Empirical Evidence On The Motivation For Dutch Auction Versus Fixed Price Tender Offers

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Abstract

Persons (1994) presents a model in which firms choose between the Dutch auction and fixed price repurchase methods. We examine the empirical implications of the model and document a number of findings that are consistent with the model. For instance, takeover activity prior to repurchase announcements is significantly higher for firms announcing Dutch auctions. However, takeover activity significantly declines after Dutch auctions but is not significantly different after fixed price offers. Moreover, using a logistic regression analysis, we find that Dutch auctions are more likely to be adopted by large firms with low Tobin's q ratios, low inside ownership, and that were subject to prior takeover pressure. When we split the sample between repurchases with and without prior takeover activity, we find that repurchases without prior takeover activity result in a permanent increase in value while those with prior takeover activity result in only a temporary increase in value. We also find that the higher incidence of takeover battles following defensive fixed price repurchases results in lower post-repurchase returns relative to defensive Dutch auctions. These findings indicate that if the repurchase is used as a takeover deterrent, Dutch auctions are the more effective repurchase method.

1. Introduction

Firms that repurchase a large number of their common shares of stock over a short time interval can do so by conducting either a Dutch auction or a fixed price self-tender offer. Until recently, the most common tender offer was the fixed price method whereby the firm announces the number of shares it will repurchase at a stated price per share. However, in 1981 the Dutch auction repurchase method was introduced whereby the firm announces the number of shares it will

repurchase within a stated range of prices.¹ Investors then indicate the price within the stated range of prices at which they are willing to tender their shares. Upon expiration of the tender offer, the firm identifies the minimum price at which the pre-specified number of shares may be repurchased. This price-setting mechanism is the unique feature of Dutch auctions relative to fixed price repurchases.

Interestingly, while Dutch auctions were nonexistent prior to 1981, they have been more prevalent than the conventional fixed price method since 1988.² Given the takeover wave

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that occurred over the same time period as this dramatic increase in the use of Dutch auctions, researchers have become increasingly interested in the motivation underlying the managerial choice between the Dutch auction and fixed price repurchase methods. Two motivations for share repurchases have received considerable attention in the literature: the signaling of undervaluation and the deterrence of unwanted takeovers.³

In a theoretical framework, Persons (1994) demonstrates that the choice between the Dutch auction and fixed price repurchase methods depends on whether the motivation underlying the repurchase is "signal-oriented" or "control-oriented". The model predicts that when managers recognize that their firm's share price is undervalued and they want to convey this information to investors, fixed price tender offers are preferred to Dutch auctions. That is, since managers specify the repurchase price in a fixed price tender offer, while the price is determined by the market in a Dutch auction, fixed price tender offers are shown to be the least cost way to provide a credible signal of undervaluation. In contrast, when the motivation underlying the repurchase is to thwart an unwanted takeover of the firm, the model predicts that Dutch auctions will be preferred to fixed price tender offers. The model shows that Dutch auctions remove shareholders with the lowest stock valuations such that they more effectively increase the takeover cost to a bidder than do fixed price tender offers.

Several testable empirical implications derive from the Persons model regarding the relative effectiveness of fixed price tender offers as signals of undervaluation and Dutch auctions as takeover deterrents. For instance, the model predicts that Dutch auctions are more likely to be preceded by takeover activity and the probability that an unwanted bidder will be deterred is higher following a defensive Dutch auction than following a defensive fixed price offer. Regarding signal-oriented repurchases, if fixed price offers are better signals of undervaluation relative

to Dutch auctions, the model predicts that the positive price effects at the time of the repurchase announcement should be higher for fixed price offers. Moreover, these positive price effects should be permanent. On the other hand, Persons points out that the long-term price effect of control-oriented repurchases is more complex. Although the model predicts a temporary positive announcement effect due to the tender premium offered, there is also a permanent negative effect because the repurchase decreases the likelihood of a value-increasing takeover. However, this negative price effect will be mitigated to some extent if the repurchase reveals the presence of a bidder or the likelihood that a bidder will appear. Persons suggests that the initial positive announcement effect will persist until investors determine that no other bidder is imminent. Consequently, the longer-term price effects associated with control-oriented repurchases are predicted to be either negative or mixed.

The purpose of this paper is to empirically test these implications and analyze the motivation underlying the managerial choice between the Dutch auction and fixed price repurchase methods. To that end, we examine Dutch auction and fixed price repurchases that were subject to prior takeover activity relative to those without prior takeover activity. Specifically, we document differences in the takeover activity before and after the repurchase, the tender offer characteristics, as well as the financial and ownership attributes of the repurchasing firms. Then, using a logistic regression analysis, we test whether these attributes affect the likelihood that the Dutch auction repurchase method will be adopted relative to the fixed price repurchase method. Finally, we compare the post-repurchase price effects for signal-oriented versus control-oriented repurchases.

Consistent with the predictions of the Persons model, we find that prior to the repurchase announcement, takeover activity is significantly higher for firms that undertake Dutch auction re-

purchases. However, takeover activity for these firms significantly declines subsequent to the repurchase program. Further, firms with prior takeover activity are less likely to be successfully taken over when a Dutch auction is adopted. Using a logistic regression analysis, we find that relative to fixed price offers, Dutch auctions are more likely to be adopted by large firms with low Tobin's q ratios, low inside ownership, and that were subject to prior takeover pressure. When we split the sample between repurchases with prior takeover activity (i.e., those more likely to be used as takeover deterrents) and those without prior takeover activity (i.e., repurchases more likely to be used as signals of undervaluation) we find that the signal-oriented repurchases result in a permanent increase in firm value while the control-oriented repurchases result in only a temporary increase in firm value. In addition, we find that the higher incidence of takeover activity following defensive fixed price offers results in lower post-repurchase returns relative to Dutch auctions used as takeover deterrents. In general, these findings support the predictions of the Persons model and indicate that by removing shareholders with low reservation values, Dutch auctions are more effective takeover deterrents than fixed price offers.

