

**Internet Appendix for
“Share Repurchases: How Important Is Market Timing?”***

	Table of Contents
Table A1	Aggregate tender-offer repurchases and all repurchases from 1985 to 2010
Table A2	Aggregate SEOs and all equity issues from 1985 to 2010
Table A3	Estimated probability of tender-offer repurchase using RRV and PS mispricing indices
Table A4	Logit analysis of tender-offer repurchase decisions, option change
Table A5	Estimated probability of tender-offer repurchases, option change
Table A6	Logit analysis of tender-offer repurchase decisions, deviation from target leverage
Table A7	Estimated probability of tender-offer repurchases, deviation from target leverage
Table A8	Estimated probability of repurchase using RRV and PS mispricing indices
Table A9	Logit analysis of repurchase decisions, option change
Table A10	Estimated probability of repurchases, option change
Table A11	Logit analysis of repurchase decisions, deviation from target leverage
Table A12	Estimated probability of repurchases, deviation from target leverage
Table A13	Share repurchases and abnormal stock returns
Table A14	Histogram of abnormal stock returns following repurchases
Table A15	Biggest winners and losers of repurchase, 12-month abnormal returns
Figure A1	Interaction effect of operating cash flow and timing variables on tender-offer decisions
Figure A2	Interaction effect of operating cash flow and timing variables on repurchase decisions

* Zhuang, Chao, 2013, Internet Appendix to “Share Repurchases: How Important Is Market Timing?,” Working Paper.

Table A1
Aggregate tender-offer repurchases and all repurchases from 1985 to 2010

Tender-offer repurchase announcements and transaction values are obtained from SDC. For all repurchases, value of repurchase net repurchase as in Fama and French (2001), measured as the increase in common treasury stock. If the treasury stock is zero in the current and previous year or the treasury stock is not available, repurchase is measured as the difference between stock purchase and stock issuance from Compustat. All firms in the sample (i) have SIC codes outside the intervals 4900-4949 (utilities) and 6000-6999 (financials), (ii) have CRSP share codes 10 or 11, (iii) are incorporated within the US, and (iv) have non-missing total assets from Compustat. All dollar amounts are inflation adjusted using the Consumer Price Index (CPI) and are expressed in 2010 dollars.

Year	Tender-offer Repurchases				All Repurchases	
	Number of firms	Percent of all repurchasers	Value (\$billions)	Percent of aggregate value repurchased	Number of firms	Aggregate value (\$billions)
1985	15	1.6%	\$4.2	7.4%	918	\$56.4
1986	14	1.5%	\$8.9	16.9%	952	\$52.3
1987	35	2.7%	\$9.7	13.7%	1,312	\$71.1
1988	35	2.9%	\$17.1	24.0%	1,225	\$71.3
1989	37	3.5%	\$11.5	20.7%	1,050	\$55.3
1990	23	1.9%	\$7.0	13.4%	1,188	\$51.8
1991	19	2.2%	\$0.7	3.2%	868	\$23.3
1992	27	3.2%	\$3.2	10.3%	838	\$31.5
1993	26	2.9%	\$2.0	6.8%	891	\$29.9
1994	30	2.9%	\$4.2	9.2%	1,045	\$45.6
1995	22	1.9%	\$4.0	5.1%	1,156	\$79.1
1996	34	2.7%	\$3.3	4.0%	1,246	\$81.4
1997	34	2.3%	\$9.1	7.7%	1,449	\$117.8
1998	26	1.5%	\$7.1	4.6%	1,763	\$155.4
1999	23	1.4%	\$5.0	2.9%	1,692	\$171.1
2000	22	1.4%	\$7.1	4.4%	1,523	\$161.9
2001	13	1.0%	\$0.2	0.2%	1,330	\$110.0
2002	16	1.3%	\$1.7	1.5%	1,208	\$117.8
2003	23	2.2%	\$1.9	1.6%	1,043	\$121.9
2004	11	1.2%	\$7.4	4.2%	945	\$175.0
2005	24	2.3%	\$11.7	4.4%	1,049	\$265.4
2006	26	2.2%	\$18.3	4.6%	1,177	\$393.4
2007	29	2.3%	\$23.2	5.1%	1,265	\$451.7
2008	23	1.6%	\$6.9	2.3%	1,402	\$307.7
2009	6	0.6%	\$0.6	0.4%	964	\$131.7
2010	7	0.8%	\$3.4	2.1%	880	\$161.5
All Years	600	2.0%	\$179.4	5.1%	30,379	\$3,491.4

Table A2
Aggregate SEOs and all equity issues from 1985 to 2010

SEO announcements and total proceeds are obtained from SDC. All equity issues are market measure of net equity issued as in Fama and French (2005), i.e., the product of (1) the split-adjusted growth in shares and (2) the average of the split-adjusted stock price at the beginning and end of the fiscal year. All firms in the sample (i) have SIC codes outside the intervals 4900-4949 (utilities) and 6000-6999 (financials), (ii) have CRSP share codes 10 or 11, (iii) are incorporated within the US, and (iv) have non-missing total assets from Compustat. All dollar amounts are inflation adjusted using the Consumer Price Index (CPI) and are expressed in 2010 dollars

Year	SEOs				All Equity Issues	
	Number of firms	Percent of all Issuers	Total proceeds (\$billion)	Percent of aggregate amount issued	Number of firms	Aggregate amount (\$billion)
1985	177	7.6%	\$15.1	25.2%	2,314	\$60.0
1986	186	7.9%	\$16.2	20.1%	2,346	\$80.4
1987	136	6.1%	\$14.6	20.6%	2,238	\$70.9
1988	68	3.1%	\$5.4	10.7%	2,187	\$51.0
1989	99	4.3%	\$5.3	6.7%	2,318	\$79.4
1990	78	3.7%	\$6.5	10.9%	2,088	\$59.6
1991	223	9.2%	\$26.3	23.8%	2,431	\$110.7
1992	192	7.1%	\$20.3	20.6%	2,713	\$98.2
1993	251	8.3%	\$27.5	18.8%	3,006	\$145.9
1994	198	6.1%	\$21.0	13.6%	3,252	\$154.5
1995	261	7.7%	\$35.8	17.5%	3,368	\$204.7
1996	316	8.9%	\$34.6	12.6%	3,570	\$273.5
1997	264	6.9%	\$32.2	8.5%	3,837	\$376.7
1998	186	5.6%	\$30.8	7.0%	3,349	\$439.7
1999	181	6.0%	\$39.3	4.7%	3,022	\$835.8
2000	174	5.7%	\$51.4	4.7%	3,027	\$1,085.9
2001	150	4.8%	\$33.4	6.4%	3,100	\$523.4
2002	146	5.1%	\$25.0	9.2%	2,845	\$272.3
2003	175	6.3%	\$26.1	11.1%	2,763	\$235.9
2004	198	7.2%	\$37.1	15.8%	2,756	\$235.1
2005	145	5.6%	\$25.4	8.6%	2,610	\$296.3
2006	141	5.8%	\$26.3	8.2%	2,414	\$320.8
2007	114	5.1%	\$26.0	14.5%	2,226	\$179.5
2008	66	3.4%	\$33.2	20.9%	1,933	\$158.9
2009	231	10.3%	\$31.3	15.5%	2,252	\$202.4
2010	167	9.0%	\$21.3	11.0%	1,862	\$193.9
All Years	4,523	6.5%	\$667.6	9.9%	69,827	\$6,745.5

Table A3
Estimated probability of tender-offer repurchase using RRV and PS mispricing indices, operating cash flow

This table reports the probability of a tender-offer repurchase conditional on specific hypothesized values of the independent variables. The base case findings in Panel A are those implied by the parameter estimates in Row D of Table 3. The base variables are standardized M/B, prior and future 12-month market-adjusted excess returns. Panel B through Panel F report the estimated repurchase probabilities calculated analogously, but with the model in Row D of Table 3 re-estimated using other mispricing measures. The mispricing index labeled RRV is the one employed by Rhodes-Kropf, Robinson, and Viswanathan (RRV, 2005, Table 4, Model 3). The mispricing index labeled PS is the one used by Polk and Sapienza (PS, 2009). I take the 95th percentile value of RRV (PS) as indicative of highly unfavorable timing opportunities and the 5th percentile value of RRV (PS) as indicative of highly favorable timing opportunities. For each pair of rows, the first row reports the estimated repurchase probabilities as a function of operating cash flow for firms with poor timing opportunities while the second row reports the estimated repurchase probabilities for firms with excellent timing opportunities.

