than one fold, suggesting a relatively homogeneous firm size among listed companies engaging in stock repurchases. The mean and median of the variable LEV are 0.4195 and 0.4153. The mean (median) of the variable ROE is 0.0892 (0.0782), and for CF, the mean (median) is 0.0458 (0.0455). The mean (median) of the variable DIV is 0.2820 (0.2244). The mean of the variable PE is 92.8428, with a median of 43.4149, indicating a right-skewed distribution of the PE variable. The mean of the variable MAR is 0.0572, suggesting that approximately 6% of the total sample consists of companies undergoing

significant asset restructuring. The mean of the variable SOE is 0.4133, indicating that about 41% of the total sample comprises state-owned enterprises. The mean of the variable TOP1 is 36.0184, indicating that the average ownership percentage of the largest shareholder is 36.02%.

Table 2. Descriptive Statistics

Variable	Mean	SD	Min	Median	Max
REPU R	0.0001	0.0007	0.0000	0.0000	0.0057
REPU A	0.6257	3.4523	0.0000	0.0000	16.5869
REPU D	0.0483	0.2143	0.0000	0.0000	1.0000
INC	0.0791	0.2699	0.0000	0.0000	1.0000
SIZE7	21.9817	1.2625	19.7600	21.7969	25.9357
LEV	0.4195	0.2057	0.0465	0.4153	0.8547
ROE	0.0892	0.0630	0.0030	0.0782	0.3156
CF	0.0458	0.0737	-0.1802	0.0455	0.2501
DIV	0.2820	0.2983	0.0000	0.2244	1.7913
PE	94.4578	175.1293	6.8362	43.4149	1161.6556
MAR	0.0572	0.2323	0.0000	0.0000	1.0000
SOE	0.4133	0.4924	0.0000	0.0000	1.0000
TOP1	36.0184	15.0922	8.9800	34.2900	75.1700

4.2 Multiple Regression Analysis

The regression findings concerning the association between equity incentive exercise (unlocked) and stock repurchases are presented in Table 3. As shown in Table 3, the regression coefficients of the equity incentive variables in models (1), (2), and (3) exhibit significant positive values at the 1% level, indicating that the exercise of equity incentives is linked to an augmentation in stock repurchases, consistent with the research Hypothesis 1.

Table 3. Empirical Results of the Equity Incentive Exercise (Unlocking) and Stock Repurchases

	(1)	(2)	(3)
	REPU R	REPU A	REPU D
INC	0.0074** *	35.1457***	1.8083***
	(28.66)	(41.16)	(33.95)
SIZE	0.0007** *	3.3597***	0.1963***

	(6.06)	(6.23)	(6.28)
LEV	-0.0009 (-1.33)	-6.4293** (-2.23)	-0.3298* (-1.91)
ROE	-0.0061* ** (-3.24)	-19.0180** (-2.22)	-1.2131** (-2.39)
CF	0.0018 (1.34)	6.3314 (0.99)	0.5759 (1.53)
DIV	0.0002 (0.57)	0.7497 (0.57)	0.0449 (0.58)
PE	-0.0000 (-1.17)	-0.0037 (-1.22)	-0.0003* (-1.72)
MAR	-0.0004 (-1.50)	-2.1074* (-1.74)	-0.1228 (-1.58)
SOE	-0.0016* ** (-5.42)	-7.2277*** (-5.06)	-0.4116*** (-5.18)
TOP1	-0.0000* ** (-2.89)	-0.0852*** (-2.65)	-0.0053*** (-2.66)
_cons	-0.0434* ** (-14.47)	-213.7070** * (-8.22)	-11.4432** * (-16.37)
INDUSTRY	Yes	Yes	Yes
YEAR	Yes	Yes	Yes
N	29523	29523	28519
R ²	0.6133	0.3774	0.5974

Among the control variables, the regression coefficients of the SIZE variable are consistently positive, suggesting that larger firms are more likely to engage in stock repurchases, possibly due to the prevalent undervaluation of large-cap stocks in China and their strong motivation for market value management. The ROE variable exhibits consistently negative coefficients, indicating that companies with greater profitability are less inclined to engage in stock repurchases. The regression coefficients of the LEV and CF variables are not statistically significant, suggesting a relatively weak motivation for Chinese firms to optimize capital structure and maintain financial flexibility through stock repurchases. The DIV variable shows positive coefficients, but lacks statistical significance, implying that stock repurchases and dividends are not mutually exclusive in the Chinese capital market, and stock repurchases may not solely serve the purpose of rewarding investors. Although the regression coefficients of the PE variable are consistently negative, statistical significance is achieved only in model (3) at the 10% level, suggesting that stock

repurchases by Chinese firms may not be driven by undervaluation. The MAR variable also shows consistently negative coefficients, but achieves statistical significance only in model (2) at the 10% level, indicating a relatively weaker motivation for stock repurchases in firms undergoing major asset restructurings. This also suggests that events requesting share repurchases due to objections to major asset restructurings are infrequent and, when they occur, the repurchase amounts are relatively small. The regression coefficients of the SOE variable are consistently negative, indicating a relatively weaker motivation for stock repurchases in state-owned enterprises. The TOP1 variable exhibits consistently negative coefficients, suggesting that a lower ownership percentage of the largest shareholder weakens the incentive for stock repurchases. In summary, the main motives for stock repurchases identified in foreign studies

are rarely tested in the Chinese context, indicating a need to rediscover the motivations behind stock repurchases in China. Importantly, this study finds a significant positive correlation between equity incentive exercise (unlocking) and stock repurchases, supporting the research Hypothesis 1.