The remainder of the paper is organized as follows: descriptive data for the sample are presented in the next section; Section 3 presents the results from the logistic regression analysis; Section 4 documents the announcement period and post-announcement period wealth effects; and finally, a summary and conclusion are provided in the last section.

2. Data

2.1. Sample selection

We examine 186 repurchase tender offers announced between 1984 and 1992. The sample of repurchases announced between 1984 and 1989 is obtained from the appendix of Comment and Jarrell (1991) who originally compiled the sample from a key word search of the *Dow*

Jones News Retrieval system. The remaining repurchases announced between 1990 and 1992 are obtained from a key word search of the Lexis/Nexis news wires. We classify firms as fixed price repurchases and Dutch auction repurchases according to the final offer made.⁴ The sample includes stocks traded on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), and stocks traded over-the-counter (OTC) of which 86 are classified as Dutch auctions and 100 are classified as fixed price tender offers.

We are particularly interested in distinguishing between repurchases that are more likely to be used as takeover deterrents and those that are more likely to be used as information signals. Following Denis (1990) and others, we classify repurchases as "control-oriented" if they are preceded by takeover activity. Further, we classify repurchases as "signal-oriented" if they are not preceded by prior takeover activity.⁵ Therefore, to detect differences between repurchases used as takeover deterrents and those used as signals, we analyze subsamples of Dutch auctions and fixed price offers that were subject to prior takeover activity and those that were not (i.e., 38 of the Dutch auctions and 33 of the fixed price tender offers have prior takeover activity).

Repurchase-specific data is obtained from Lexis/Nexis news articles and from a full set of SEC 13E-4 filings which report the details of the repurchase offer.⁶ For example, data was compiled on the tender-offer price (for fixed price offers) or the range of prices (for Dutch auction offers), the fraction of shares to be repurchased, and completion details. We also searched Lexis/Nexis news articles for takeover activity before and after the repurchase. In addition, we compile data on each sample firm's financial characteristics and ownership structure. The financial data were obtained from the Compustat database while the ownership attributes were gathered from SEC 10k reports and proxy statements.

Finally, to determine and compare the post-repurchase wealth effects of signal-oriented repurchases versus control-oriented repurchases, daily return data on each firm are obtained from the Center for Research in Security Prices (CRSP) NYSE/AMEX and OTC tapes. Monthly returns are then calculated by compounding daily returns beginning on the first trading day of each month and ending on the last trading day of each month.

2.2. Takeover activity before and after repurchase announcements

Persons predicts that managers who intend to signal undervaluation are more likely to choose the fixed price repurchase method, while those who intend to deter unwanted takeovers are more likely to choose the Dutch auction repurchase method. If this is the case, we expect to find a higher incidence of takeover activity preceding Dutch auctions, relative to fixed price tender offers. Furthermore, if Dutch auctions are relatively more effective takeover deterrents, we expect to see a lower incidence of takeover activity following Dutch auction repurchases. To explore this notion, we document the takeover activity during the period four years before and four years after the repurchase announcement for both fixed price tender offers and Dutch auctions. As in other studies of takeovers, we define takeover activity as reports of a 13D filing by an outside investor, rumors or announcements of takeover interest, merger negotiations, or the adoption of an antitakeover provision.

Table 1 presents the frequency distribution of takeover activity during each of the eight years surrounding the repurchase announcement. In general, the findings provide some anecdotal evidence to support the prediction of the Persons model that when the repurchase is defensive, the Dutch auction is more likely to be adopted as the repurchase method. For instance, we find that Dutch auctions are more likely to be preceded by takeover activity relative to fixed price offers.

During the four years before the repurchase announcement, there were 42 incidences of takeover activity for 38 of the Dutch auction sample firms and there were 35 incidences of takeover activity for 33 of the fixed price sample firms. Thus, 44% of the Dutch auctions are preceded by takeover activity while only 33% of the fixed price repurchases are preceded by takeover activity (this difference is significant with $p=0.06$).⁷

In addition, the incidence of takeover activity significantly declines subsequent to Dutch auction repurchases but does not decline subsequent to fixed price repurchases. Specifically, during the four years following the repurchase, there were only 21 takeover-related incidences involving 19 of the Dutch auction sample firms. Thus, while 44% of the Dutch auction sample firms were subject to prior takeover activity, only 22% were subject to takeover activity following the repurchase (this decline is significant with $p=0.04$). In contrast, during the four years following fixed price repurchases there were 41 takeover-related incidences involving 37 of the sample firms. While 33% of the fixed price sample firms were subject to prior takeover activity, 37% were subject to takeover activity following the repurchase (this difference is not statistically significant).

However, the relative effectiveness of Dutch auctions as takeover deterrents can be more readily judged if we focus on the post-repurchase takeover activity of those firms that adopted the repurchase under takeover pressure. To that end, we find that 30% of the fixed price sample with prior takeover activity were successfully taken over while only 16% of the Dutch auction sample with prior takeover activity were successfully taken over (this difference is significant with $p=0.03$). Another 6% of the fixed price sample with prior takeover activity received unsuccessful takeover bids following the repurchase while 7% of the Dutch auction sample with prior takeover activity received subsequent takeover bids that were unsuccessful (this differ-

Table 1

Frequency distribution of the number of takeover-related incidences during the four years preceding and four years following self-tender offers.^a The sample includes 86 Dutch auctions and 100 fixed price self-tender offers that were announced and completed during 1984-1992.