Market mispricing indices included in logit model	Percentile of standardized M/B ratio	Percentile of prior excess stock return	Percentile of future excess stock return	Percentile of supplementary mispricing index	Estimated probability of a tender-offer repurchase as a function of percentile of operating-cash-flow/assets				
					5th	25th	50th	75th	95th
A. Base case	95th	95th	5th	-	0.01%	0.04%	0.05%	0.06%	0.09%
	5th	5th	95th	-	0.23%	0.79%	1.01%	1.21%	1.64%
B. RRV index alone	-	-	-	95th	0.13%	0.33%	0.40%	0.45%	0.57%
	-	-	-	5th	0.26%	0.66%	0.79%	0.91%	1.15%
C. PS index alone	-	-	-	95th	0.21%	0.52%	0.63%	0.72%	0.90%
	-	-	-	5th	0.26%	0.65%	0.78%	0.89%	1.12%
D. Base and RRV index	95th	95th	5th	95th	0.01%	0.04%	0.06%	0.07%	0.09%
	5th	5th	95th	5th	0.21%	0.72%	0.93%	1.11%	1.50%
E. Base and PS index	95th	95th	5th	95th	0.00%	0.03%	0.04%	0.05%	0.08%
	5th	5th	95th	5th	0.15%	0.90%	1.30%	1.68%	2.60%
F. Base and RRV and PS indices	95th	95th	5th	95th	0.00%	0.03%	0.04%	0.05%	0.07%
	5th	5th	95th	5th	0.14%	0.79%	1.13%	1.46%	2.26%

Table A4
Logit analysis of tender-offer repurchase decisions, option change

Tender-offer repurchase announcements are obtained from SDC over 1996-2010. The dependent variable equals one if the firm conducts a tender-offer repurchase in the year in question or zero otherwise. The independent variables are (i) the standardized market-to-book (M/B) ratio at the end of the fiscal year prior to the year in question, (ii) the market-adjusted abnormal return over the 12 months (or over the 36 months in rows C and F) ending immediately before the year in question, (iii) the market-adjusted excess return over the 12 months (or over the 36 months in rows C and F) beginning immediately after the year in question, and (iv) the change in options outstanding at the end of the year in question. The standardized M/B ratio is the firm's M/B ratio for the fiscal year immediately before the year in question, divided by the median M/B in that year for all firms. The abnormal return is the firm's actual stock return minus the contemporaneous return on the value-weighted market index. Change in options outstanding is computed as the difference between options outstanding/common shares outstanding in the current and prior year. Sample period is from 1996 to 2010.

	Intercept	Market to book ratio	Prior stock return	Future stock return	Option change
A. All firms					
Coefficient	-4.341	-0.699	-0.030	-0.007	
(Marginal probability)		(-0.0045)	(-0.000)	(-0.000)	
[t-statistic]	[-25.19]	[-5.32]	[-0.38]	[-0.13]	
B. All firms with raw M/B in lieu of standardized M/B					
Coefficient	-4.458	-0.379	-0.058	-0.010	
(Marginal probability)		(-0.002)	(-0.000)	(-0.000)	
[t-statistic]	[-27.28]	[-5.24]	[-0.79]	[-0.19]	
C. All firms with 36-month market-adjusted return in lieu of 12-month return					
Coefficient	-4.245	-0.737	-0.039	-0.018	
(Marginal probability)		(-0.005)	(-0.000)	(-0.000)	
[t-statistic]	[-23.27]	[-4.60]	[-0.58]	[-0.49]	
D. All firms					
Coefficient	-4.125	-0.726	-0.018	-0.212	9.471
(Marginal probability)		(-0.005)	(-0.000)	(-0.002)	(0.070)
[t-statistic]	[-20.15]	[-5.42]	[-0.17]	[-1.99]	[4.89]
E. All firms with raw M/B in lieu of standardized M/B					
Coefficient	-4.316	-0.350	-0.069	-0.223	9.428
(Marginal probability)		(-0.003)	(-0.001)	(-0.002)	(0.069)
[t-statistic]	[-18.09]	[-4.85]	[-0.67]	[-2.04]	(4.86)
F. All firms with 36-month market-adjusted return in lieu of 12-month return					
Coefficient	-4.017	-0.726	-0.121	-0.167	10.969
(Marginal probability)		(-0.006)	(-0.001)	(-0.001)	(0.089)
[t-statistic]	[-19.68]	[-3.71]	[-0.93]	[-1.33]	[4.52]

Table A5
Estimated probability of tender-offer repurchases, option change

This table reports the probability of a tender-offer repurchase conditional on specific hypothesized values of the independent variables. In Panel A, the estimated probabilities are based on the model in Row D of Table A4, which include standardized M/B, prior and future 12-month market-adjusted excess returns, and the change in options outstanding. Row 1 reports the probability of a tender-offer repurchase for a firm that faces neutral market-timing opportunities. Rows 2-7 show the impact of changing each timing variable by large amounts, while holding other timing variables neutral. Rows 8-13 describe the impact of large swings in future abnormal returns while holding M/B and prior excess stock return highly favorable or unfavorable. The probability of conducting a tender-offer repurchase for firms face highly unfavorable versus highly favorable timing opportunities is given in Rows 14-15 respectively. The estimated probabilities in far right column are based on the model in Row A of Table A4, which includes only the market-timing variables and no control for options change effect. Panel B are similar to Panel A, except that standardized M/B ratio is not used to estimate the probabilities.

Panel A.

	Percentile of standardized M/B ratio	Percentile of prior excess stock return	Percentile of future excess stock return	Estimated probability of a tender-offer repurchase as a function of percentile of change in options /# of shares					Tender-offer probability as a function of market-timing variables only (no option change effect)
				5th	25th	50th	75th	95th	
Neutral market-timing opportunities									
1.	50th	50th	50th	0.51%	0.70%	0.77%	0.85%	1.09%	0.64%
Effect of large variation in each market-timing variable									
2.	50th	95th	50th	0.50%	0.68%	0.75%	0.82%	1.06%	0.61%
3.	50th	5th	50th	0.52%	0.70%	0.78%	0.85%	1.10%	0.65%
4.	50th	50th	95th	0.38%	0.52%	0.58%	0.63%	0.82%	0.63%
5.	50th	50th	5th	0.59%	0.80%	0.89%	0.97%	1.26%	0.64%
6.	95th	50th	50th	0.06%	0.08%	0.09%	0.10%	0.13%	0.08%
7.	5th	50th	50th	0.73%	0.99%	1.10%	1.20%	1.55%	0.90%
Future returns effect, given very low M/B and prior returns									
8.	5th	5th	5th	0.85%	1.15%	1.28%	1.40%	1.80%	0.92%
9.	5th	5th	50th	0.73%	1.00%	1.11%	1.22%	1.56%	0.91%
10.	5th	5th	95th	0.55%	0.75%	0.83%	0.91%	1.17%	0.91%
Future returns effect, given very high M/B and prior returns									
11.	95th	95th	5th	0.07%	0.09%	0.10%	0.11%	0.14%	0.08%
12.	95th	95th	50th	0.06%	0.08%	0.09%	0.10%	0.12%	0.08%
13.	95th	95th	95th	0.04%	0.06%	0.07%	0.07%	0.09%	0.08%
Extremely unfavorable versus favorable timing opportunities									
14.	95th	95th	5th	0.07%	0.09%	0.10%	0.11%	0.14%	0.08%
15.	5th	5th	95th	0.55%	0.75%	0.83%	0.91%	1.17%	0.91%

Panel B.

	Percentile of prior excess stock return	Percentile of future excess stock return	Estimated probability of a tender-offer repurchase as a function of percentile of change in options /# of shares					Tender-offer probability as a function of market-timing variables only (no option change effect)
			5th	25th	50th	75th	95th	
Neutral market-timing opportunities								
1.	50th	50th	0.47%	0.63%	0.70%	0.77%	0.99%	0.60%
Effect of large variation in each market-timing variable								
2.	95th	50th	0.30%	0.41%	0.45%	0.49%	0.63%	0.41%
3.	5th	50th	0.57%	0.77%	0.86%	0.94%	1.20%	0.71%
4.	50th	95th	0.35%	0.48%	0.53%	0.58%	0.75%	0.60%
5.	50th	5th	0.53%	0.72%	0.79%	0.87%	1.11%	0.60%
Future returns effect, given very low prior returns								
6.	5th	5th	0.64%	0.87%	0.97%	1.06%	1.36%	0.71%
7.	5th	50th	0.57%	0.77%	0.86%	0.94%	1.20%	0.71%
8.	5th	95th	0.43%	0.59%	0.65%	0.71%	0.92%	0.71%
Future returns effect, given very high prior returns								
9.	95th	5th	0.34%	0.46%	0.51%	0.56%	0.72%	0.41%
10.	95th	50th	0.30%	0.41%	0.45%	0.49%	0.63%	0.41%
11.	95th	95th	0.23%	0.31%	0.34%	0.37%	0.48%	0.41%
Extremely unfavorable versus favorable timing opportunities								
12.	95th	5th	0.34%	0.46%	0.51%	0.56%	0.72%	0.41%
13.	5th	95th	0.43%	0.59%	0.65%	0.71%	0.92%	0.71%

Table A6
Logit analysis of tender-offer repurchase decisions, deviation from target leverage

Tender-offer repurchase announcements are obtained from SDC over 1985-2010. The dependent variable equals one if the firm conducts a tender-offer repurchase in the year in question or zero otherwise. The independent variables are (i) the standardized market-to-book (M/B) ratio at the end of the fiscal year prior to the year in question, (ii) the market-adjusted abnormal return over the 12 months (or over the 36 months in rows C and F) ending immediately before the year in question, (iii) the market-adjusted excess return over the 12 months (or over the 36 months in rows C and F) beginning immediately after the year in question, and (iv) the deviation from target leverage ratio at the end of the fiscal year immediately before the year in question. The standardized M/B ratio is the firm's M/B ratio for the fiscal year immediately before the year in question, divided by the median M/B in that year for all firms. The abnormal return is the firm's actual stock return minus the contemporaneous return on the value-weighted market index. Deviation from target is the difference between the debt to assets ratio and an estimated target leverage ratio at the end of the fiscal year prior to the year in question. Target leverage ratio is the fitted value from a liner regression of debt to assets ratio on variables often hypothesized to affect leverage decisions: log(sales), market-to-book ratio, profitability and asset tangibility. Sample period is from 1985 to 2010.

