

**Managerial Discretion in Repurchase Tender Offers: Do
Shareholders Benefit ?**

Jarrad Harford

**Lindquist College of Business
University of Oregon**

Agenda

- **Types of repurchase tender offers**
- **Previous studies of repurchase tender offers**
- **Econometric techniques used in Harford's paper**
- **Results of the paper and conclusions**

Types of Repurchase offers

- **Open Market Repurchases**

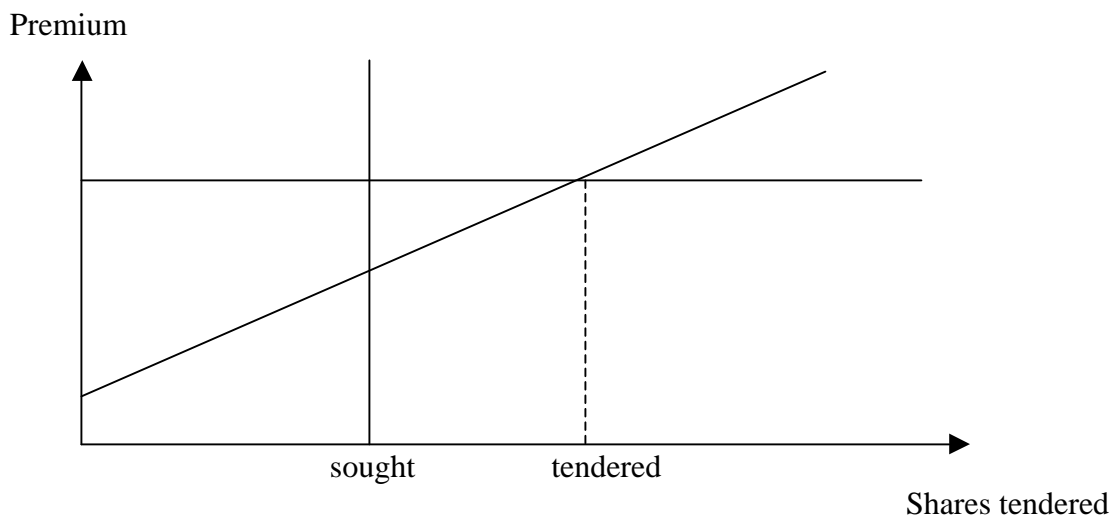
- the most frequent form of repurchases
- small magnitude
- occur over long periods of time

- **Privately Negotiated Repurchases**

- firms buying shares from major shareholder via direct negotiation
- the least frequent method

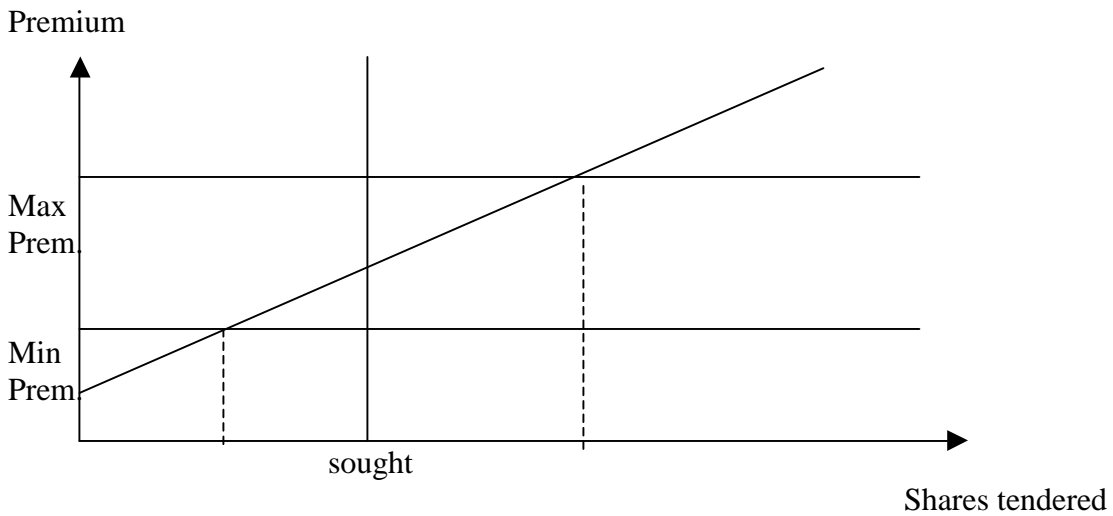
- **Fixed-Price Offers**

- company specifies the maximum number of shares it offers to purchase, the tender offer price and the time during which the offer is effective
- if there are more shares tendered than the maximum number specified in the offer the firm buys shares on the pro-rata basis, although sometimes the company may decide to purchase all the shares tendered
- the managers in most cases agree not to participate in the offer (are bonding the offer, using Harford's terminology)