Relative Year	Dutch Auction Sample		Fixed Price Sample	
	Total Offers	Total Successful Offers	Total Offers	Total Successful Offers
-4	4	0	2	0
-3	6	0	0	0
-2	3	0	4	0
-1	29	1	29	2
1	7	6	20	14
2	7	2	12	5
3	5	3	6	5
4	2	1	3	1

^a If a firm is involved in more than one takeover-related activity in a given year, each incidence is included in the distribution.

ence is not statistically significant). In general, these findings provide some evidence consistent with Persons' prediction that relative to fixed price offers, Dutch auctions are more often undertaken following takeover pressure and are more likely to be successful in thwarting these attempts.

Also consistent with the prediction that Dutch auctions are more likely to be used as takeover deterrents is the shift in the frequency distribution of Dutch auctions relative to fixed price repurchases during the sample period.⁸ As Table 2 illustrates, the use of Dutch auctions dramatically increased during the latter half of the 1980s which corresponds with the peak in the takeover wave of the 1980s. Given that a frequent managerial response to an unwanted bid for the firm is a self-tender offer, the increase in takeover activity during the 1980s and the contemporaneous increase in the use of Dutch auctions suggests that the underlying motivation for these repurchases may have been control-

oriented. Moreover, the overall decline in repurchases during the early 1990s coincides with the decline in takeover activity over the same time period.

2.3. Repurchase-specific characteristics

Previous studies compare the offer-specific characteristics between Dutch auction and fixed price self-tender offers.⁹ We re-examine these data, however, unlike previous studies we document these characteristics for subsamples of repurchases with and without prior takeover activity. Specifically, we document the premiums offered and paid, the number and fraction of shares sought, the number and fraction of shares tendered, the number and fraction of shares repurchased, and the incidence of oversubscription. Repurchases used to deter takeovers are expected to offer higher premiums, seek a higher fraction of shares, and have less frequency of oversubscription relative to those repurchases used as signals.

Table 2

Frequency distribution of Dutch auction and fixed price repurchase announcements and the corresponding dollar amount of merger activity during each year from 1984-1992. The full sample of repurchases during this time period consists of 186 firms, of which 86 were Dutch auctions and 100 were fixed price self-tender offers.

Year	No. of Dutch Auctions	No. of Fixed Price Offers	% of Repurchases That Are Dutch Auctions	Merger Activity ^a (\$Billion 1992)
1984	2	21	8.7	200.0
1985	6	11	35.3	189.5
1986	10	12	45.5	275.4
1987	9	21	30.0	238.5
1988	21	16	56.8	327.2
1989	22	14	61.1	353.3
1990	8	2	80.0	220.2
1991	2	1	66.7	145.2
1992	6	2	75.0	125.3

^aThis data is provided in Persons (1994) and was originally compiled from the *M&A Almanac*.

The findings for repurchases without prior takeover activity are reported in Panel A of Table 3 while the results for repurchases with prior takeover activity are reported in Panel B. As in other studies, we find that relative to fixed price tender offers, Dutch auctions have a significantly higher price prior to the repurchase while the shares sought, tendered, and repurchased are lower, regardless of whether the offer is preceded by takeover activity or not. These findings are consistent with the fact that firms adopting fixed price tender offers are significantly smaller in size than Dutch auctions such that Dutch auctions may be precluded from seeking higher fractions of shares to repurchase.¹⁰ However, we do find that relative to fixed price offers, Dutch auctions are less often oversubscribed and pay lower premiums for their shares, regardless of prior takeover activity. Thus, managers that choose to repurchase their shares using the Dutch auction repurchase method are able to take advantage of the inherent price flexibility, whether the repurchase is control-oriented or not.

To further determine if there are any other offer-specific characteristics that distinguish repurchases that are more likely to be used as takeover deterrents and those that are more likely to be used as signals of undervaluation, we test for differences between the subsample of Dutch auctions with prior takeover activity and the subsample of fixed price offers without prior takeover activity.¹¹ While not reported in Table 3, we find that relative to fixed price offers without prior takeover activity, Dutch auctions with prior takeover activity offer significantly lower premiums (14.09% versus 18.33%), seek and repurchase significantly more shares (7,130,921 versus 2,306,170), are significantly less frequently oversubscribed (50.00% versus 55.09%), and pay a significantly lower final premium (10.39% versus 21.12%). These findings indicate those firms that are most likely to be using the repurchase as a takeover deterrent (i.e., Dutch auctions with prior takeover activity) are able to repurchase more shares at lower premiums and are less frequently oversubscribed than firms that are most likely to be using the repurchase as a signal (i.e., fixed price offers without prior takeover activity).

Table 3

Repurchase offer and completion characteristics for 186 firms that announced and completed self-tender offers during 1984-1992. The sample consists of 86 Dutch auctions and 100 fixed price self-tender offers.

Panel A: Firms Without Prior Takeover Activity

Variable	Dutch Auction Sample (n=48)			Fixed Price Sample (n=67)			t-test for Difference ^c
	Mean	Min	Max	Mean	Min	Max	
Price Prior ^a	32.45	2.00	134.00	21.48	2.00	155.00	2.21**
Min Price Offered	33.14	2.50	132.50	NA	NA	NA	NA
Max Price Offered	37.07	3.00	139.50	25.34	3.00	200.00	2.42**
Max Premium Offered ^b	17.06	4.10	41.18	18.33	-22.17	53.19	-0.65
# Shares Sought	5,658,541	250,000	30,000,000	2,306,170	150,000	25,000,000	3.14***
% Shares Sought	16.40	4.40	46.50	18.52	3.80	67.90	-1.03
# Shares Tendered	7,010,046	16,995	75,039,214	3,832,102	90,000	46,296,230	1.63
% Shares Tendered	16.60	0.02	90.99	25.38	1.40	72.28	-2.56**
# Shares Repurchased	5,360,729	16,995	30,500,000	1,919,377	90,000	11,220,999	3.21***
% Shares Repurchased	12.97	0.02	35.61	16.96	1.40	59.61	-1.92**
% Oversubscribed	25.00	NA	NA	55.09	NA	NA	-3.07***
Final Premium Paid ^b	14.34	0.76	50.00	21.12	-22.17	53.19	-1.96**