	Intercept	Market to book ratio	Prior stock return	Future stock return	Deviation from target
A. All firms					
Coefficient	-4.204	-0.775	0.096	-0.010	
(Marginal probability)		(-0.005)	(0.001)	(-0.000)	
[t-statistic]	[-32.91]	[-7.49]	[1.86]	[-0.27]	
B. All firms with raw M/B in lieu of standardized M/B					
Coefficient	-4.284	-0.477	0.087	-0.010	
(Marginal probability)		(-0.003)	(0.001)	(-0.000)	
[t-statistic]	[-33.67]	[-6.90]	[1.68]	[-0.25]	
C. All firms with 36-month market-adjusted return in lieu of 12-month return					
Coefficient	-4.144	-0.763	-0.002	-0.028	
(Marginal probability)		(-0.006)	(-0.000)	(-0.000)	
[t-statistic]	[-28.56]	[-6.74]	[-0.04]	[-0.90]	
D. All firms					
Coefficient	-4.240	-0.747	0.060	0.001	-1.133
(Marginal probability)		(-0.005)	(0.000)	(0.000)	(-0.008)
[t-statistic]	[-30.17]	[-7.23]	[1.03]	[0.02]	(-4.31)
E. All firms with raw M/B in lieu of standardized M/B					
Coefficient	-4.320	-0.457	0.048	0.001	-1.159
(Marginal probability)		(-0.003)	(0.000)	(0.000)	(-0.008)
[t-statistic]	[-29.57]	[-6.22]	[0.83]	[0.03]	(-4.42)
F. All firms with 36-month market-adjusted return in lieu of 12-month return					
Coefficient	-4.190	-0.757	-0.005	-0.023	-1.191
(Marginal probability)		(-0.006)	(-0.000)	(-0.000)	(-0.009)
[t-statistic]	[-27.47]	[-6.55]	[-0.12]	[-0.73]	[-3.99]

Table A7
Estimated probability of tender-offer repurchases, deviation from target leverage

This table reports the probability of a tender-offer repurchase conditional on specific hypothesized values of the independent variables. In Panel A, the estimated probabilities are based on the model in Row D of Table A6, which include standardized M/B, prior and future 12-month market-adjusted excess returns, and the deviation from target leverage ratio. Row 1 reports the probability of a tender-offer repurchase for a firm that faces neutral market-timing opportunities. Rows 2-7 show the impact of changing each timing variable by large amounts, while holding other timing variables neutral. Rows 8-13 describe the impact of large swings in future abnormal returns while holding M/B and prior excess stock return highly favorable or unfavorable. The probability of conducting a tender-offer repurchase for firms face highly unfavorable versus highly favorable timing opportunities is given in Rows 14-15 respectively. The estimated probabilities in far right column are based on the model in Row A of Table A6 which includes only the market-timing variables and no control for deviation from target. Panel B are similar to Panel A, except that standardized M/B ratio is not used to estimate the probabilities.

Panel A.

	Percentile of standardized M/B ratio	Percentile of prior excess stock return	Percentile of future excess stock return	Estimated probability of a tender-offer repurchase as a function of percentile of deviation from target					Tender-offer probability as a function of market-timing variables only (no deviation from target effect)
				5th	25th	50th	75th	95th	
Neutral market-timing opportunities									
1.	50th	50th	50th	0.91%	0.82%	0.71%	0.58%	0.41%	0.67%
Effect of large variation in each market-timing variable									
2.	50th	95th	50th	0.97%	0.88%	0.76%	0.63%	0.44%	0.76%
3.	50th	5th	50th	0.88%	0.79%	0.69%	0.56%	0.40%	0.64%
4.	50th	50th	95th	0.91%	0.82%	0.71%	0.58%	0.41%	0.67%
5.	50th	50th	5th	0.91%	0.82%	0.71%	0.58%	0.41%	0.68%
6.	95th	50th	50th	0.11%	0.10%	0.08%	0.07%	0.05%	0.07%
7.	5th	50th	50th	1.28%	1.15%	1.01%	0.83%	0.58%	0.97%
Future returns effect, given very low M/B and prior returns									
8.	5th	5th	5th	1.24%	1.12%	0.97%	0.80%	0.56%	0.92%
9.	5th	5th	50th	1.24%	1.12%	0.97%	0.80%	0.56%	0.91%
10.	5th	5th	95th	1.24%	1.12%	0.98%	0.80%	0.56%	0.90%
Future returns effect, given very high M/B and prior returns									
11.	95th	95th	5th	0.12%	0.10%	0.09%	0.07%	0.05%	0.08%
12.	95th	95th	50th	0.12%	0.10%	0.09%	0.07%	0.05%	0.08%
13.	95th	95th	95th	0.12%	0.10%	0.09%	0.07%	0.05%	0.08%
Extremely unfavorable versus favorable timing opportunities									
14.	95th	95th	5th	0.12%	0.10%	0.09%	0.07%	0.05%	0.08%
15.	5th	5th	95th	1.24%	1.12%	0.98%	0.80%	0.56%	0.90%

Panel B.

	Percentile of prior excess stock return	Percentile of future excess stock return	Estimated probability of a tender-offer repurchase as a function of percentile of deviation from target					Tender-offer probability as a function of market-timing variables only (no deviation from target effect)
			5th	25th	50th	75th	95th	
Neutral market-timing opportunities								
1.	50th	50th	0.86%	0.78%	0.69%	0.57%	0.41%	0.63%
Effect of large variation in each market-timing variable								
2.	95th	50th	0.69%	0.62%	0.55%	0.46%	0.33%	0.54%
3.	5th	50th	0.95%	0.86%	0.76%	0.63%	0.46%	0.68%
4.	50th	95th	0.87%	0.79%	0.70%	0.58%	0.42%	0.64%
5.	50th	5th	0.85%	0.77%	0.68%	0.57%	0.41%	0.63%
Future returns effect, given very low prior returns								
6.	5th	5th	0.94%	0.85%	0.75%	0.63%	0.45%	0.68%
7.	5th	50th	0.95%	0.86%	0.76%	0.63%	0.46%	0.68%
8.	5th	95th	0.97%	0.88%	0.78%	0.65%	0.47%	0.69%
Future returns effect, given very high prior returns								
9.	95th	5th	0.68%	0.62%	0.55%	0.45%	0.33%	0.54%
10.	95th	50th	0.69%	0.62%	0.55%	0.46%	0.33%	0.54%
11.	95th	95th	0.70%	0.64%	0.56%	0.47%	0.34%	0.55%
Extremely unfavorable versus favorable timing opportunities								
12.	95th	5th	0.68%	0.62%	0.55%	0.45%	0.33%	0.54%
13.	5th	95th	0.97%	0.88%	0.78%	0.65%	0.47%	0.69%

Table A8
Estimated probability of repurchase using RRV and PS mispricing indices, operating cash flow

This table reports the probability of a repurchase conditional on specific hypothesized values of the independent variables. A firm is defined as a repurchaser if it buys back at least 1% of its shares. The base case findings in Panel A are those implied by the parameter estimates in Row D of Table 7. The base variables are standardized M/B, prior and future 12-month market-adjusted excess returns. Panel B through Panel F report the estimated repurchase probabilities calculated analogously, but with the model in Row D of Table 7 re-estimated using other mispricing measures. The mispricing index labeled RRV is the one employed by Rhodes-Kropf, Robinson, and Viswanathan (RRV, 2005, Table 4, Model 3). The mispricing index labeled PS is the one used by Polk and Sapienza (PS, 2009). I take the 95th percentile value of RRV (PS) as indicative of highly unfavorable timing opportunities and the 5th percentile value of RRV (PS) as indicative of highly favorable timing opportunities. For each pair of rows, the first row reports the estimated repurchase probabilities as a function of operating cash flow for firms with poor timing opportunities while the second row reports the estimated repurchase probabilities for firms with excellent timing opportunities.

