Internet Appendix for "The Market for Corporate Control as a Limit to Short Arbitrage"

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Appendix A: Variable Definitions

SR	The number of shares shorted over total shares outstanding (COMPUSTAT)
TAKEOVER	Number of takeover attempts in a 2-SIC industry divided by the number of public firms in the same industry. (SDC)
REV	The short-term reversal measured by lagged monthly stock return.
MOM	The compounded 11-month stock return from month -12 to month -2. (CRSP)
BM	Book value of equity, measured as the value of common stockholders' equity, plus deferred taxes and investment tax credits, minus the book value of preferred stock, divided by market capitalization (CRSP and COMPUSTAT)
ME	Market capitalization in thousands at the end of the June of each year. (CRSP)
IVOL	Idiosyncratic volatility measured following Ang, Hodrick, Xing, and Zhang (2006)
IO	The sum of shares held by institutions from 13F filings in each quarter divided by the total shares outstanding
ILLIQ	The monthly average of absolute daily returns divided by dollar trading volume (Amihud (2002)). In the summary statistics, we report the natural logarithm of *ILLIQ* multiplied by one million. (CRSP)
1_MONTH_COMP_RETURN	1-month compounded return computed from daily returns.
DAILY_SR	Daily number of shares on loan divided by the number of shares.
LENDABLE_ SHARES_ SUPPLY	Daily number of lendable shares divided by number of shares outstanding
DAILY_UTILIZATION	The ratio of shares borrowed to shares made available by Markit lenders.
DCBS	Daily Cost of Borrowing Score, a measure of the relative cost of borrowing developed by Markit, ranging from 1 (low cost) to 10 (high cost).
SHORT_FEE	IndicativeFee, Markit's estimate of the expected borrowing cost.
SHORT_RISK	Fittest value from the following regression model which forecasts future loan fee variance: $Var(SHORT\ FEE)_{t+1}=\alpha+\beta_1 UTILIZATION+ \beta 2TAILUTILIZATION+ \beta_3 log(VOLUME)+ \beta_4 log(BID\text{-}ASK)+ \beta_5 log(MARKEP\ CAP)+ \beta_6 SHORT\ FEE+ \beta_7 log(Return\ Volatility)+ \beta_8 DIVIDEND\ FLAG+ \beta_9 OPTION\ FLAG+ \beta_{10} IPO\ FLAG.$ The regression includes firm fixed effects. See Engelberg, Reed, and Ringgenberg (2018) for details.
BC	Dummy equal to 1 when Business Combination Laws introduced in the state of incorporation.
G	A measure of firm-level number of takeover defenses by Gompers, Ishii, Metrick (2003).
GEO	Instrument for G-index based on takeover defenses at geographically proximate firms. (Karpoff, Schonlau and Wehrly (2017))
IPO	Instrument for G-index based on takeover defenses at firms that went public within one year of the focus firm (and that are not in the same industry). (Karpoff, Schonlau and Wehrly (2017))
ANNOUNCEMENT	Binary variable that equals 1 if the firm received a takeover bid in month *t.*
1_DAY_PREMIUM	2-SIC mean 1-day premium.
MISPRICE	Composite score based on a set of anomaly variables from Stambaugh, Yu, and Yuan (2012).

Appendix B: Illustrative Model

Appendix B – Illustrative Model

This appendix contains an illustrative model based on Wurgler and Zhuravskaya (2002) and Gromb and Vayanos (2010) to generate our testable hypotheses. Assume an economy with two periods, $t = 0$ and t = 1, and one asset in zero net supply. At $t = 0$, there is a positive demand shock for the asset for d fraction of the shares, and the arbitrageur spends x dollars to trade against it. There are two possible realizations of the asset value in $t = 1$. If there is no takeover, the asset value is V. If there is a takeover, the asset value in $t = 1$ is $V(1+k)$, where k represents the premium paid by the acquirer. We assume that the probability of a takeover is $q < 0.5$. Hence $E_0(V) = V(1 + qk)$. The risk-free rate is assumed to be zero. The arbitrageur is a short seller who borrows shares at the risk-free rate, and extracts utility from the gain of the trade.