- **Dutch Auction Offers**

- firm specifies range of prices at which shareholders can tender and the number of shares sought
- firm assembles responses of shareholders and calculates the lowest price that will fetch the number of shares sought – this price is paid to all shareholders who tendered their shares below the clearing price
- If the offer is undersubscribed at the maximum offer price, this price is paid to all tendering shareholders



Motivations for conducting self-tender offers

- **Information signalling**

Announcement of repurchase constitutes a revelation by the management of new (generally positive) information about firm's prospects

- **Defense against potential takeover**

Repurchasing shares may concentrate ownership in hands friendly to management and reduce the probability that outside bidder will prevail in fight for control

- **Personal taxation**

Share repurchases enable shareholders to substitute lower capital gain tax for higher tax on dividends

- **Leverage**

Share repurchases increase leverage (especially if they are partially financed by debt) and may move the firm towards its' optimal capital structure

- **Expropriation**

Wealth transfer from senior securities' holders to shareholders

Previous studies of self-tender offers

- **Masulis (JF, 1980), Dann (JFE, 1981), Vermaelen (JFE, 1981)**
 - Analyzed fixed-price offers
 - High positive returns on stock
 - Small positive returns on convertible debt and convertible preferred stock
 - No effect on nonconvertible debt

Conclusions

- Expropriation hypothesis not supported by the data
- Tax hypothesis not supported

- **Comment and Jarrell (JF, 1991)**

- Analyzed fixed-price and Dutch auction offers and open-market repurchases
- Positive returns for all three forms of repurchases, highest for fixed-price offers, followed by Dutch auction offers
- Premiums lower in Dutch auctions than for fixed-price offers

Conclusions

- Dutch auction offers are less informative than fixed-price offers as signals of undervaluation
- Dutch auctions eliminate the segment of the valuations below purchase price, may be better suited for takeover deterrence

- **Lee, Mikkelson and Partch (JF, 1992), Persons (JF, 1994), Lie and McConnell (JFE, 1998)**

- Analyze the motivations for fixed-price and Dutch auction offers and the relative signalling power of the two offer types theoretically and empirically

Conclusions

- Mixed

- **Harford's contribution**

- Among the first ones to recognize that the choice of the offer type (and the bonding decision) are endogenous, and to treat them accordingly.

Binary choice models

- Dependent variable Y takes values of 0 or 1 (we may think about it as a decision variable)
- Vector of independent variables X that we think explains the decision

$$\Pr(Y = 1) = F(\mathbf{b}'x)$$

$$\Pr(Y = 0) = 1 - F(\mathbf{b}'x)$$

So, the set of parameters β reflects the impact of changes in X on probability.

Linear probability model

$$F(x, \mathbf{b}) = \mathbf{b}'x$$

$$\text{Since } E(y | x) = 1 * F(\mathbf{b}'x) + 0 * (1 - F(\mathbf{b}'x)) = F(\mathbf{b}'x)$$

Our regression model is

$$y = \mathbf{b}'x + \mathbf{e}$$

Problems in linear probability model:

- Errors are heteroscedastic: $\text{Var}(\mathbf{e} | x) = \mathbf{b}'x(1 - \mathbf{b}'x)$
- Can't constrain $\beta'x$ to be in the $[0, 1]$ interval without ad-hoc adjustments

So, our model should satisfy the requirements:

$$\lim_{\mathbf{b}'x \rightarrow \infty} \Pr(Y = 1) = 1$$

$$\lim_{\mathbf{b}'x \rightarrow -\infty} \Pr(Y = 1) = 0$$

Probit and Logit models

$$\text{Probit: } \Pr(Y = 1) = \int_{-\infty}^{b'x} f(t) dt = \Phi(\mathbf{b}'x)$$

$$\text{Logit: } \Pr(Y = 1) = \frac{e^{b'x}}{1 + e^{b'x}} = \Lambda(\mathbf{b}'x)$$

Differences:

- Logit has fatter tails, which gives higher probabilities for less likely events
- Logit is usually easier to estimate (by maximum likelihood)