Panel B: Firms With Prior Takeover Activity

Variable	Dutch Auction Sample (n=38)			Fixed Price Sample (n=33)			t-test for Difference ^c
	Mean	Min	Max	Mean	Min	Max	
Price Prior ^a	40.23	3.50	102.50	27.78	1.63	177.38	1.91**
Min Price Offered	40.44	4.00	115.00	NA	NA	NA	NA
Max Price Offered	43.10	5.00	125.00	32.51	1.80	190.00	1.79*
Max Premium Offered ^b	14.09	0.07	42.86	17.55	3.70	41.28	-1.48
# Shares Sought	7,130,921	275,000	40,000,000	7,787,353	150,000	40,000,000	-0.33
% Shares Sought	19.59	4.00	53.00	32.76	3.90	65.60	-3.25***
# Shares Tendered	8,040,629	359,842	46,880,167	18,000,408	146,456	84,471,136	-2.11**
% Shares Tendered	21.05	3.99	92.75	58.71	3.97	93.12	-5.66***
# Shares Repurchased	6,232,646	275,000	22,340,000	7,841,079	146,456	40,435,764	-1.80*
% Shares Repurchased	16.92	3.99	53.00	30.72	3.85	62.60	-3.83***
% Oversubscribed	50.00	NA	NA	62.96	NA	NA	-0.94
Final Premium Paid ^b	10.39	-8.60	42.86	18.21	3.70	41.17	-2.75**

^a Measured five days prior to repurchase announcement.

^b Premium measured as $(P_t - P_0)/P_0$ where P_t is the maximum or final price and P_0 is the price 5 days prior to announcement.

^c Similar results are obtained using nonparametric Wilcoxon tests.

*** Statistically significant at the 1% level.

** Statistically significant at the 5% level.

* Statistically significant at the 10% level.

2.4. Financial and ownership characteristics

Descriptive statistics regarding the financial and ownership characteristics of Dutch auctions and fixed price offers are reported in Table 4. Panel A reports the results for repurchases without prior takeover activity while Panel B reports the results for repurchases with prior takeover activity. Specifically, we examine characteristics that have been shown to affect the likelihood that a firm becomes a takeover target. For instance, prior studies in the takeover literature document that takeover targets tend to be smaller firms with lower Tobin's q ratios, P/E ratios, profitability, sales growth, leverage, and inside ownership but are more liquid than nontarget firms.¹² Similar to Palepu (1986) and Comment and Schwert (1995), the proxies used to examine these firm attributes are: firm size (measured as the market value of equity), Tobin's q (measured as (market value of equity + preferred stock + book value of debt)/total assets), P/E ratio (measured as market value of equity/net income), profitability (measured as earnings before interest, depreciation and taxes/total assets), sales growth (measured as the percentage change in sales over the prior year), liquidity (measured as (cash + marketable securities)/total assets), leverage (measured as long-term debt/total assets), and inside ownership (measured as the percentage of common stock owned by managers and the board of directors).

In comparing Dutch auctions to fixed price tender offers, we find that Dutch auctions are significantly larger and have significantly lower inside ownership, regardless of the motivation underlying the repurchase. In no other way are we able to distinguish between the financial characteristics of firms that engage in Dutch auctions and those that engage in fixed price offers, whether the repurchase is preceded by takeover activity or not.

While not reported in Table 4, we did test for differences in the financial and ownership characteristics between those repurchases most

likely to be used as takeover deterrents (i.e., Dutch auctions with prior takeover activity) and those most likely to be used as signals (i.e., fixed price offers without prior takeover activity). These findings indicate that relative to fixed price offers without prior takeover activity, Dutch auctions with prior takeover activity are significantly larger firms (market value of equity is \$1,755.02 million versus \$726.57 million) with significantly lower Tobin's q ratios (1.01 versus 1.39) and significantly lower percentage inside ownership (0.096 versus 0.302). Thus, despite their size, Dutch auctions with prior takeover activity appear to have characteristics that are more similar to those of takeover candidates than do fixed price offers without prior takeover activity.

3. Logistic Analysis

The Persons' model predicts that relative to fixed price tender offers, Dutch auctions are more likely to be used as takeover deterrents. While the univariate analyses in the previous sections provide some evidence that is consistent with this prediction, the tests do not capture the possible interaction among the various explanatory variables. A multivariate analysis incorporates the interaction between these variables and may reveal discernible characteristics that influence the choice between the Dutch auction and fixed price tender offer repurchase methods.

To test whether the threat of a takeover influences the choice between the Dutch auction and fixed price repurchase methods, we estimate a logistic regression model where the dependent variable of the model equals one if the Dutch auction repurchase method is selected and equals zero if the fixed price repurchase method is selected. The independent variables include proxies for variables that have previously been found to affect the probability of a takeover. These variables include firm size, Tobin's q, P/E ratio, profitability, sales growth, liquidity, leverage, inside ownership, and an indicator variable set equal to one if the repurchase is preceded by

Table 4

Financial and ownership characteristics for 186 firms that adopted and completed self-tender offers during 1984-1992. Variables are measured one-year prior to the repurchase announcement for a sample of 86 Dutch auctions and 100 fixed price self-tender offers.