Market mispricing indices included in logit model	Percentile of standardized M/B ratio	Percentile of prior excess stock return	Percentile of future excess stock return	Percentile of supplementary mispricing index	Estimated probability of a repurchase as a function of percentile of operating-cash-flow/assets				
					5th	25th	50th	75th	95th
A. Base case	95th	95th	5th	-	2.19%	6.46%	8.02%	9.54%	12.88%
	5th	5th	95th	-	7.19%	19.29%	23.16%	26.72%	33.82%
B. RRV index alone	-	-	-	95th	3.36%	8.93%	10.82%	12.63%	16.47%
	-	-	-	5th	7.46%	18.51%	21.96%	25.10%	31.38%
C. PS index alone	-	-	-	95th	5.66%	15.70%	19.05%	22.18%	28.58%
	-	-	-	5th	5.75%	15.93%	19.31%	22.47%	28.92%
D. Base and RRV index	95th	95th	5th	95th	1.86%	5.83%	7.33%	8.82%	12.13%
	5th	5th	95th	5th	7.73%	21.52%	25.94%	29.98%	37.93%
E. Base and PS index	95th	95th	5th	95th	2.26%	8.22%	10.58%	12.95%	18.25%
	5th	5th	95th	5th	5.95%	19.68%	24.47%	28.94%	37.94%
F. Base and RRV and PS indices	95th	95th	5th	95th	1.99%	7.60%	9.89%	12.21%	17.48%
	5th	5th	95th	5th	6.54%	22.13%	27.50%	32.47%	42.26%

Table A9
Logit analysis of repurchase decisions, option change

The dependent variable equals one if a firm repurchases at least 1% of its shares during the year in question or zero otherwise. The independent variables are (i) the standardized market-to-book (M/B) ratio at the end of the fiscal year prior to the year in question, (ii) the market-adjusted abnormal return over the 12 months (or over the 36 months in rows C and F) ending immediately before the year in question, (iii) the market-adjusted excess return over the 12 months (or over the 36 months in rows C and F) beginning immediately after the year in question, and (iv) the change in options outstanding at the end of the year in question. The standardized M/B ratio is the firm's M/B ratio for the fiscal year immediately before the year in question, divided by the median M/B in that year for all firms. The abnormal return is the firm's actual stock return minus the contemporaneous return on the value-weighted market index. Change in options outstanding is computed as the difference between options outstanding/common shares outstanding in the current and prior year. Sample period is from 1996 to 2010.

	Intercept	Market to book ratio	Prior stock return	Future stock return	Option change
A. All firms					
Coefficient	-1.090	-0.095	-0.086	0.005	
(Marginal probability)		(-0.017)	(-0.016)	(0.001)	
[t-statistic]	[-11.43]	[-2.76]	[-1.60]	[0.15]	
B. All firms with raw M/B in lieu of standardized M/B					
Coefficient	-1.109	-0.052	-0.094	0.005	
(Marginal probability)		(-0.009)	(-0.017)	(0.001)	
[t-statistic]	[-11.51]	[-2.18]	[-1.81]	[0.14]	
C. All firms with 36-month market-adjusted return in lieu of 12-month return					
Coefficient	-1.007	-0.080	-0.017	0.020	
(Marginal probability)		(-0.015)	(-0.003)	(0.004)	
[t-statistic]	[-9.74]	[-2.27]	[-1.48]	[1.45]	
D. All firms					
Coefficient	-0.898	-0.027	-0.051	-0.075	5.690
(Marginal probability)		(-0.005)	(-0.010)	(-0.015)	(1.156)
[t-statistic]	[-8.36]	[-0.97]	[-0.66]	[-1.31]	(5.22)
E. All firms with raw M/B in lieu of standardized M/B					
Coefficient	0.917	-0.008	-0.062	-0.075	5.652
(Marginal probability)		(-0.002)	(-0.012)	(-0.015)	(1.146)
[t-statistic]	[-7.93]	[-0.46]	[-0.83]	[-1.32]	(5.18)
F. All firms with 36-month market-adjusted return in lieu of 12-month return					
Coefficient	-0.795	0.003	-0.064	0.006	6.488
(Marginal probability)		(0.001)	(-0.014)	(0.001)	(1.388)
[t-statistic]	[-8.28]	[0.10]	[-2.74]	[0.35]	[4.68]

Table A10
Estimated probability of repurchases, option change

This table reports the probability of a repurchase conditional on specific hypothesized values of the independent variables. A firm is defined as a repurchaser if it buys back at least 1% of its shares. In Panel A, the estimated probabilities are based on the model in Row D of Table A9, which include standardized M/B, prior and future 12-month market-adjusted excess returns, and the change in options outstanding. Row 1 reports the probability of a repurchase for a firm that faces neutral market-timing opportunities. Rows 2-7 show the impact of changing each timing variable by large amounts, while holding other timing variables neutral. Rows 8-13 describe the impact of large swings in future abnormal returns while holding M/B and prior excess stock return highly favorable or unfavorable. The probability of conducting a repurchase for firms face highly unfavorable versus highly favorable timing opportunities is given in Rows 14-15 respectively. The estimated probabilities in far right column are based on the model in Row A of Table A9, which includes only the market-timing variables and no control for the change in options outstanding/shares outstanding. Panel B are similar to Panel A, except that standardized M/B ratio is not used to estimate the probabilities.

Panel A.

	Percentile of standardized M/B ratio	Percentile of prior excess stock return	Percentile of future excess stock return	Estimated probability of a repurchase as a function of of percentile of change in options /# of shares					Repurchase probability as a function of market-timing variables only (no option change effect)
				5th	25th	50th	75th	95th	
Neutral market-timing opportunities									
1.	50th	50th	50th	23.63%	27.17%	28.45%	29.57%	32.87%	23.50%
Effect of large variation in each market-timing variable									
2.	50th	95th	50th	22.37%	25.78%	27.02%	28.11%	31.32%	21.43%
3.	50th	5th	50th	24.21%	27.80%	29.10%	30.24%	33.57%	24.47%
4.	50th	50th	95th	21.82%	25.17%	26.39%	27.47%	30.63%	23.63%
5.	50th	50th	5th	24.56%	28.19%	29.50%	30.64%	34.00%	23.44%
6.	95th	50th	50th	22.24%	25.64%	26.87%	27.95%	31.15%	18.83%
7.	5th	50th	50th	23.87%	27.43%	28.71%	29.84%	33.16%	24.35%
Future returns effect, given very low M/B and prior returns									
8.	5th	5th	5th	25.40%	29.10%	30.44%	31.60%	35.01%	25.28%
9.	5th	5th	50th	24.45%	28.06%	29.37%	30.51%	33.86%	25.34%
10.	5th	5th	95th	22.59%	26.03%	27.27%	28.37%	31.59%	25.47%
Future returns effect, given very high M/B and prior returns									
11.	95th	95th	5th	21.89%	25.25%	26.47%	27.55%	30.72%	17.02%
12.	95th	95th	50th	21.03%	24.30%	25.49%	26.54%	29.65%	17.07%
13.	95th	95th	95th	19.37%	22.45%	23.58%	24.58%	27.54%	17.17%
Extremely unfavorable versus favorable timing opportunities									
14.	95th	95th	5th	21.89%	25.25%	26.47%	27.55%	30.72%	17.02%
15.	5th	5th	95th	22.59%	26.03%	27.27%	28.37%	31.59%	25.47%

Panel B.

