Agency Implications of Equity Market Timing

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Overview

- ▶ Equity market timing by new equity issuance and share repurchases asymmetrically affect current and future shareholders.
- ▶ Therefore HOW managers time their equity market has different implications for a certain group of shareholders
- ▶ In particular, we can use this fact to test the manager's objective function.
- ▶ The manager may be rewarded for successful market timing only of a particular type.
- ▶ The paper proposes a new measure of equity market timing, based on realized returns and direction of mispricing.

Specifics

- ▶ Suppose the manager has inside information and can buy or sell company's stock on the firm's account
- ▶ Both share buybacks (repurchases) and new issues (SEOs, stock grants, mergers) are very popular and easy to implement.
- ▶ Direction of the trade is based on whether the stock is undervalued or overvalued.

Specifics 2

▶ We show that current shareholders prefer repurchases whereas the future shareholders prefer new equity sales.

▶ Differently from extant literature, we are asking a particular question of how informed manager trading affects shareholder welfare.

▶ Step 1. Recognize that mispricing already exists in stock market and affects shareholders who buy and sell shares without knowledge of mispricing

▶ Step 2. Now suppose the manager is allowed to buy and sell shares on firm's behalf. Will those shareholders be better or worse off from the firm's intervention in equity market?

Literature

- ▶ Evidence of timing:
- ▶ Loughran and Ritter (1995) for equity sales. (and all IPO/SEO literature).
- ▶ Baker and Wurgler (2002) for capital structure.
- ▶ Graham and Harvey (2001) survey evidence.
- ▶ Majority of papers in the literature disregard the difference between timing sales or repurchases, or they specifically focus on, e.g., repurchases.
- ▶ Common comments based on superficial intuition: "repurchasing underpriced shares rips off selling shareholders" or "these guys would sell anyway, good that the firm stepped in" or "it is all about manager—he never sells his shares." Some truth in each.

- ▶ Some related papers study both sales and repurchases, with emphasis on timing asymmetry.
- ▶ Dittmar and Dittmar (2008), but they focus on aggregate repurchase/sales flow.
- ▶ Yang (2010) uses differences in beliefs, studies capital structure.
- ▶ Brennan and Thakor (1990) based on asymmetric information between large and small shareholders.
- ▶ Huang and Thakor (2011) discuss repurchases and shareholder pessimistic investors.

First step — equilibrium price (not in the paper)

▶ Assume downward sloping supply functions.

▶ We will show in a moment that this is a strong assumption coming from the general framework.

▶ Suppose demand and supply are determined by the short-term shareholders (who supply shares) and incoming investors (who buy shares):

$$Q_{ST} = a_{ST} + b_{ST} P_1, \text{ and } Q_{IN} = a_{IN} - b_{IN} P_1.$$

▶ Short term are predisposed to sell, and incoming are predisposed to buy.

Equilibrium price 2

▶ Setting $Q_{ST} = Q_{IN}$ produces some equilibrium price and quantity, which are easy to derive.

▶ We are interested, however, in how these price and quantity changing with the firm's trading on its own stock.

▶ Higher demand for shares (e.g., from the company's repurchase) raises the price.

▶ It raises total quantity sold as well, but not necessarily for a given group of sellers.

▶ For example, company's repurchases shift up the total number of shares bought but competition for shares means higher price and also means that uninformed buyers get fewer shares.

Wealth implications — price and quantity effect separation—for repurchases

Consider the wealth changes of shareholders, suppose when firm repurchases.

...it follows from assumptions (details omitted) for short-term shareholders who sell

$$\Delta V_{ST}^{REP} = \underbrace{\left(Q_{ST}^{REP} - Q_{ST}\right)\left(P_1^{REP} - P_2\right)}_{\text{quantity effect, negative}} + \underbrace{Q_{ST}\left(P_1^{REP} - P_1\right)}_{\text{price effect, positive}}.$$

for incoming shareholders

$$\Delta V_{IN}^{REP} = \underbrace{\left(Q_{IN}^{REP} - Q_{IN}\right)\left(P_2 - P_1^{REP}\right)}_{\text{quantity effect, negative}} + \underbrace{Q_{IN}\left(P_1 - P_1^{REP}\right)}_{\text{price effect, negative}}.$$

(!) repurchases hurt incoming shareholders, but may be ok for selling, this goes against conventional thinking.