Panel A: Firms Without Prior Takeover Activity

Variable	Dutch Auction Sample (n=48)			Fixed Price Sample (n=67)			t-test for Difference ^a
	Mean	Min	Max	Mean	Min	Max	
Market Value Equity	1886.15	6.04	6004.57	726.57	2.52	11032.53	2.24**
Total Assets	2719.01	50.02	18503.00	883.06	13.85	16362.00	2.76***
Tobin's Q	1.17	0.57	2.51	1.39	0.07	5.49	-1.31
P/E	6.87	-101.26	153.27	10.64	-28.89	174.62	-0.63
Profitability	0.135	-0.008	0.310	0.153	-0.373	0.588	-0.88
Sales Growth	0.191	-0.873	3.218	0.066	-0.995	0.807	1.69*
Liquidity	0.104	0.0004	0.420	0.144	0.001	0.965	-1.34
Leverage	0.498	0	4.496	0.343	0	1.595	1.28
Inside Ownership	0.161	0.002	0.658	0.302	0.002	0.759	-3.47***

Panel B: Firms With Prior Takeover Activity

Variable	Dutch Auction Sample (n=38)			Fixed Price Sample (n=33)			t-test for Difference ^a
	Mean	Min	Max	Mean	Min	Max	
Market Value Equity	1755.02	28.46	11131.07	748.24	12.556	3378.44	2.56***
Total Assets	2446.76	58.38	6740.96	1567.31	17.59	8716.50	1.54
Tobin's Q	1.01	0.125	1.75	1.02	0.177	1.83	-0.13
P/E	5.49	1.009	22.319	6.01	1.57	16.19	-0.46
Profitability	0.153	0.023	0.285	0.122	0.023	0.369	1.76*
Sales Growth	0.027	-0.593	0.549	0.046	-0.531	1.427	-0.24
Liquidity	0.074	0.003	0.276	0.143	0.008	0.395	-2.48**
Leverage	0.507	0	3.0	0.415	0	2.426	1.37
Inside Ownership	0.096	0.001	0.478	0.205	0.001	0.746	-2.12***

^a Similar results are obtained using nonparametric Wilcoxon tests.

*** Statistically significant at the 1% level.

** Statistically significant at the 5% level.

* Statistically significant at the 10% level.

takeover activity (the financial and ownership characteristics are measured as previously described in section 2.4).

The regression results are presented in Table 5 for the full sample of firms that adopted Dutch auction or fixed price repurchases. Regardless of the model specification, we find that Dutch auctions are more likely to be adopted by larger firms with lower growth opportunities (as meas-

ured by Tobin's q), lower percentage inside ownership, and that were the target of takeover activity prior to the repurchase. In general, these multivariate results are consistent with the predictions of the Persons model and indicate that managers are more likely to choose the Dutch auction repurchase mechanism as a takeover deterrent.

Table 5

Results from a logistic regression analysis relating the probability that a Dutch auction is selected over the fixed price repurchase method, to the incidence of prior takeover activity and firm characteristics that affect the probability of takeover. The sample includes 86 Dutch auctions and 100 fixed price self-tender offers that were announced and completed during 1984-1992.

Variable	Model 1	Model 2	Model 3
Intercept	-1.10	-1.15	-1.17
Log Market Value Equity	0.27**	0.29**	0.31**
Tobin's Q	-0.87*	-0.70*	-0.84**
P/E	-0.01	-	-
Profitability	1.90	-	-
Sales Growth	0.89	0.80	-
Liquidity	-0.46	-0.89	-
Leverage	0.13	0.12	-
Inside Ownership	-2.30*	-2.11*	-2.09*
Prior Takeover Activity	2.93***	2.88***	2.83***
% Concordant	84.1	84.4	84.1

***Statistically significant at the 1% level.

** Statistically significant at the 5% level.

* Statistically significant at the 10% level.

4. Repurchase wealth effects

One final testable implication of the Persons model concerns the short-term and long-term price effects associated with signal-oriented repurchases versus repurchases that are defensive. In the short-term, the model predicts that if fixed price offers are better signals of undervaluation than Dutch auctions, the positive price effect at the time of the repurchase announcement should be higher for fixed price offers. In the long-term, the positive price effect associated with signal-oriented repurchase announcements is expected to be permanent. However, the predicted short-term and long-term price effects associated with control-oriented repurchases are more complicated. For instance, although the model predicts a temporary positive short-term effect due to the tender premium offered, over the long-term there is a permanent negative price effect since the repurchase effectively decreases the likelihood of a takeover. Persons notes that this long-term negative price effect will be mitigated to some extent if the repurchase reveals the presence of a bidder or the likelihood that a bidder

will appear. Thus, the initial positive announcement effect will persist until investors determine that no other bid is forthcoming such that the initial positive price effect will subsequently be reversed. To test these predictions, we first examine the announcement period returns for signal-oriented versus control-oriented repurchases and then test for any subsequent reversion of these returns over a longer time horizon.

4.1. Announcement period wealth effects

It is well documented that announcements of self-tender offers are associated with significantly positive stock price reactions. Generally, the conclusions of these prior studies are that the stock price reaction reflects either signaling of undervaluation on the part of better informed managers (e.g., Dann (1981), Vermaelen (1981), Comment and Jarrell (1991)) or reflects an increase in the takeover cost to an acquirer if the repurchase removes shareholders with relatively low stock valuations (e.g., Bagwell (1991)). We re-examine the short-term stock price reaction to

self-tender offer announcements but from a slightly different perspective. Specifically, we examine separately the stock price reaction of signal-oriented repurchases relative to those that are control-oriented (i.e., those without prior takeover activity relative to those with prior takeover activity). We measure the three-day announcement period returns as described in Comment and Jarrell (1991).

The results of the analysis of the announcement-period stock price reaction are presented in Table 6. In general, we find significant and positive three-day excess returns for both Dutch auction and fixed price tender offers, whether or not the repurchases were preceded by takeover activity. For instance, in Panel A, we find significant three-day excess returns on the order of 6.97% for the full sample of Dutch auctions and for the full sample of fixed price tender offers we find significant three-day excess returns of 8.53% (this difference is significant with $p=0.07$). For firms without prior takeover activity (Panel B) we find significant three-day excess returns on the order of 7.38% for Dutch auctions and for fixed price offers we find significant three-day excess returns of 11.03% (this difference is significant with $p=0.02$). Thus, the larger price reaction for both the full sample of fixed price offers and for the subsample of fixed price offers without prior takeover activity is consistent with the prediction that the fixed price repurchase mechanism is a more effective signaling tool.