Correction for the biases caused by self-selection

Assume the following decision function:

$$y_i = \mathbf{g}'Z_i + \mathbf{e}_i$$

Choose fixed-price offer if $y_i > 0$ or $\mathbf{e}_i > -\mathbf{g}'Z_i$

Choose Dutch auction offer if $y_i < 0$ or $\mathbf{e}_i < -\mathbf{g}'Z_i$

Now assume that depending on our choice, we have 2 different equations for announcement returns of the offer:

$$R_{FP,i} = \mathbf{b}_{FP}x_{FP,i} + u_{FP,i}$$

$$R_{DA,i} = \mathbf{b}_{DA}x_{DA,i} + u_{DA,i}$$

$$E(u_{FP,i}) = \mathbf{s}_{ue} E(\mathbf{e}_i | \mathbf{e}_i > -\mathbf{g}'Z_i)$$

If we assume \mathbf{e}_i to be normally distributed,

$$E(u_i | \mathbf{e}_i > -\mathbf{g}'Z_i) = \mathbf{s}_{ue} \frac{\mathbf{f}(\mathbf{g}'Z_i)}{\Phi(\mathbf{g}'Z_i)}$$

and

$$E(u_i | \mathbf{e}_i < -\mathbf{g}'Z_i) = -\mathbf{s}_{ue} \frac{\mathbf{f}(\mathbf{g}'Z_i)}{1 - \Phi(\mathbf{g}'Z_i)}$$

So, the correct announcement return equations would be (Maddala, pages 224-225):

$$R_{FP,i} = \mathbf{b}_{FP}x_{FP,i} - \mathbf{s}_{ue} \frac{\mathbf{f}(\mathbf{g}'Z_i)}{\Phi(\mathbf{g}'Z_i)} + u_{FP,i}$$

$$R_{DA,i} = \mathbf{b}_{DA}x_{DA,i} + \mathbf{s}_{ue} \frac{\mathbf{f}(\mathbf{g}'Z_i)}{1 - \Phi(\mathbf{g}'Z_i)} + u_{DA,i}$$

Two-stage procedure:

- Estimate ? using probit or logit model
- Estimate parameters of the two announcement returns equations

Multinomial case (logit model)

Choose between:

- Fixed-price bonded offer
- Dutch auction bonded offer
- Dutch auction not bonded offer

Objective function:

$$y_s = Z\mathbf{g}_s + v_s$$

y_s -the payoff for choice s ,

Z -set of firm characteristics,

\mathbf{g}_s -vector of weights on characteristics which is different for each s ,

v_s -random component of the payoff

Let $I=s$ if $y_s > \max_{j \neq s} y_j$, $j \neq s$ (s is chosen)

Or $I=s$ if $\max_{j \neq s} y_j - v_s < Z\mathbf{g}_s$

Then, under the assumption that $\max_{j \neq s} y_j - v_s$ has a logistic distribution, it can be shown (pages 34-35 in Maddala):

$$\Pr(I = 1 | Z) = F(Z\mathbf{g}_1) = \frac{(\max(y_2, y_3) - v_1)^{Z\mathbf{g}_1}}{1 + (\max(y_2, y_3) - v_1)^{Z\mathbf{g}_1} + (\max(y_1, y_3) - v_2)^{Z\mathbf{g}_2}}$$

$$\Pr(I = 2 | Z) = F(Z\mathbf{g}_2) = \frac{(\max(y_1, y_3) - v_2)^{Z\mathbf{g}_2}}{1 + (\max(y_2, y_3) - v_1)^{Z\mathbf{g}_1} + (\max(y_1, y_3) - v_2)^{Z\mathbf{g}_2}}$$

$$\Pr(I = 3 | Z) = F(Z\mathbf{g}_3) = \frac{1}{1 + (\max(y_2, y_3) - v_1)^{Z\mathbf{g}_1} + (\max(y_1, y_3) - v_2)^{Z\mathbf{g}_2}}$$

Our announcement returns regression for $I=1$, for example is:

$$R_{1,i} = x_i \mathbf{b}_1 + u_{1,i}$$

But since R_1 is only observed if $\max(y_2, y_3) - v_1 < Z\mathbf{g}_1$, so if u_s and $\max_{j \neq s} y_j - v_s$ are correlated, expectation of u_1 is not 0.