The arbitrageur spends x dollars to trade the asset at price p at $t = 0$ and closes the position at $t = 1$. Assuming an exponential utility function $(-e^{-aW})$, the arbitrageur's objective is to maximize the following equation with respect to the value of the shares shorted x:

$$E_0(-e^{-aW_1}) = -(1-q)e^{-\frac{ax(V-p)}{p}} - qe^{-\frac{ax[V(1+k)-p]}{p}} \quad (1)$$

The first order condition with respect to x is:

$$\frac{\partial E_0(-e^{-aW_1})}{\partial X} = \frac{a(1-q)(V-p)}{p}e^{-\frac{ax(V-p)}{p}} + \frac{aq[V(1+k)-p]}{p}e^{-\frac{ax[V(1+k)-p]}{p}} = 0 \quad (2)$$

Solving Equation (2) gives the optimal x:

$$x = \frac{pln\left\{\frac{q[V(1+k)-p]}{(1-q)(p-V)}\right\}}{akV} \tag{3}$$

Since the asset is in zero net supply, the market clearing condition is that:

$$x + dp = 0 \tag{4}$$

Combining Equations (3) and (4) we find the equilibrium risk-compensation to be:

$$p = V\left(1 + \frac{kqe^{adkV}}{1-q+qe^{adkV}}\right) \tag{5}$$

Note that p is bounded by $[V, V(1+k)]$. When there is no chance of a takeover (q = 0) or when the acquirer does not require any premium (k = 0) it is trivial to show that the expected value of the asset is V and that $p = V$. On the other hand, when takeover likelihood is close to one, or when demand shock and premium approaches arbitrarily large values, the equilibrium price converges to $V(1+k)$.

The first derivative of the price p with respect to the demand shock d is given by the following equation:

$$\frac{\partial p}{\partial d} = \frac{qV^2k^2(1-q)ae^{adkV}}{\left[1+q\left(e^{adkV}-1\right)\right]^2} > 0 \tag{6}$$

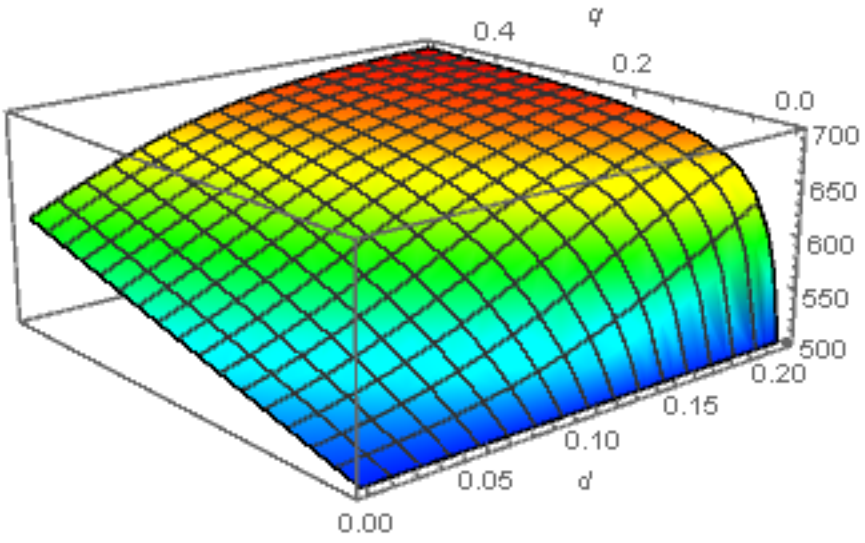
This result suggests that, *ceteris paribus*, the arbitrageur demands a higher expected return if the demand shock is larger. Since the market clearing condition in Equation (4) requires that the dollar amount of shares shorted (x) is equal to the dollar amount of the demand shock (dp), then a higher

short interest (which reflects a larger demand shock) implies a more negative expected stock return.

The second derivative of the price p with respect to the demand shock d and the probability of a takeover q is:

$$\frac{\partial^2 p}{\partial d \partial q} = \frac{V^2 k^2 (1-q-qe^{adkV}) a e^{adkV}}{[1+q(e^{adkV}-1)]^3} > 0 \qquad (7)$$

This inequality is true if $q < \frac{1}{1+e^{adkV}}$. Assume an extreme demand shock of d = 10%, which is similar to the difference between the top and bottom decile of short interest in our sample, and a takeover premium of 40%, which is close to the average takeover premium observed in the data. Further assume that absolute risk aversion is a = 0.1 and the no-takeover asset value V=500 ($mil). Then the relation between takeover likelihood, demand shock, and market price is shown in the following graph:



When $q < \frac{1}{1+e^{adkV}} = 11.9\%$, then $\frac{\partial^2 p}{\partial d \partial q} > 0$. This suggests that the sensitivity of the expected stock return to the demand shock increases with takeover risk. To the extent that monthly short interest reflects the informed short sellers' position against demand shocks in equilibrium, a higher short interest should be related to greater negative expected stock return when there is higher takeover risk. As takeover risk goes beyond the threshold given by the level of risk aversion and the takeover premium, the equilibrium price converges to the upper bound ($V(1+k) = 700$) and $\frac{\partial^2 p}{\partial d \partial q}$ turns negative. Given that the unconditional likelihood of a takeover for any firm-quarter (1%) is far below the illustrative threshold, the parameters in the sample will likely lie in the range such that an increase in takeover risk will increase the sensitivity of future stock returns to current short interests.