However, in the case of repurchases with prior takeover activity (Panel C), the announcement period returns are considerably lower than those reported for repurchases without prior takeover activity. Specifically, we find significant three-day excess returns of 6.67% for Dutch auctions with prior takeover activity and for fixed price offers with prior takeover activity we find significant three-day excess returns of 4.01% (this difference is not statistically significant). However, as Persons suggests, the interpretation of these findings is not straightforward

since the short-term price reaction to repurchase programs adopted as takeover deterrents represents the net effect of multiple and sometimes offsetting influences. To filter out these conflicting wealth effects, we examine the price effects over a longer time horizon and test for any subsequent reversion in the announcement period returns.

4.2. Post-repurchase wealth effects

To test whether the positive announcement period wealth effects associated with signal-oriented and control-oriented repurchases are permanent or are subsequently reversed, we examine the price behavior of Dutch auction and fixed price tender offers, with and without prior takeover activity, during the twelve months following the repurchase announcement. We calculate monthly cumulative abnormal returns (CARs) using standard event-study methodology. The CRSP value-weighted market index is used to estimate model parameters over the estimation period beginning 60 months prior to the repurchase announcement and ending one month prior to the announcement.¹³

We test for the reversion of the announcement period abnormal returns using the methodology put forth by Harris and Gurel (1986) and used by Erwin and Miller (1997). To that end, we test whether the mean CAR in the announcement month (month 0) is equal to the negative of the mean CAR from month 1 to month T (i.e., $CAR_0 = -CAR_{1,T}$). Thus, the null hypothesis to be tested is that subsequent to the repurchase, prices revert to their pre-repurchase levels. The mean CARs during the twelve months subsequent to Dutch auction and fixed price repurchase announcements and the results of the tests of price reversion are reported in Table 7. The results are reported for the full sample of Dutch auctions and fixed price offers (Panel A) as well as for the subsamples of repurchases without prior takeover activity (Panel B) and those with prior takeover activity (Panel C). In general, the full sample of Dutch auctions and

Table 6

Three-day excess returns for 86 Dutch auctions and 100 fixed price self-tender offers announced and completed during 1984-1992. Results are reported for the full sample as well as for subsamples of firms with and without prior takeover activity.

Panel A: Full Sample							
Dutch Auction Sample				Fixed Price Sample			
n	Excess Return	t-statistic	p-value	n	Excess Return	t-statistic	p-value
86	6.97	9.06	0.0001	100	8.53	8.46	0.0001
t-test for difference between Dutch auction and fixed price offers (p-value)				1.84 (0.07)			
Panel B: Firms Without Prior Takeover Activity							
Dutch Auction Sample				Fixed Price Sample			
n	Excess Return	t-statistic	p-value	n	Excess Return	t-statistic	p-value
48	7.38	8.70	0.0001	67	11.03	8.57	0.0001
t-test for difference between Dutch auction and fixed price offers (p-value)				2.37 (0.02)			
Panel C: Firms With Prior Takeover Activity							
Dutch Auction Sample				Fixed Price Sample			
n	Excess Return	t-statistic	p-value	n	Excess Return	t-statistic	p-value
38	6.67	4.64	0.0001	33	4.01	2.99	0.0053
t-test for difference between Dutch auction and fixed price offers (p-value)				1.36 (0.18)			

the full sample of fixed price offers exhibit insignificant abnormal returns during the twelve months following the repurchase announcement. That is, by month 12, the mean CAR for the full sample of Dutch auctions is found to be -0.42% ($p=0.92$) while the mean cumulative abnormal return is found to be -3.78% ($p=0.34$) for the full sample of fixed price offers (this difference is not found to be statistically significant). Moreover, tests of price reversion reject the null hypothesis that prices subsequently revert.

However, when we split the Dutch auction and fixed price repurchases into subsamples without prior takeover activity and those with prior takeover activity, the evidence indicates that the price behavior subsequent to the repurchase announcement is considerably different for

repurchases that were signal-oriented versus those that were control-oriented. For instance, the results for repurchases without prior takeover activity indicate that during the twelve months following the repurchase announcement, the abnormal returns increase gradually. By month 12, the mean CAR is found to be 3.59% ($p=0.46$) for signal-oriented Dutch auctions and is 2.63% ($p=0.62$) for signal-oriented fixed price offers (this difference is not found to be statistically significant). Moreover, tests of price reversion consistently reject the null hypothesis that prices revert. These findings indicate that the initial positive price effect associated with these signal-oriented repurchases persists during the twelve months following the repurchase announcement and appears to be permanent.

Table 7

Mean cumulative abnormal returns (CARs) from month 1 to month T for 86 Dutch auctions and 100 fixed price self-tender offers announced and completed during 1984-1992, and tests of whether the mean of the month 0 abnormal return is equal to the negative of the mean CAR over month 1 to month T.

Panel A: Full Sample

Month 1 to Month T	Dutch Auction Sample			Fixed Price Sample		
	Mean CAR	t-statistic for reversion test	p-value for reversion test	Mean CAR	t-statistic for reversion test	p-value for re- version test
1	-0.78	5.75	0.00	-1.21	4.27	0.00
2	-0.08	5.17	0.00	-3.22	3.06	0.00
3	-0.68	4.32	0.00	-0.91	3.74	0.00
4	-0.13	3.84	0.00	-2.03	2.76	0.01
5	0.58	3.37	0.00	-1.87	2.53	0.01
6	0.76	3.35	0.00	-2.11	2.17	0.03
7	1.77	3.74	0.00	-0.55	2.64	0.01
8	1.64	3.43	0.00	-2.63	2.03	0.04
9	0.94	2.91	0.00	-3.57	1.75	0.08
10	1.18	2.70	0.01	-2.56	1.79	0.08
11	-0.15	2.31	0.02	-2.94	1.75	0.08
12	-0.42	2.19	0.03	-3.78	1.69	0.10