Discussion of a simple example

- ▶ Short term shareholders are worse off due to the manager timing new share issuances.
- ▶ Incoming shareholders are worse off because of the repurchases.
- ▶ Introduce long-term, current, and future shareholders.
- ▶ From the net-zero argument——the manager prefers sales to maximize the value of future shareholders, and prefers repurchases to maximize the value of current shareholders.
- ▶ Long-term shareholders, of course, always benefit, but the expense of different people depending on type of timing.
- ▶ Next discuss the general model

Introduce imperfect Investor Learning

▶ Note that simple example starts with demand/supply assumptions and also cannot give much in terms of quantitative results.

▶ We build a model with imperfect learning.

▶ The long-term (fundamental) value of the firm is drawn from the normal distribution $P_2 \sim N(P_0, \sigma_p^2)$.

▶ The manager in a timing firm has a noisy signal v about the long-term firm value $v = P_2 + \varepsilon$, where $\varepsilon \sim N(0, \sigma_\varepsilon^2)$,

Imperfect Investor Learning 2

▶ The manager maximizes the expected profit from trading F shares.

▶ She uses an expectation conditional on her signal

$$\max_{F} E\left[(P_2 - P_1(F)) F | v\right].$$

▶ Proportion λ of firms that are controlled by informed managers who are able to time the market ("timing firms")

▶ Proportion $1 - \lambda$ of other firms that sell and repurchase equity for reasons that are unrelated to misvaluation.

▶ Otherwise, equilibrium is revealing and without further frictions, timing makes no sense.

Investors utilities

▶ We thrive to ensure the existence of the equilibrium and capture heterogeneity among investors.

▶ Shareholders can observe the firm's decision to repurchase or issue equity F and maximize their utility function

$$\max_{X_s} X_s \left(E\left(P_2|F\right) - P_1 \right) - \frac{\theta_s}{2} \left(X_s - Q_s \right)^2,$$

$$\max_{X_i} X_i \left(E\left(P_2|F\right) - P_1 \right) - \frac{\theta_i}{2} \left(X_i - Q_i \right)^2.$$

▶ where $Q_i > 0$ and $Q_s < 0$. That is, short-term investors have preference to sell on average, and the incoming investors—to purchase more, on average.

▶ It is important that we obtain a downward-sloping utility as in the simple example above.

▶ Many ways to achieve this, what we show above is just for tractability.

PROPOSITION 1

If $\lambda < 1/2$, the rational expectations equilibrium exists. The equilibrium price is given by

$$P_1 = P_0 + \beta F,$$

where F is firm's trades and

$$\beta = \frac{1}{1 - 2\lambda} \frac{\theta_s \theta_i}{\theta_s + \theta_i}.$$

The sensitivity of price to the firm's order flow is positive. Sensitivity is positive even if shareholders cannot infer any information from the price or from the firm's trades (e.g., when $\lambda \to 0$)

PROPOSITION 2

Short-term and incoming shareholders are worse off when a firm engages in market timing.

–intuitive result which comes from manager's being aligned with the long-term shareholders.

The proposition holds irrespective of whether we measure the welfare of shareholders by wealth or by utility functions.

Welfare implications for the groups of shareholders

Short-term shareholders are worse off from market timing with equity issuances. The incoming shareholders are worse off from market timing with repurchases.

Consider, for example, short-term shareholders who are negatively affected by the timing of equity sales.

Corollary

The expected wealth of current shareholders increases with share repurchase timing. The expected wealth of future shareholders increases with equity issuance timing.

Measure Equity Market Timing

- ▶ It is important to measure the value from timing, not just the fact of repurchase or sale of shares.

- ▶ Compare to the literature with event studies.

- ▶ The measures capture how much additional return the long-term shareholders gain from manager's timing.