Appendix C: Additional Empirical Results

In Table A1, we show that our main result on takeover risk and return predictability of short interest is robust to alternative asset-pricing models, such as the CAPM model, Fama and French (2016 and 2017) five-factor model, Carhart (1997) four-factor model plus Pástor and Stambaugh (2003) liquidity factor, and Hou, Xue, and Zhang's (2015) Q-factor alphas. In Table A2, we adjust stock returns by industry returns at the 2-digit SIC level to ameliorate potential concerns related to using an industry-level takeover measure.

In Table A3 we show that this result holds using alternative sorting methods, such as five-by-five and five-by-ten. In Table A4, we use takeover intensity at the 3-digit SIC level instead of 2-digit SIC.

In Table A5, we use a firm-level predicted likelihood as an alternative proxy of takeover risk. Specifically, we estimate a probit model of takeover likelihood following Cremers, Nair, and John (2009). In this model, the occurrence of a takeover is predicted based on firm characteristics including market capitalization, leverage, ROA, Q, tangibility, cash holding, and the existence of block holder. We also augment this model using our industry takeover risk measure. The results show that the underperformance of the top decile of *SR*, both in terms of raw return and Carhart alpha, is significantly stronger in the top decile of predicted takeover likelihood. In Table A6 we examine the persistence of the return predictability of short interest and find that the predictive power of short interest remains significant up to three months in the future.

Table A7 reports Fama-MacBeth regressions from Table 3 re-estimated with the inclusion of industry fixed effects. We note that controlling for industry fixed effects does not significantly affect the negative coefficient on the interaction term *SR* × *HIGH_TAKEOVER*. Therefore, our results capture the return predictability of short interest within an industry that may face high takeover risk.

Figure A1 presents coefficient estimates from a regression estimating changes in short selling activity around takeover announcements. The sample consists of stock-day observations from 2007 to 2018. The dependent variable is DAILY_SR, measured as daily number of shares on loan divided by the number of shares. The independent variables are binary variables indicating weeks around takeover announcements. The figure shows that the level of short interest on a target firm's stock starts to significantly increase 15 weeks before a takeover announcement.

Table A1: Alternative Factor Models

This table reports equal-weighted CAPM alphas, Fama and French (2016 and 2017) five factor alphas, Carhart (1997) four-factor plus Pástor and Stambaugh (2003) liquidity factor alphas (in percentages), and Hou, Xue, and Zhang's (2015) Q-factor alphas sorted by takeover intensity and stock's short ratio. The sample runs from January 1985 to December 2018. At the beginning of each month, we first sort all the stocks into terciles based on takeover intensity at the 2-digit SIC industry level, and within each tercile we sort the stocks further into deciles based on their short ratios in the past month. The time-series average of portfolio size is 66 stocks. All variables are defined in Appendix A. We report Newey-West adjusted *t*-statistics in parentheses. For the long-short portfolios, we use *, ** and *** to indicate significance better than 10%, 5%, and 1% respectively.

Takeover Terciles	CAPM Alphas Short Ratio Deciles				Fama-French Five-factor Alphas Short Ratio Deciles			
	1	5	10	1 - 10	1	5	10	1 - 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	0.27	0.17	-0.37	0.63***	0.09	-0.08	-0.52	0.61***
	(1.60)	(1.01)	(-1.74)	(3.61)	(0.66)	(-0.84)	(-3.77)	(3.44)
2	0.37	0.26	-0.45	0.82***	0.05	-0.14	-0.70	0.75***
	(1.82)	(1.49)	(-2.13)	(4.39)	(0.39)	(-1.39)	(-3.99)	(3.59)
3	0.46	0.13	-0.57	1.03***	0.23	-0.17	-0.76	0.99***
	(2.43)	(0.71)	(-2.64)	(6.11)	(1.71)	(-1.63)	(-4.49)	(5.61)
3 - 1	0.19	-0.04	-0.21	0.40***	0.15	-0.09	-0.24	0.38**
	(1.62)	(-0.35)	(-1.29)	(2.64)	(1.21)	(-0.73)	(-1.55)	(2.55)

Takeover Terciles	Carhart-Pastor-Stambaugh Alphas Short Ratio Deciles				Q-factor Alphas Short Ratio Deciles			
	1	5	10	1 - 10	1	5	10	1 - 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	0.27	0.08	-0.37	0.64***	0.08	-0.09	-0.45	0.53***
	(2.14)	(0.81)	(-2.70)	(3.62)	(0.56)	(-0.80)	(-2.86)	(3.09)
2	0.33	0.18	-0.40	0.73***	0.10	-0.07	-0.58	0.67***
	(2.35)	(1.63)	(-2.43)	(3.44)	(0.58)	(-0.49)	(-2.81)	(3.18)
3	0.38	0.05	-0.59	0.97***	0.27	-0.11	-0.64	0.91***
	(3.00)	(0.43)	(-4.14)	(5.43)	(1.53)	(-0.79)	(-3.03)	(5.01)
3 - 1	0.11	-0.03	-0.22	0.33**	0.18	-0.03	-0.20	0.38**
	(0.92)	(-0.26)	(-1.29)	(2.17)	(1.48)	(-0.20)	(-1.19)	(2.47)