Panel B: Firms Without Prior Takeover Activity

Month 1 to Month T	Dutch Auction Sample			Fixed Price Sample		
	Mean CAR	t-statistic for reversion test	p-value for re- version test	Mean CAR	t-statistic for reversion test	p-value for re- version test
1	0.13	6.68	0.00	-0.94	4.33	0.00
2	0.91	5.19	0.00	-1.93	4.24	0.00
3	1.24	4.14	0.00	0.35	4.69	0.00
4	2.22	3.72	0.00	0.97	4.03	0.00
5	1.46	2.78	0.01	0.93	3.80	0.00
6	1.45	2.49	0.01	1.27	3.33	0.00
7	3.48	2.81	0.01	2.76	3.81	0.00
8	5.26	3.08	0.00	1.14	3.36	0.00
9	5.25	2.82	0.01	2.93	3.17	0.00
10	5.60	2.86	0.01	2.09	3.08	0.00
11	4.44	2.38	0.02	2.33	2.85	0.01
12	3.59	2.25	0.02	2.63	2.97	0.00

(continued on next page)

In contrast, the results for repurchases with prior takeover activity indicate that the abnormal returns revert during the twelve months following the repurchase announcement. By month 12, the mean CAR is found to be -5.99% ($p=0.19$)

for control-oriented Dutch auctions and is -15.12% ($p=0.05$) for control-oriented fixed price offers (this difference is not statistically significant). Furthermore, tests of price reversion accept the null hypothesis that prices revert.

Table 7 (continued)

Panel C: Firms With Prior Takeover Activity						
Month 1 to Month T	Dutch Auction Sample			Fixed Price Sample		
	Mean CAR	t-statistic for reversion test	p-value for re- version test	Mean CAR	t-statistic for reversion test	p-value for re- version test
1	-1.98	2.07	0.05	-1.65	1.16	0.25
2	-1.39	1.98	0.05	-5.27	0.24	0.82
3	-3.27	1.39	0.17	-2.92	0.39	0.70
4	-3.33	1.06	0.30	-7.10	0.56	0.58
5	-0.59	1.48	0.15	-6.76	0.60	0.56
6	-0.16	1.61	0.12	-7.99	0.77	0.45
7	-0.59	1.68	0.10	-6.53	0.47	0.65
8	-3.21	0.93	0.35	-9.41	0.95	0.35
9	-4.84	0.41	0.68	-10.52	1.11	0.28
10	-4.75	0.41	0.68	-10.78	1.05	0.30
11	-6.50	0.10	0.92	-12.27	1.14	0.26
12	-5.99	0.20	0.84	-15.12	1.43	0.16

These findings indicate that the initial positive price effect associated with these control-oriented repurchases is reversed significantly during the twelve months following the repurchase announcement and appears to be temporary.

Overall, these findings indicate that while the positive announcement period abnormal returns persist for those repurchases motivated by signaling, the initial positive price reaction to defensive repurchases does not persist over longer time horizons due to the reduced likelihood of a takeover.¹⁴ Furthermore, the disparate post-repurchase price reversion of defensive Dutch auctions relative to defensive fixed price offers (i.e., -5.99% and -15.12%, respectively) suggests that Dutch auctions are less costly takeover deterrents than are fixed price offers. Given that investors determine the price at which they will tender their shares, Dutch auctions effectively remove shareholders with the lowest reservation values thereby increasing the cost of any subsequent takeover attempts and improving the bargaining position of the target firm. In contrast, when fixed price repurchases are used, managers

set the tender price without observing shareholder reservation values. Thus, potential bidders may perceive that the firm is still in play, even after a defensive fixed price offer, since this repurchase method does not effectively remove shareholders with the lowest valuations. Moreover, the firm will have to incur the costs of deterring any future takeover activity. Given the higher frequency of takeover battles following fixed price repurchases relative to Dutch auctions, it may be that the post-repurchase returns for the defensive fixed price sample are lower due to the costs involved in thwarting subsequent takeover attempts.

To test this possibility, we recalculate the post-repurchase mean CARs for repurchases with prior takeover activity, excluding firms with takeover activity during the twelve months following the defensive repurchase. Specifically, we find that 12 of the control-oriented fixed price sample firms are in play during the year following the repurchase, resulting in negative abnormal returns over the period of -23.37%. These losses appear to be the result of the defensive actions taken by 10 of the 12 firms. We

find that two firms adopt anti-takeover amendments, one firm seeks a white knight, three firms engage in proxy battles, two firms initiate a leveraged buyout, one firm purchases the bidder's stake, and one firm agrees to a friendly merger that is subsequently cancelled. In the case of the control-oriented Dutch auctions, however, only four firms continue to be in play during the year subsequent to the repurchase, resulting in negative abnormal returns of -11.52%. Of these firms, one initiates a management buyout that is later cancelled, one firm reaches a standstill agreement with the bidder, and two firms attempt to negotiate friendly mergers. After removing these firms and their confounding effects, the post-repurchase mean CAR is found to be -9.49% for the defensive fixed price repurchases that do not experience subsequent takeover activity. This is significantly higher than the post-repurchase mean CAR of -15.12% for the full sample of defensive fixed price repurchases. In contrast, the post-repurchase mean CAR for the defensive Dutch auctions without subsequent takeover activity is -5.44% compared to the post-repurchase mean CAR of -5.99% for the full sample of defensive Dutch auctions (this difference is not statistically significant). Thus, it appears that the costs incurred defending subsequent takeovers explains a substantial portion of the negative returns for the fixed price offers and a negligible portion of the negative returns for the Dutch auctions. Moreover, the results indicate that the market expects Dutch auctions to be better takeover deterrents and puts a low probability on the emergence of subsequent bids. In contrast, for the fixed price offers, the probability of future bids is higher and consequently the price reversion is more pronounced in the absence of any takeover activity. Overall, these findings indicate that by removing shareholders with the lowest reservation prices, Dutch auctions are better takeover deterrents than fixed price offers.