- ▶ We generally can employ a measure with current or ex-post mispricing, there are potential issues with both.

- ▶ One complication is that the action of timing itself will change the firm's true value. We can only observe the final value P_2 as a result of timing, but cannot observe the fair price P_2' before timing.

Measure Equity Market Timing 2

▶ We back up P_2' by the price P_1 at which firm repurchased/issued based on the no-arbitrage relationship $(1 - q)P_2 = P_2' - qP_1$.

$$\text{Timing with repurchases} = \frac{P_2 - P_2'}{P_1} = q\left(P_2/P_1 - 1\right)$$

▶ For each month, we calculate the proportion of equity repurchased during a month, α_i, and then multiply it by either one- or three-year post-repurchase risk-adjusted returns, r_i.

Adjustment and Data

▶ We adjust the measure of timing for risk using matching firms portfolios.

▶ Repurchase data comes from Compustat.

▶ Additionally, following Stephens and Weisbach (1998), we proxy for share repurchases by the monthly decreases in split-adjusted shares outstanding reported by CRSP.

▶ SEOs are from the SDC database. We additionally repeat results with monthly changes in number of shares.

▶ We use the compensation data on firms' CEOs from the Standard and Poor's Execucomp database.

Summary: Data

Variable	Obs.	Mean	T-test
Timing SEOs (1-year)	3,615	0.452	2.28**
Timing SEOs (3-year)	2,577	3.229	8.38***
Timing sales (1-year)	68,553	0.491	26.28***
Timing sales (3-year)	49,793	1.312	32.52***
Timing repurchases (1-year)	36,092	0.028	2.81***
Timing repurchases (3-year)	28,674	-0.050	-2.82***
T-REP Compustat (1-year)	28,612	0.045	4.30***
T-REP Compustat (3-year)	21,102	0.051	1.92*

Summary: Timing measures

Variable	Obs.	Mean	T-test
Fraction of issued equity in SEO	3,615	20.174	N/A
Fraction of issued equity	68,553	7.216	N/A
Fraction of repurchased equity	36,092	3.154	N/A
Risk-adjusted returns after repurchase (1 year)	36,092	1.374	5.55***
Risk-adjusted returns after repurchase (3 year)	28,674	-0.784	-1.84*
Risk-adjusted returns after SEO (1 year)	3,615	-3.138	-3.97***
Risk-adjusted returns after SEO (3 year)	2,577	-15.046	-8.73***
Risk-adjusted returns after equity issuance (1 year)	68,553	-1.290	-7.01***
Risk-adjusted returns after equity issuance (3 year)	49,793	-3.893	-8.37***

Correlations

Variable	Autocorrelation
Timing SEOs (1-year)	-0.011
	(0.149)
Timing sales (1-year)	0.016^{**}
	(0.048)

Variable	Autocorrelation
Timing repurchases (1-year)	0.032^{***}
	(0.001)
Timing rep Compustat(1-year)	0.059^{***}
	(0.001)

By Size

	<$100m	<$1B	>$1B	T-test for difference
Timing SEOs (1-year)	4.515***	0.432	-0.865***	5.73***
	(5.00)	(1.63)	(-3.38)	
Timing SEOs (3-year)	10.618***	3.138***	1.288***	4.83***
	(5.61)	(5.76)	(3.43)	
Timing sales (1-year)	1.020***	0.359***	0.015	21.50***
	(26.88)	(12.56)	(0.53)	
Timing sales (3-year)	1.908***	1.354***	0.563***	13.14***
	(22.68)	(21.38)	(9.66)	
Timing rep (1-year)	-0.089***	0.066***	0.100***	-7.59***
	(-4.22)	(4.19)	(7.51)	
Timing R Comp (1-year)	-0.056**	0.042**	0.122***	-6.34***
	(-2.33)	(2.51)	(8.50)	