	Percentile of prior excess stock return	Percentile of future excess stock return	Estimated probability of a repurchase as a function of percentile of change in options /# of shares					Repurchase probability as a function of market-timing variables only (no option change effect)
			5th	25th	50th	75th	95th	
Neutral market-timing opportunities								
1.	50th	50th	23.55%	27.05%	28.31%	29.41%	32.67%	23.10%
Effect of large variation in each market-timing variable								
2.	95th	50th	21.82%	25.14%	26.34%	27.40%	30.53%	19.96%
3.	5th	50th	24.36%	27.93%	29.21%	30.34%	33.65%	24.61%
4.	50th	95th	21.72%	25.03%	26.23%	27.29%	30.41%	23.28%
5.	50th	5th	24.41%	27.98%	29.26%	30.39%	33.70%	23.02%
Future returns effect, given very low prior returns								
6.	5th	5th	25.23%	28.88%	30.19%	31.33%	34.70%	24.53%
7.	5th	50th	24.36%	27.93%	29.21%	30.34%	33.65%	24.61%
8.	5th	95th	22.48%	25.87%	27.10%	28.17%	31.35%	24.80%
Future returns effect, given very high prior returns								
9.	95th	5th	22.62%	26.02%	27.26%	28.34%	31.53%	19.88%
10.	95th	50th	21.82%	25.14%	26.34%	27.40%	30.53%	19.96%
11.	95th	95th	20.09%	23.22%	24.36%	25.37%	28.35%	20.12%
Extremely unfavorable versus favorable timing opportunities								
12.	95th	5th	22.62%	26.02%	27.26%	28.34%	31.53%	19.88%
13.	5th	95th	22.48%	25.87%	27.10%	28.17%	31.35%	24.80%

Table A11
Logit analysis of repurchase decisions, deviation from target leverage

The dependent variable equals one if a firm repurchases at least 1% of its shares during the year in question or zero otherwise. The independent variables are (i) the standardized market-to-book (M/B) ratio at the end of the fiscal year prior to the year in question, (ii) the market-adjusted abnormal return over the 12 months (or over the 36 months in rows C and F) ending immediately before the year in question, (iii) the market-adjusted excess return over the 12 months (or over the 36 months in rows C and F) beginning immediately after the year in question, and (iv) the deviation from target leverage ratio at the end of the fiscal year immediately before the year in question. The standardized M/B ratio is the firm's M/B ratio for the fiscal year immediately before the year in question, divided by the median M/B in that year for all firms. The abnormal return is the firm's actual stock return minus the contemporaneous return on the value-weighted market index. Deviation from target is the difference between the debt to assets ratio and an estimated target leverage ratio at the end of the fiscal year prior to the year in question. Target leverage ratio is the fitted value from a liner regression of debt to assets ratio on variables often hypothesized to affect leverage decisions: log(sales), market-to-book ratio, profitability and asset tangibility. Sample period is from 1971 to 2010.

	Intercept	Market to book ratio	Prior stock return	Future stock return	Deviation from target
A. All firms					
Coefficient	-1.300	-0.212	-0.043	0.052	
(Marginal probability)		(-0.031)	(-0.006)	(0.008)	
[t-statistic]	[-20.36]	[-5.14]	[-1.15]	[2.08]	
B. All firms with raw M/B in lieu of standardized M/B					
Coefficient	-1.430	-0.077	-0.083	0.056	
(Marginal probability)		(-0.011)	(-0.012)	(0.008)	
[t-statistic]	[-23.07]	[-3.32]	[-2.11]	[2.20]	
C. All firms with 36-month market-adjusted return in lieu of 12-month return					
Coefficient	-1.295	-0.174	-0.001	0.047	
(Marginal probability)		(-0.026)	(-0.000)	(0.007)	
[t-statistic]	[-18.47]	[-4.25]	[-0.05]	[3.10]	
D. All firms					
Coefficient	-1.326	-0.161	-0.103	0.049	-1.019
(Marginal probability)		(-0.025)	(-0.016)	(0.008)	(-0.158)
[t-statistic]	[-20.97]	[-4.06]	[-2.62]	[1.87]	(-10.98)
E. All firms with raw M/B in lieu of standardized M/B					
Coefficient	-1.449	-0.042	-0.145	0.053	-1.010
(Marginal probability)		(-0.006)	(-0.022)	(0.008)	(-0.155)
[t-statistic]	[-22.97]	[-1.87]	[-3.44]	[2.00]	(-10.97)
F. All firms with 36-month market-adjusted return in lieu of 12-month return					
Coefficient	-1.295	-0.184	-0.001	0.050	-0.978
(Marginal probability)		(-0.029)	(-0.000)	(0.008)	(-0.152)
[t-statistic]	[-19.00]	[-4.32]	[-0.09]	[3.13]	[-9.33]

Appendix A12
Estimated probability of repurchases, deviation from target leverage

This table reports the probability of a repurchase conditional on specific hypothesized values of the independent variables. A firm is defined as a repurchaser if it buys back at least 1% of its shares. In Panel A, the estimated probabilities are based on the model in Row D of Table A11, which include standardized M/B, prior and future 12-month market-adjusted excess returns, and the deviation from target leverage ratio. Row 1 reports the probability of a repurchase for a firm that faces neutral market-timing opportunities. Rows 2-7 show the impact of changing each timing variable by large amounts, while holding other timing variables neutral. Rows 8-13 describe the impact of large swings in future abnormal returns while holding M/B and prior excess stock return highly favorable or unfavorable. The probability of conducting a repurchase for firms face highly unfavorable versus highly favorable timing opportunities is given in Rows 14-15 respectively. The estimated probabilities in far right column are based on the model in Row A of Table A11, which includes only the market-timing variables and no control for deviation from target. Panel B are similar to Panel A, except that standardized M/B ratio is not used to estimate the probabilities

Panel A.

	Percentile of standardized M/B ratio	Percentile of prior excess stock return	Percentile of future excess stock return	Estimated probability of a repurchase as a function of percentile of deviation from target					Repurchase probability as a function of market-timing variables only (no deviation from target effect)
				5th	25th	50th	75th	95th	
Neutral market-timing opportunities									
1.	50th	50th	50th	22.36%	20.84%	19.06%	16.98%	13.75%	18.03%
Effect of large variation in each market-timing variable									
2.	50th	95th	50th	20.40%	18.99%	17.33%	15.40%	12.42%	17.33%
3.	50th	5th	50th	23.41%	21.84%	20.00%	17.84%	14.47%	18.41%
4.	50th	50th	95th	23.35%	21.78%	19.95%	17.79%	14.43%	18.92%
5.	50th	50th	5th	21.82%	20.33%	18.59%	16.54%	13.38%	17.56%
6.	95th	50th	50th	15.83%	14.67%	13.33%	11.78%	9.43%	11.15%
7.	5th	50th	50th	23.61%	22.03%	20.18%	18.00%	14.61%	19.46%
Future returns effect, given very low M/B and prior returns									
8.	5th	5th	5th	24.13%	22.53%	20.65%	18.43%	14.97%	19.34%
9.	5th	5th	50th	24.71%	23.08%	21.16%	18.90%	15.37%	19.85%
10.	5th	5th	95th	25.77%	24.09%	22.12%	19.78%	16.12%	20.81%
Future returns effect, given very high M/B and prior returns									
11.	95th	95th	5th	13.96%	12.92%	11.72%	10.33%	8.24%	10.37%
12.	95th	95th	50th	14.34%	13.27%	12.05%	10.63%	8.48%	10.68%
13.	95th	95th	95th	15.05%	13.94%	12.66%	11.17%	8.93%	11.25%
Extremely unfavorable versus favorable timing opportunities									
14.	95th	95th	5th	13.96%	12.92%	11.72%	10.33%	8.24%	10.37%
15.	5th	5th	95th	25.77%	24.09%	22.12%	19.78%	16.12%	20.81%

Panel B.

	Percentile of prior excess stock return	Percentile of future excess stock return	Estimated probability of a repurchase as a function of percentile of deviation from target					Repurchase probability as a function of market-timing variables only (no deviation from target effect)
			5th	25th	50th	75th	95th	
Neutral market-timing opportunities								
1.	50th	50th	21.82%	20.36%	18.65%	16.64%	13.52%	17.42%
Effect of large variation in each market-timing variable								
2.	95th	50th	18.68%	17.38%	15.87%	14.11%	11.40%	15.35%
3.	5th	50th	23.58%	22.04%	20.22%	18.08%	14.74%	18.58%
4.	50th	95th	22.93%	21.41%	19.64%	17.54%	14.28%	18.43%
5.	50th	5th	21.27%	19.83%	18.16%	16.19%	13.14%	16.92%
Future returns effect, given very low prior returns								
6.	5th	5th	23.00%	21.48%	19.70%	17.60%	14.33%	18.05%
7.	5th	50th	23.58%	22.04%	20.22%	18.08%	14.74%	18.58%
8.	5th	95th	24.75%	23.15%	21.27%	19.04%	15.56%	19.64%
Future returns effect, given very high prior returns								
9.	95th	5th	18.19%	16.91%	15.44%	13.72%	11.07%	14.89%
10.	95th	50th	18.68%	17.38%	15.87%	14.11%	11.40%	15.35%
11.	95th	95th	19.67%	18.32%	16.74%	14.90%	12.06%	16.26%
Extremely unfavorable versus favorable timing opportunities								
12.	95th	5th	18.19%	16.91%	15.44%	13.72%	11.07%	14.89%
13.	5th	95th	24.75%	23.15%	21.27%	19.04%	15.56%	19.64%

Table A13
Share repurchases and abnormal stock returns

All firms in this table come from the same sample in Table A1. Future (past) 12(36)-month cumulative abnormal return is the market-adjusted buy-and-hold abnormal return over 12(36) months beginning (ending) immediately after (before) the year in question. The abnormal return is the firm's actual return minus the contemporaneous return on the value-weighted market index. One-shot repurchasers are firms that only repurchase once during their time in the sample. Tender-offer repurchases are reported by SDC.