The correction:

$$R_{1,i} = x_i \mathbf{b}_1 - \mathbf{s}_{u_2, \max(y_2, y_3) - v_1} \frac{\mathbf{f}(\Phi^{-1}(F(Z_i \hat{\mathbf{g}}_1)))}{F(Z_i \hat{\mathbf{g}}_1)} + u_{1,i}$$

and similarly for the other two return equations.

The Goal of Harford's Paper

Analyze the agency conflicts between managers and shareholders in the repurchase tender offers.

- There is a conflict of interest between tendering and non-tendering shareholders – and managers choose to which group to join.
- If managers choose not to participate in the offer, their wealth is at risk and this bonds the offer

The Hypotheses

- **Shareholders' interest:** managers consider which type of repurchase will yield the highest gain to shareholders (costs of each repurchase characteristics package versus benefits to the firm)
- **Managerial opportunism:** managers choose the characteristics of the offer to increase their own welfare at the expense of the shareholders

Implication of shareholders' interest hypothesis:

- Firms will separate themselves into different repurchasing groups based on different levels of information asymmetry between the managers and the market.
 - Information asymmetry is likely to be negatively correlated with firm size

Table 2

Analysis of repurchase method and bonding choice – bivariate probit

- **Assumption:** managers simultaneously choose the type of the offer and whether to bond the offer

Dependent variables:

- **Information assymetry variables**
 - Insider ownership
 - Size
- **Managerial opportunism variables:**
 - Abnormal return for the period of 2 years prior to offer announcement
 - One year post-repurchase return starting with the maximum offer price (as a proxy for private information of the management)
 - Adjusted financial commitment of the offer:
 - Raw financial commitment=offer premium*fraction of shares sought
 - This financial commitment is adjusted for endogeneity by regressing it on exogenous variables and substructing the predicted financial commitment from the actual one.

Regression	Constant	90-days return	ln (firm size)	Significant news dummy	Relative number of tender offers	Self-selectivity Regressor	R square	Chi square for self-selectivity regressor	Chi square for firm characteristics
Offer premium fixed	0.0109 (0.01)	-0.6342 (-2.84)	0.0762 (0.83)	-0.1706 (-0.77)	-0.0285 (-1.21)	-2.2801 (-1.22)	0.1940	3.20	
Target fraction fixed	-0.0304 (-0.06)	-0.0839 (-0.56)	0.0588 (0.96)	-0.0818 (-0.56)	0.0126 (0.81)	-1.6287 (-1.31)	0.1695		
Minimum premium Dutch	1.1934 (0.49)	-0.2809 (-1.58)	-0.0380 (-0.55)	0.0856 (0.46)	-0.0043 (-0.33)	-0.4039 (-0.39)	0.1648	1.07	5.37
Maximum premium Dutch	-1.7991 (-0.58)	-0.7654 (-3.41)	0.0417 (0.47)	-0.1944 (-0.83)	-0.0142 (-0.86)	1.1362 (0.87)	0.3092		
Target fraction Dutch	0.9711 (0.65)	0.0704 (0.64)	-0.0280 (-0.65)	0.1149 (1.01)	0.0081 (1.00)	-0.2581 (-0.43)	0.0875		

- **Other variables:**

- Control contest indicator
- Standard deviation of the daily stock return for a year prior to repurchase as a proxy for the uncertainty about reservation prices
- Tobin's q (ratio of firm's market value and "replacement cost")
- Change in leverage in the 3 years period prior to the offer
- Potential effect of the offer on managers' shareholdings, assuming they bond the offer

Table 3

Analysis of repurchase method and bonding choice – multinomial logit

First stage: multinomial logit that we have discussed

Second stage: regression of announcement returns corrected for the endogeneity by the

introduction of self-selectivity regressor $\frac{f(\Phi^{-1}(F(Z_i\hat{\mathbf{g}}_j)))}{F(Z_i\hat{\mathbf{g}}_j)}$

Table 4

Are the repurchase choices optimal?

- The decision is optimal if the expected return for decision i given that decision i is made is higher than the expected return for any other decision (accounting for self-selection)
- The returns to compare are
 - announcement returns – if managers are acting in the interests of the tendering shareholders
 - total returns – if managers are acting in the interests of the non-tendering shareholders

Table 5

Conclusions

- **Most of the evidence suggests that managers design the offer to maximize shareholders' gains given the characteristics of the firm**
- **First study to treat the decision about the offer type and participation of the managers in the self-tender offer endogenously**