Stock Returns and Program Size

	$<$\$100m	$<$\$1B	$>$\$1B
Fraction of equity issued in SEO	36.06%	21.51%	12.55%
Risk-adjusted returns after SEO (1-year)	-19.92***	-3.98***	3.99
	(-7.45)	(-3.80)	(3.09)
Fraction of equity issued	7.87%	7.53%	5.84%
Risk-adjusted ret issue (1-year)	-7.33***	0.89***	3.00***
	(-19.25)	(3.22)	(11.25)
Fraction of equity repurchased	3.54%	3.07%	2.85%
Risk-adjusted returns after rep (1-year)	-3.47***	3.13***	4.16***
	(-6.53)	(7.78)	(12.84)
Fraction of equity repurchased Compustat	3.28%	3.08%	3.31%
Risk-adjusted ret Rep Compustat (1-year)	-3.05***	1.99***	3.03***
	(-4.53)	(4.47)	(9.34)

Total CEO Compensation

Variable	(1)	(2)	(3)	(4)	(5)
Timing rep (1-year)	1.492***				
	(3.03)				
Timing rep (3-year)		1.747***			
		(4.87)			
Timing SEO (1-year)			-0.771**		
			(-2.26)		
Timing SEO (3-year)				-0.334**	
				(-2.28)	
Timing sales (1-year)					-
					0.669***
					(-3.53)

CEO Compensation, continued

Variable	(7)	(8)	(9)	(10)
Timing SEOs+rep (1-year)	-0.213			
	(-0.76)			
Timing SEOs+rep (3-year)		0.039		
		(0.28)		
Timing rep-SEOs (1-year)			0.961***	
			(3.34)	
Timing rep-SEOs (3-year)				0.587***
				(4.15)

Compensation components

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	Salary	Salary	Bonus	Bonus	Equity Grants	Option Grants
Timing rep-SEOs (1-year)	0.035 (0.77)		0.892*** (4.20)		0.808* (1.87)	
Timing rep-SEOs (3-years)		0.041 (1.53)		0.464*** (3.16)		0.543** (2.53)

Returns by Investment Rates

Low investment rate				
	<$100m	<$1B	>$1B	
Timing SEOs(1-year)	6.237***	0.287	-0.689**	
	(3.73)	(0.65)	(-2.26)	
Timing SEOs(3-year)	9.227**	3.386***	0.668**	
	(2.15)	(3.78)	(1.97)	
Timing sales (1-year)	1.143***	0.491***	0.048	
	(16.37)	(8.85)	(0.88)	
High investment rate				
Timing SEOs(1-year)	5.661***	0.821*	-1.012**	
	(3.81)	(1.79)	(-1.96)	
Timing SEOs(3-year)	11.253***	4.433***	1.600***	
	(3.58)	(4.71)	(2.78)	
Timing sales (1-year)	1.217***	0.352***	0.009	
	(15.69)	(6.79)	(0.20)	
Timing sales (3-year)	2.093***	1.202***	0.595***	
	(11.66)	(10.14)	(6.14)	

Adjusting for Clustering

	$<$\$100m	$<$\$1B	$>$\$1B
Timing SEOs (1-year)	4.515***	0.432	-0.865
	(3.02)	(1.63)	(-0.83)
Timing SEOs (3-year)	10.618***	3.138*	1.288
	(5.61)	(1.95)	(0.94)
Timing sales (1-year)	1.020***	0.359*	0.015
	(3.57)	(1.81)	(0.08)
Timing sales (3-year)	1.908***	1.354**	0.563
	(5.38)	(2.49)	(0.85)
Timing repurchases(1-year)	-0.089	0.066	0.100
	(-0.49)	(0.45)	(1.10)
Timing repurchases(3-year)	-0.030	-0.102	-0.005
	(-0.10)	(-0.48)	(-0.23)

Conclusion

In this paper, we infer managers' preferences for maximizing current or future shareholder value by examining their firms' market timing strategies.

Our model predicts that the wealth of current shareholders is maximized when a manager engages in market timing with share repurchases. In contrast, managers who tend to time the market with equity issuances maximize the value of future shareholders.

Overall, these results suggest that the objective functions of firm managers are likely different in small and large firms. We hope this approach will find its way into future analyses concerned with managers' incentives.