5. Conclusions

While prior studies have attributed the motivation of self-tender offers to either information

signaling or takeover deterrence, these studies have not distinguished between the motivation for selecting the Dutch auction and fixed price repurchase methods. In contrast, this study empirically examines the motivation underlying the choice between the Dutch auction and fixed price methods by testing the model put forth by Persons (1994). Specifically, the model predicts that fixed price repurchases are more effective signals of undervaluation while Dutch auctions are more effective takeover deterrents. We test this and a number of empirical implications that emerge from the model regarding the likelihood of takeover and the price behavior subsequent to self-tender offers.

We find that firms adopting Dutch auctions are more likely to be takeover targets prior to the repurchase program than are firms that undertake fixed price offers. However, subsequent to the repurchase program we find that Dutch auction firms experience a significant decline in the level of takeover activity while fixed price firms do not experience a significant change in post-repurchase takeover activity. Moreover, firms with prior takeover activity are less likely to be successfully taken over when a Dutch auction is adopted. Using a logistic regression model we find that the Dutch auction repurchase method is more likely to be adopted by relatively large firms with low Tobin's q ratios, low inside ownership, and that were subject to prior takeover pressure. Finally, when we examine repurchases with prior takeover activity, relative to repurchases without prior takeover activity, we find that repurchases without prior takeover activity result in a permanent increase in firm value while defensive repurchases result in only a temporary increase in firm value. We also find that the higher incidence of takeover battles following defensive fixed price repurchases results in lower post-repurchase returns, relative to defensive Dutch auctions. Consistent with the Persons model, these findings indicate that if the repurchase is used as a takeover deterrent, the Dutch auction method is more effective than the fixed price method.

6. Suggestions for Future Research

The takeover wave of the 1980s resulted in the evolution of innovative and sophisticated corporate antitakeover mechanisms. This study examines the relative effectiveness of one type of defense mechanism that was introduced over this period: the Dutch auction repurchase method. The results suggest that relative to the more conventional fixed price repurchase method, Dutch auctions are better takeover deterrents. By allowing the market to determine the repurchase price, managers are able to remove shareholders with the lowest reservation values thereby increasing the cost of subsequent takeover bids and improving the bargaining position of the target firm.

However, Dutch auctions were not the only innovation in corporate antitakeover measures during the 1980s. For example, poison pills, ESOPs, antitakeover charter amendments, control share laws, and supermajority provisions were also introduced. An analysis of how Dutch auctions compare to other innovative types of defense mechanisms would provide practitioners and researchers with a better understanding of the relative effectiveness of these types of takeover deterrents and their effect on the bargaining position of the target firm. Moreover, by examining the firm-specific attributes, takeover activity, and price effects surrounding each of these types of defense mechanisms separately as well as comparatively, future research could shed light on the motivation underlying the response of target managers to a real or perceived takeover threat. □

Endnotes

1. Bagwell (1991) notes that the first Dutch auction self-tender offer was announced by Todd Shipyards in 1981. The repurchase technique was developed by Bear Stearns & Co.
2. In 1981 the Dutch auction method accounted for only two of 23 self-tender offers. By 1988, however, 21 of 37 self-tender offers were Dutch auctions.
3. Studies that examine the use of repurchases as signals include: Masulis (1980), Dann (1981), Vermaelen (1981), Comment and Jarrell (1991). Studies that examine the use of repurchases as takeover deterrents include: Bagwell (1991) and Denis (1990).
4. For example, two firms in the sample originally announced Dutch auctions but subsequently changed to a fixed price offer. Therefore, these firms were classified as fixed price tender offers.
5. This classification scheme could understate the number of repurchases that were indeed used as takeover deterrents since some firms that were not preceded by takeover activity may have adopted the repurchase as a defense rather than as a signal. However, there is no way to filter out these other defensive repurchases from those used as signals since firms are not required to disclose the purpose of the repurchase.
6. Firms conducting self-tender repurchase programs are required to submit 13E-4 filings to the SEC in which they report items and specific details of the repurchase offer.
7. While the frequency distribution in Table 1 presents takeover offers in each year, the percentage of sample firms subject to takeover offers during the four years before and after the repurchase does not take into account firms that were subject to more than one incidence during that time period.
8. This was also pointed out in Persons (1994).
9. See for example, Comment & Jarrell (1991) & Kamma, Kanatas, & Raymar (1992).
10. See Kamma, Kanatas, & Raymar (1992).
11. We thank an anonymous referee for suggesting this comparison.
12. See for example Comment and Schwert (1995), Mikkelson and Partch (1989), Palepu (1986), and Hasbrouck (1985).
13. The results are not sensitive to the estimation period used to calculate market model parameters.
14. As a robustness check on these results, we also perform tests of price reversion using holding period abnormal returns (HPARs),

as described in Barber and Lyon (1997). The results are similar to those found using CARs. For instance, the average twelve-month HPAR is an insignificant -2.69% for the full sample of Dutch auctions and is an insignificant -3.21% for the full sample of fixed price offers. Moreover, we do not find evidence of price reversion for these subsamples. For repurchases without prior takeover activity, the average twelve-month HPAR is an insignificant -0.65% for Dutch auctions and is an insignificant -1.57% for fixed price offers. Tests of price reversion for these subsamples reject the null hypothesis that the initial price effects are reversed during the twelve months following the repurchase announcement. Finally, for repurchases with prior takeover activity we find the average twelve-month HPAR is a significant -5.58% for Dutch auctions and is a significant -6.93% for fixed price tender offers. Tests of price reversion for these subsamples accept the null hypothesis that the initial price effects are temporary.

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Notes