5. Further Analysis - Moderating Effects of External Supervisory Mechanisms

Supervisory mechanisms play a certain role in constraining executive self-interest behaviors [13]. If executives receiving equity incentives engage in stock repurchases to boost stock prices, thereby achieving the goal of high-level reduction, it implies that the correlation between equity incentives and stock repurchases is a result of executive self-interest. External supervision can curb such self-interested behavior, thereby restraining stock repurchases.

Table 4. Empirical Results of the External Supervision, Equity Incentives, and Stock Repurchases

	(1)	(2)	(3)	(4)	(5)	(6)
	REPU R	REPU A	REPU D	REPU R	REPU A	REPU D
INC	0.0065*** (26.96)	32.6225*** (37.42)	1.8571*** (32.34)	0.0074*** (22.89)	35.6537*** (29.53)	2.0590*** (24.45)
NEWS	0.0000 (1.45)	0.0048 (1.64)	0.0002 (1.40)			
INC×NEWS	-0.0000** (-2.53)	-0.0170*** (-3.12)	-0.0008*** (-2.78)			
ANA				0.0000*** (2.89)	0.2492*** (3.80)	0.0115*** (3.13)
INC×ANA				-0.0001*** (-5.73)	-0.4247*** (-5.35)	-0.0232*** (-4.65)
CONTROLS	Yes	Yes	Yes	Yes	Yes	Yes
INDUSTRY	Yes	Yes	Yes	Yes	Yes	Yes
YEAR	Yes	Yes	Yes	Yes	Yes	Yes
cons	-0.0436*** (-13.53)	-209.3575*** (-14.74)	-11.3590*** (-15.31)	-0.0437*** (-12.18)	-196.6790*** (-13.51)	-11.0673*** (-13.13)
N	29024	29024	28027	24040	24040	23170
R ²	0.6133	0.3774	0.5974	0.6041	0.3614	0.5974

This study introduces the variables of news media (NEWS) and analysts (ANA) to reflect the strength of external supervisory mechanisms. Here, the NEWS denotes the overall count of news articles featuring the company, while the ANA variable represents the total number of analysts tracking the company. The moderating effects of news media supervision and analyst supervision on the relationship between equity incentives and stock repurchases are presented in Table 4. As

observed in Table 4, the regression coefficients of the INCNEWS variable in regressions (1), (2), (3), and the INCANA variable in regressions (4), (5), (6) are all significantly negative at the 1% level. This indicates that the more robust the external supervision, the weaker the relationship between equity incentives and stock repurchases, consistent with the analysis above.

6. Robustness Test — Modified Sample

Period

Due to the irrational downturn in the stock market in 2015, the China Securities Regulatory Commission (CSRC) mandated all listed companies to devise plans for maintaining stock price stability, encompassing major shareholder increases, senior management increases, company repurchases, employee stock ownership plans, and equity incentives, among others. Under the guidance of this policy, some listed companies even concurrently introduced equity incentive and stock repurchase programs to uplift stock prices. Thus, the correlation between equity incentives and stock repurchases may result from the CSRC's mandatory requirements, rather than the unlocking of equity incentives. To eliminate this alternative explanation, this paper excludes the 2015 sample and re-conducts regression analysis on Model (1), with the results presented in Table 5.

Table 5. Empirical Results after Excluding 2015 Data

	(1)	(2)	(3)
	REPU R	REPU A	REPU D
INC	0.0064** *	31.9741***	1.8562***
	(28.22)	(39.18)	(33.94)
INDUSTRY	Yes	Yes	Yes
YEAR	Yes	Yes	Yes
_cons	-0.0436* **	-211.8698** *	-11.2687** *
	(-13.83)	(-15.54)	(-15.62)
N	26494	26494	25591
R ²	0.6345	0.3810	0.6029

7. Conclusions

This study empirically examines the relationship between equity incentives and stock repurchases utilizing data from Chinese A-share listed companies spanning the period from 2007 to 2022. The research findings indicate a significant positive correlation between equity incentives and stock repurchases. Further investigation reveals that as the intensity of incentives increases, the likelihood and amount of stock repurchases also increase. However, the positive correlation between equity incentives and stock repurchases is notably influenced by external supervisory mechanisms. The stronger the external supervision, the weaker the relationship between equity incentives and

stock repurchases. The research findings imply that equity incentives may lead to opportunistic utilization of stock repurchases to maximize self-interest. Robust market oversight mechanisms can effectively constrain the behavior of executives.

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