Year	Number of repurchases			Percent of repurchasers with future 12-month cumulative abnormal return <0			Percent of repurchasers with past 12-month cumulative abnormal return <0		
	All	One-shot	Tender-offer	All	One-shot	Tender-offer	All	One-shot	Tender-offer
1985	829	35	13	61.6%	65.7%	61.5%	64.1%	82.9%	61.5%
1986	862	45	12	58.8%	66.7%	50.0%	59.9%	73.3%	41.7%
1987	1,096	47	21	51.9%	48.9%	42.9%	59.3%	66.0%	38.1%
1988	1,073	57	24	65.0%	71.9%	66.7%	60.5%	70.2%	62.5%
1989	959	32	22	65.4%	78.1%	54.5%	56.0%	78.1%	36.4%
1990	1,089	33	14	58.8%	66.7%	50.0%	63.3%	84.8%	78.6%
1991	801	29	11	54.6%	65.5%	36.4%	64.9%	72.4%	63.6%
1992	757	28	18	51.4%	60.7%	33.3%	57.3%	57.1%	38.9%
1993	789	28	10	47.7%	64.3%	30.0%	55.9%	64.3%	60.0%
1994	916	34	14	61.1%	76.5%	50.0%	51.4%	58.8%	42.9%
1995	1,048	49	13	57.9%	63.3%	46.2%	54.2%	65.3%	53.8%
1996	1,116	42	25	60.9%	66.7%	36.0%	64.2%	59.5%	72.0%
1997	1,271	40	25	71.7%	87.5%	68.0%	61.9%	85.0%	60.0%
1998	1,556	65	16	67.9%	43.1%	75.0%	62.0%	63.1%	62.5%
1999	1,528	79	22	51.4%	65.8%	63.6%	76.3%	86.1%	81.8%
2000	1,362	40	19	26.9%	42.5%	21.1%	72.8%	82.5%	89.5%
2001	1,198	53	9	40.5%	60.4%	22.2%	50.7%	71.7%	22.2%
2002	1,123	52	10	41.3%	19.2%	40.0%	31.8%	42.3%	10.0%
2003	986	21	20	44.3%	33.3%	45.0%	39.8%	57.1%	50.0%
2004	889	13	11	55.6%	69.2%	45.5%	41.7%	30.8%	36.4%
2005	981	16	17	58.6%	43.8%	64.7%	43.3%	25.0%	64.7%
2006	1,070	21	19	59.6%	61.9%	78.9%	53.4%	47.6%	42.1%
2007	1,179	25	25	53.7%	72.0%	68.0%	54.4%	68.0%	72.0%
2008	1,300	54	16	43.3%	37.0%	43.8%	59.0%	64.8%	62.5%
2009	878	28	5	44.3%	35.7%	60.0%	54.1%	75.0%	60.0%
All Years	26,656	966	411	54.0%	58.1%	51.8%	57.2%	68.0%	56.7%

Year	Number of repurchases			Percent of repurchasers with future 36-month cumulative abnormal return <0			Percent of repurchasers with past 36-month cumulative abnormal return <0		
	All	One-shot	Tender-offer	All	One-shot	Tender-offer	All	One-shot	Tender-offer
1985	653	12	11	58.8%	58.3%	45.5%	49.3%	66.7%	36.4%
1986	688	15	9	63.7%	80.0%	88.9%	57.4%	93.3%	66.7%
1987	896	23	16	68.0%	82.6%	62.5%	60.7%	82.6%	37.5%
1988	873	28	21	70.3%	82.1%	61.9%	63.5%	78.6%	81.0%
1989	786	12	21	63.1%	66.7%	61.9%	59.0%	91.7%	52.4%
1990	961	14	13	51.9%	57.1%	53.8%	61.9%	85.7%	61.5%
1991	714	17	8	49.0%	64.7%	50.0%	66.8%	94.1%	50.0%
1992	668	11	17	59.7%	72.7%	41.2%	62.3%	72.7%	76.5%
1993	679	10	9	62.7%	80.0%	44.4%	55.4%	70.0%	88.9%
1994	777	11	11	66.4%	100.0%	63.6%	47.0%	54.5%	54.5%
1995	824	19	10	74.5%	84.2%	50.0%	48.1%	63.2%	60.0%
1996	877	14	19	79.9%	78.6%	94.7%	59.5%	85.7%	52.6%
1997	993	15	20	75.6%	93.3%	70.0%	64.9%	86.7%	65.0%
1998	1,146	14	13	48.2%	50.0%	46.2%	66.7%	71.4%	84.6%
1999	1,183	31	20	30.8%	58.1%	40.0%	74.1%	80.6%	80.0%
2000	1,145	19	16	25.4%	36.8%	12.5%	79.3%	84.2%	100.0%
2001	1,008	25	6	34.8%	56.0%	50.0%	70.1%	68.0%	50.0%
2002	927	19	7	45.3%	47.4%	42.9%	40.6%	42.1%	28.6%
2003	843	11	14	50.1%	54.5%	28.6%	29.8%	54.5%	35.7%
2004	791	9	8	62.1%	88.9%	37.5%	25.8%	55.6%	12.5%
2005	839	7	10	60.2%	85.7%	90.0%	32.5%	71.4%	60.0%
2006	923	7	16	53.0%	85.7%	56.3%	41.9%	42.9%	62.5%
2007	1,039	17	22	41.2%	52.9%	59.1%	46.3%	47.1%	72.7%
All Years	20,233	360	317	54.9%	68.3%	55.2%	55.8%	73.1%	62.5%

Table A14
Histogram of abnormal stock returns following repurchases

All firms in this table come from the same sample in Table A1. Future 12(36)-month cumulative abnormal return is the market-adjusted buy-and-hold abnormal return over 12(36) months beginning immediately after the year in question. The abnormal return is the firm's actual return minus the contemporaneous return on the value-weighted market index. One-shot repurchasers are firms that only repurchase once during their time in the sample. Tender-offer repurchases are reported by SDC. Numbers in the parentheses are cumulative percent.

Panel A.

	Percent (cumulative percent) of repurchases with future 12-month abnormal stock return in the interval:					
	All		One-shot		Tender-offer	
Below -0.750	1.8%	(1.8%)	9.3%	(9.3%)	1.1%	(1.1%)
-0.750 to -0.500	6.8%	(8.5%)	15.7%	(25.0%)	4.3%	(5.5%)
-0.500 to -0.250	17.4%	(25.9%)	16.7%	(41.7%)	18.5%	(24.0%)
-0.250 to 0.000	28.1%	(54.0%)	16.7%	(58.4%)	28.9%	(52.8%)
0.000 to 0.250	22.2%	(76.2%)	13.9%	(72.3%)	24.2%	(77.0%)
0.250 to 0.500	11.1%	(87.3%)	9.8%	(82.2%)	11.3%	(88.3%)
0.500 to 0.750	5.3%	(92.5%)	4.9%	(87.1%)	5.1%	(93.4%)
Above 0.750	7.5%	(100.0%)	12.9%	(100.0%)	6.6%	(100.0%)
Median abnormal stock return	-0.03		-0.14		-0.02	
Mean abnormal stock return	0.07		0.06		0.06	

Panel B.

	Percent (cumulative percent) of repurchases with future 36-month abnormal stock return in the interval:					
	All		One-shot		Tender-offer	
Below -0.750	6.9%	(6.9%)	25.3%	(25.3%)	6.8%	(6.8%)
-0.750 to -0.500	12.9%	(19.7%)	19.2%	(44.5%)	13.1%	(20.0%)
-0.500 to -0.250	17.6%	(37.3%)	13.2%	(57.7%)	18.7%	(38.7%)
-0.250 to 0.000	17.6%	(54.9%)	10.7%	(68.4%)	16.3%	(55.0%)
0.000 to 0.250	14.1%	(69.0%)	5.2%	(73.6%)	16.8%	(71.8%)
0.250 to 0.500	9.7%	(78.7%)	5.5%	(79.1%)	10.2%	(82.0%)
0.500 to 0.750	6.0%	(84.6%)	2.5%	(81.6%)	4.1%	(86.1%)
Above 0.750	15.4%	(100.0%)	18.4%	(100.0%)	13.9%	(100.0%)
Median abnormal stock return	-0.07		-0.41		-0.08	
Mean abnormal stock return	0.18		0.00		0.13	

Table A15
Biggest winners and losers of repurchase, 12-month abnormal returns

Dollar repurchase is net repurchase as in Fama and French (2001). Future abnormal return is the market-adjusted buy-and-hold abnormal return over 12 months beginning immediately after the year in question. Percent of dollar repurchase to market value is the dollar repurchase divided by market capitalization at the end of prior year. Dollar abnormal return is the product of dollar amount of repurchase and future abnormal return. Percent of dollar abnormal return to market value is the dollar abnormal return divided by market capitalization at the end of prior year. The sample period is from 1985 to 2009.

