Managerial Discretion in Repurchase Tender Offers: Do Shareholders Benefit?

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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**

- The 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).

![Premium vs. Shares tendered diagram](image-url)
• **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

![Graph showing the premium and shares tendered relationship](image)
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

  - 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

\[
\begin{align*}
\Pr(Y = 1) &= F(\beta'x) \\
\Pr(Y = 0) &= 1 - F(\beta'x)
\end{align*}
\]

So, the set of parameters \( \beta \) reflects the impact of changes in X on probability.

Linear probability model

\[
F(x, \beta) = \beta'x
\]

Since \( E(y \mid x) = 1 * F(\beta'x) + 0 * (1 - F(\beta'x)) = F(\beta'x) \)

Our regression model is

\[
y = \beta'x + \epsilon
\]

Problems in linear probability model:

- Errors are heteroscedastic: \( Var(\epsilon \mid x) = \beta'x(1 - \beta'x) \)
- Can’t constrain \( \beta'x \) to be in the \([0,1]\) interval without ad-hoc adjustments

So, our model should satisfy the requirements:

\[
\begin{align*}
\lim_{\beta'x \to -\infty} \Pr(Y = 1) &= 1 \\
\lim_{\beta'x \to \infty} \Pr(Y = 1) &= 0
\end{align*}
\]
Probit and Logit models

**Probit:**\[ \Pr(Y = 1) = \int_{-\infty}^{\beta' x} \Phi(t) dt = \Phi(\beta' x) \]

**Logit:**\[ \Pr(Y = 1) = \frac{e^{\beta' x}}{1 + e^{\beta' x}} = \Lambda(\beta' x) \]

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:

\[ y_i = \gamma'Z_i + \varepsilon_i \]

Choose fixed-price offer if \( y_i > 0 \) or \( \varepsilon_i > -\gamma'Z_i \)
Choose Dutch auction offer if \( y_i < 0 \) or \( \varepsilon_i < -\gamma'Z_i \)

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

\[
R_{FP,i} = \beta_{FP}x_{FP,i} + u_{FP,i} \\
R_{DA,i} = \beta_{DA}x_{DA,i} + u_{DA,i}
\]

\[
E(u_{FP,i}) = \sigma_{ue} \, E(\varepsilon_i | \varepsilon_i > -\gamma'Z_i)
\]

If we assume \( \varepsilon_i \) to be normally distributed,

\[
E(u_i | \varepsilon_i > -\gamma'Z_i) = \sigma_{ue} \frac{\phi(\gamma'Z_i)}{\Phi(\gamma'Z_i)}
\]

and

\[
E(u_i | \varepsilon_i < -\gamma'Z_i) = -\sigma_{ue} \frac{\phi(\gamma'Z_i)}{1 - \Phi(\gamma'Z_i)}
\]

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

\[
R_{FP,i} = \beta_{FP}x_{FP,i} - \sigma_{ue} \frac{\phi(\gamma'Z_i)}{\Phi(\gamma'Z_i)} + u_{FP,i} \\
R_{DA,i} = \beta_{DA}x_{DA,i} + \sigma_{ue} \frac{\phi(\gamma'Z_i)}{1 - \Phi(\gamma'Z_i)} + u_{DA,i}
\]

Two-stage procedure:

- Estimate \( \beta \) 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:

\[ y_s = Z \gamma_s + v_s \]

\( y_s \) - the payoff for choice \( s \),
\( Z \) - set of firm characteristics,
\( \gamma_s \) - vector of weights on characteristics which is different for each \( s \),
\( v_s \) - random component of the payoff

Let \( I = s \) if \( y_s > \max_{j \neq s} y_j \) (s is chosen)
Or \( I = s \) if \( \max_{j \neq s} y_j - v_s < Z \gamma_s \)

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):

\[
\Pr(I = 1 \mid Z) = F(Z\gamma_1) = \frac{(\max(y_2, y_3) - v_1)^{Z\gamma_1}}{1 + (\max(y_2, y_3) - v_1)^{Z\gamma_1} + (\max(y_1, y_3) - v_2)^{Z\gamma_2}}
\]

\[
\Pr(I = 2 \mid Z) = F(Z\gamma_2) = \frac{(\max(y_1, y_3) - v_2)^{Z\gamma_2}}{1 + (\max(y_2, y_3) - v_1)^{Z\gamma_1} + (\max(y_1, y_3) - v_2)^{Z\gamma_2}}
\]

\[
\Pr(I = 3 \mid Z) = F(Z\gamma_3) = \frac{1}{1 + (\max(y_2, y_3) - v_1)^{Z\gamma_1} + (\max(y_1, y_3) - v_2)^{Z\gamma_2}}
\]
Our announcement returns regression for $I=1$, for example is:

$$R_{1,i} = x_i \hat{\beta}_1 + u_{1,i}$$

But since $R_1$ is only observed if $\max(y_2, y_3) - v_1 < Z\gamma_1$, so if $u_s$ and $\max y_j - v_1$ are correlated, expectation of $u_1$ is not 0.

The correction:

$$R_{1,i} = x_i \hat{\beta}_1 - \sigma_{u_s, \max(y_2, y_3) - v_1} \frac{\phi(\Phi^{-1}(F(Z_i \hat{\gamma}_1)))}{F(Z_i \hat{\gamma}_1)} + u_{1,i}$$

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 asymmetry 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 Results

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

### 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

\[
\frac{\phi(\Phi^{-1}(F(Z_j \hat{\gamma}_j)))}{F(Z_j \hat{\gamma}_j)}
\]
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.