Panel A. Biggest 20 winners		Year	\$ Repurchase	Abnormal return	Percent of \$ repurchase to market value
1.	MEHL/BIOPHILE INTL CORP	1994	\$0.23	38.909	5.5%
2.	EXX INC -CL A	2002	\$0.20	15.334	3.9%
3.	CATO CORP -CL A	1990	\$0.05	14.419	0.1%
4.	SILICON STORAGE TECHNOLOGY	1998	\$1.01	13.571	1.4%
5.	ELCOM INTERNATIONAL INC	1998	\$0.63	13.468	0.3%
6.	PERFECTDATA CORP	1998	\$0.01	13.301	0.2%
7.	VALUEVISION MEDIA INC -CL A	2008	\$3.32	12.067	1.6%
8.	AMERICA'S CAR-MART INC	1992	\$0.08	11.697	4.7%
9.	RC2 CORP	2000	\$3.99	11.411	5.7%
10.	USANA HEALTH SCIENCES INC	2001	\$0.03	10.767	0.2%
11.	MOVIE GALLERY INC	2000	\$5.70	10.591	10.5%
12.	ION NETWORKS INC -OLD	1998	\$0.20	10.558	1.5%
13.	LIBERTY MEDIA CAPITAL GROUP	2008	\$462.00	10.266	3.1%
14.	SCO GROUP INC	2002	\$4.00	9.965	23.4%
15.	NBTY INC	1991	\$0.02	9.810	0.3%
16.	BIOTIME INC	1995	\$0.19	9.537	2.3%
17.	ARRHYTHMIA RESEARCH TECH	2002	\$0.73	8.890	10.1%
18.	FORWARD INDUSTRIES INC	2004	\$0.08	8.013	0.6%
19.	ANAREN INC	1999	\$1.47	7.867	1.8%
20.	KEITHLEY INSTRUMENTS INC	1999	\$7.64	7.703	19.2%
Panel B. Biggest 20 losers		Year	\$ Repurchase	Abnormal return	Percent of \$ repurchase to market value
1.	COLOROCS CORP	1990	\$16.87	-0.998	13.8%
2.	MOLTEN METAL TECHNOLOGY INC	1996	\$0.48	-0.996	0.1%
3.	PROGRESSIVE GAMING INTL CORP	2007	\$0.13	-0.987	0.0%
4.	PURCHASEPRO.COM	2001	\$0.90	-0.987	0.1%
5.	VESTRON INC	1989	\$0.12	-0.980	0.1%
6.	BRENTWOOD INSTRUMENTS INC	1988	\$0.01	-0.979	0.7%
7.	VITALSTREAM HOLDINGS INC	1999	\$1.44	-0.978	32.1%
8.	ANACOMP INC	1999	\$4.16	-0.977	2.2%
9.	DEX ONE CORP	2007	\$94.86	-0.976	2.1%
10.	ONCOR INC	1997	\$0.00	-0.974	0.0%
11.	CONSTAR INTERNATIONAL INC	2007	\$0.24	-0.968	0.3%
12.	CARMIKE CINEMAS INC	1999	\$0.44	-0.967	0.2%
13.	TECHNOLOGY DEVELOPMENT CORP	1990	\$0.05	-0.964	1.0%
14.	UNIROYAL TECHNOLOGY CORP	2001	\$11.24	-0.963	2.9%
15.	SABRATEK CORP	1998	\$19.34	-0.961	6.5%
16.	CAREMATRIX CORP	1999	\$3.00	-0.960	0.5%
17.	COMDISCO HOLDING CO INC	2000	\$81.00	-0.958	2.7%
18.	AMERICAN COMMUNITY NEWSPAPER	2007	\$8.13	-0.951	8.9%
19.	BLUE CHIP COMPUTERWARE INC	1994	\$0.25	-0.949	2.0%
20.	LEASING SOLUTIONS INC	1998	\$1.24	-0.949	0.6%

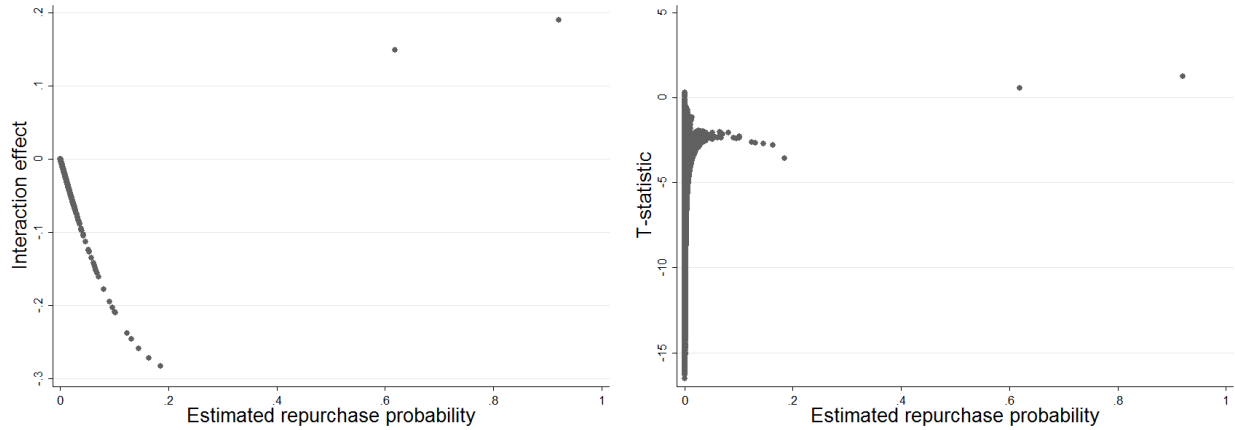
Panel C. Winners based on abnormal \$ return					Percent of \$ abnormal
	Year	\$ Repurchase	\$ Abnormal return	return to market value	
1.	EXXON MOBIL CORP	2007	\$30,291	\$10,163	2.3%
2.	INTL BUSINESS MACHINES CORP	2007	\$17,649	\$4,932	3.4%
3.	LIBERTY MEDIA CAPITAL GROUP	2008	\$462	\$4,743	31.5%
4.	EXXON MOBIL CORP	2006	\$28,040	\$4,380	1.3%
5.	AMGEN INC	2007	\$4,823	\$4,322	5.4%
6.	ALTRIA GROUP INC	1999	\$3,185	\$3,973	3.1%
7.	WAL-MART STORES INC	2007	\$7,691	\$3,825	1.9%
8.	INTL BUSINESS MACHINES CORP	2000	\$5,975	\$3,819	2.0%
9.	ORACLE CORP	1998	\$781	\$3,531	15.4%
10.	EXXON MOBIL CORP	2005	\$17,133	\$3,458	1.1%
11.	PFIZER INC	2007	\$10,107	\$2,921	1.6%
12.	CISCO SYSTEMS INC	2006	\$6,613	\$2,492	2.1%
13.	COMCAST CORP	2002	\$7,517	\$2,373	7.0%
14.	BOEING CO	1999	\$3,206	\$2,338	7.6%
15.	MCDONALD'S CORP	2007	\$3,210	\$2,192	4.1%
16.	DELL INC	1997	\$935	\$2,078	18.2%
17.	ANHEUSER-BUSCH COS INC	2007	\$2,707	\$2,040	5.4%
18.	INTEL CORP	2002	\$3,333	\$1,904	0.9%
19.	ORACLE CORP	2001	\$2,460	\$1,875	2.2%
20.	CISCO SYSTEMS INC	2008	\$7,324	\$1,834	1.0%

Panel D. Losers based on abnormal \$ return					Percent of \$ abnormal
	Year	\$ Repurchase	\$ Abnormal return	return to market value	
1.	EXXON MOBIL CORP	2008	\$34,420	-\$12,492	-2.5%
2.	TIME WARNER INC	2006	\$19,140	-\$5,481	-6.9%
3.	PFIZER INC	2003	\$13,011	-\$4,157	-2.2%
4.	GENERAL ELECTRIC CO	2007	\$12,003	-\$3,034	-0.8%
5.	INTEL CORP	2005	\$9,435	-\$2,761	-1.9%
6.	PROCTER & GAMBLE CO	2006	\$34,235	-\$2,601	-2.0%
7.	HEWLETT-PACKARD CO	2000	\$4,822	-\$2,296	-3.1%
8.	VALERO ENERGY CORP	2007	\$4,701	-\$2,146	-6.9%
9.	ORACLE CORP	1999	\$4,365	-\$2,115	-6.0%
10.	DELL INC	2005	\$7,249	-\$1,992	-1.9%
11.	CONOCOPHILLIPS	2008	\$8,213	-\$1,812	-1.3%
12.	CISCO SYSTEMS INC	2004	\$7,823	-\$1,786	-1.3%
13.	DELL INC	2004	\$4,219	-\$1,641	-1.9%
14.	AVIS BUDGET GROUP INC	1999	\$2,821	-\$1,626	-10.1%
15.	ORACLE CORP	2000	\$3,805	-\$1,566	-0.8%
16.	HOME DEPOT INC	2006	\$6,671	-\$1,564	-1.8%
17.	CHEVRON CORP	2008	\$7,484	-\$1,490	-0.8%
18.	INTL BUSINESS MACHINES CORP	2004	\$7,038	-\$1,486	-0.9%
19.	MICROSOFT CORP	2009	\$8,774	-\$1,352	-0.5%
20.	EXXON MOBIL CORP	2009	\$18,312	-\$1,346	-0.3%

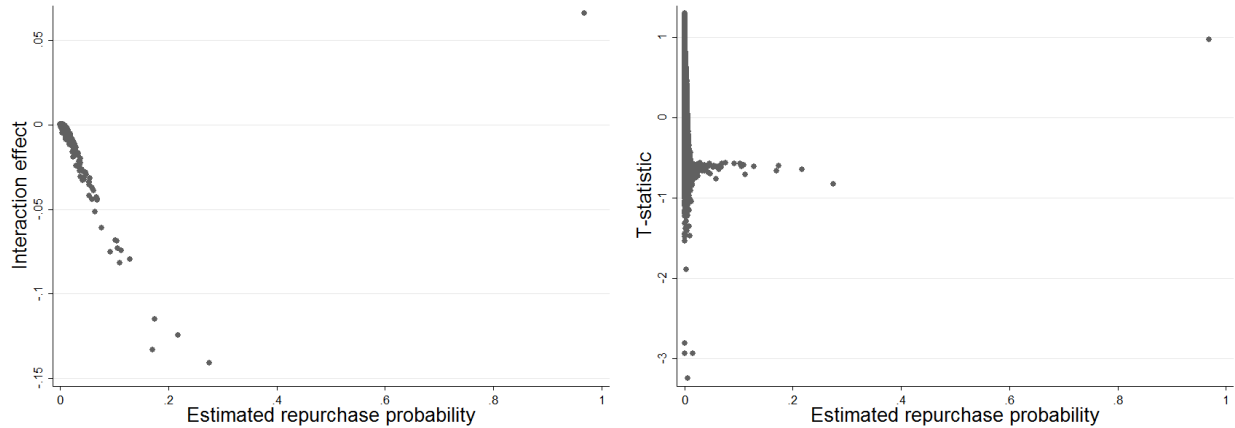
Figure A1
Interaction effect of operating cash flow and timing variables on tender-offer decisions

The estimated interaction effects are based on the model in Row D of Table 3 plus the interaction between operating cash flow and each timing variable. Since the method developed in Ai and Norton (2003) only computes the marginal effects of one interaction term, I estimate the interaction effects separately for each timing variable: market-to-book ratio, prior 12-month stock return, and future 12-month stock return. All variables are as defined in Table 3.

Panel A. Interaction effects between operating cash flow and market-to-book ratio



Panel B. Interaction effects between operating cash flow and prior 12-month stock return



Panel C. Interaction effects between operating cash flow and future 12-month stock return

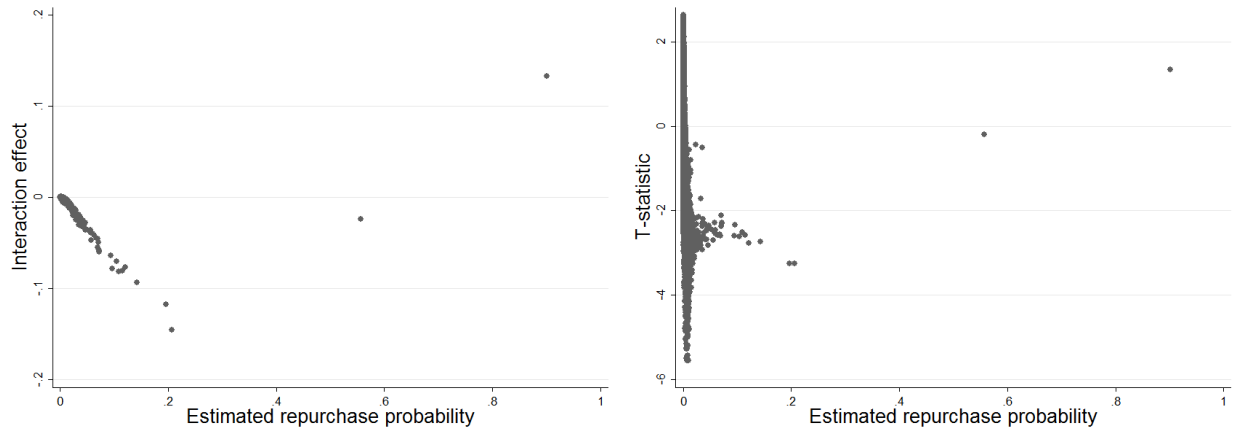
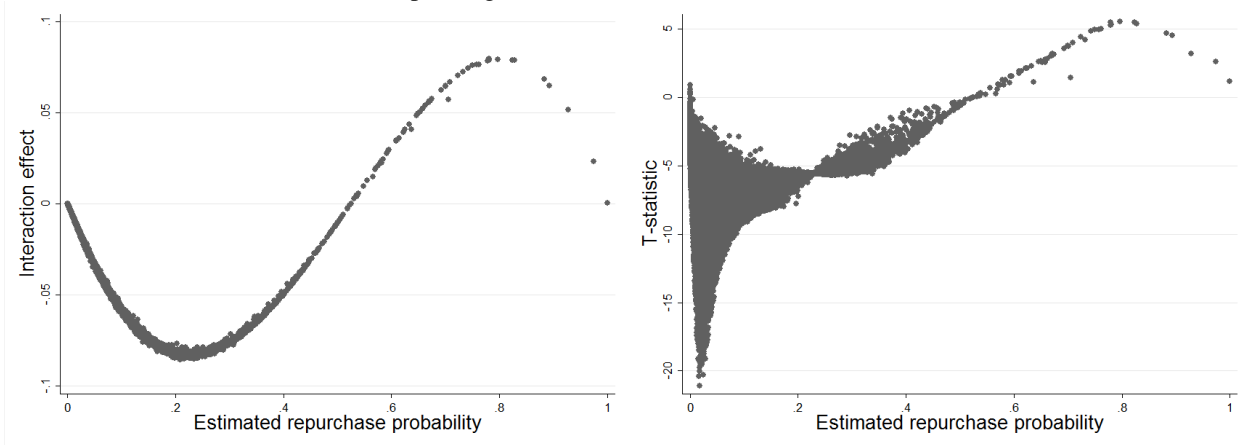


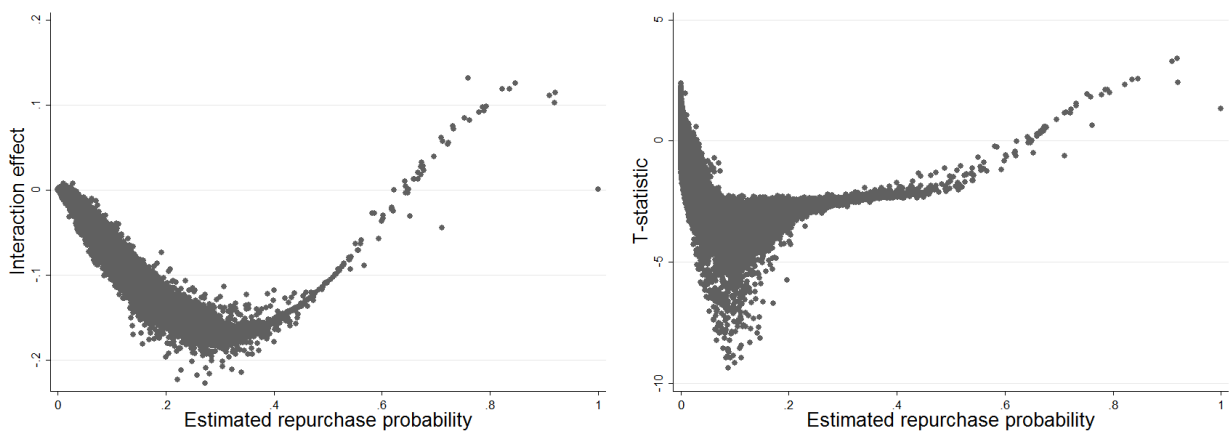
Figure A2
Interaction effect of operating cash flow and timing variables on repurchase decisions

The estimated interaction effects are based on the model in Row D of Table 7 plus the interaction between operating cash flow and each timing variable. Since the method developed in Ai and Norton (2003) only computes the marginal effects of one interaction term, I estimate the interaction effects separately for each timing variable: market-to-book ratio, prior 12-month stock return, and future 12-month stock return. All variables are as defined in Table 7.

Panel A. Interaction effects between operating cash flow and market-to-book ratio



Panel B. Interaction effects between operating cash flow and prior 12-month stock return



Panel C. Interaction effects between operating cash flow and future 12-month stock return