Table A2: Industry Adjusted Returns

This table uses industry-adjusted returns for performance measurement. We report equal-weighted average raw industry-adjusted returns, CAPM alphas, Carhart (1997) four-factor alphas, Fama and French (2016 and 2017) five factor alphas, Carhart (1997) four-factor plus Pástor and Stambaugh (2003) liquidity factor alphas (in percentages), and Hou, Xue, and Zhang's (2015) Q-factor alphas sorted by takeover intensity and stock's short ratio. The sample runs from January 1985 to December 2018. At the beginning of each month, we first sort all the stocks into terciles based on takeover intensity at the 2-digit SIC industry level, and within each tercile we sort the stocks further into deciles based on their short ratios in the past month. The time-series average of portfolio size is 66 stocks. All variables are defined in Appendix A. We report Newey-West adjusted *t*-statistics in parentheses. For the long-short portfolios, we use *, ** and *** to indicate significance better than 10%, 5%, and 1% respectively.

Takeover Terciles	Returns Short Ratio Deciles				CAPM Alphas Short Ratio Deciles			
	1	5	10	1 - 10	1	5	10	1 - 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	0.04	0.08	-0.24	0.28*	-0.06	-0.18	-0.63	0.57***
	(0.26)	(0.54)	(-1.76)	(1.96)	(-0.43)	(-1.17)	(-4.06)	(3.99)
2	0.22	0.15	-0.31	0.53***	0.05	-0.10	-0.70	0.75***
	(2.32)	(1.20)	(-2.35)	(3.20)	(0.49)	(-0.81)	(-5.15)	(4.20)
3	0.32	0.17	-0.36	0.68***	0.21	-0.07	-0.74	0.95***
	(2.29)	(0.96)	(-2.26)	(4.84)	(1.58)	(-0.44)	(-4.46)	(6.63)
3 - 1	0.29**	0.09	-0.12	0.40***	0.27**	0.10	-0.11	0.38**
	(2.37)	(0.72)	(-0.87)	(2.75)	(2.14)	(0.86)	(-0.80)	(2.56)

Takeover Terciles	Carhart four-factor Alphas Short Ratio Deciles				Fama-French Five-factor Alphas Short Ratio Deciles			
	1	5	10	1 - 10	1	5	10	1 - 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	-0.13	-0.34	-0.74	0.60***	-0.31	-0.50	-0.93	0.61***
	(-0.89)	(-2.63)	(-5.30)	(4.34)	(-1.99)	(-3.61)	(-6.21)	(4.49)
2	-0.03	-0.23	-0.71	0.69***	-0.10	-0.32	-0.77	0.67***
	(-0.29)	(-1.95)	(-4.95)	(3.65)	(-0.92)	(-2.79)	(-5.46)	(3.69)
3	0.05	-0.28	-0.88	0.93***	-0.02	-0.44	-1.01	0.99***
	(0.39)	(-2.10)	(-5.50)	(6.10)	(-0.15)	(-3.38)	(-6.17)	(6.81)
3 - 1	0.18	0.07	-0.14	0.32**	0.29**	0.06	-0.08	0.37**
	(1.35)	(0.60)	(-1.05)	(2.00)	(2.18)	(0.48)	(-0.57)	(2.47)

Takeover Terciles	Carhart-Pastor-Stambaugh Alphas Short Ratio Deciles				Q-factor Alphas Short Ratio Deciles			
	1	5	10	1 - 10	1	5	10	1 - 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	-0.14	-0.37	-0.78	0.64***	-0.36	-0.61	-0.99	0.62***
	(-0.91)	(-2.89)	(-5.45)	(4.47)	(-2.02)	(-3.86)	(-5.63)	(4.45)
2	-0.02	-0.24	-0.73	0.70***	-0.18	-0.39	-0.81	0.64***
	(-0.24)	(-1.96)	(-5.15)	(3.72)	(-1.59)	(-3.01)	(-5.08)	(3.40)
3	0.04	-0.29	-0.91	0.96***	-0.14	-0.56	-1.08	0.94***
	(0.36)	(-2.16)	(-6.01)	(6.27)	(-1.02)	(-3.93)	(-5.55)	(5.86)
3 - 1	0.18	0.08	-0.13	0.31*	0.22	0.05	-0.10	0.32*
	(1.35)	(0.71)	(-0.95)	(1.93)	(1.39)	(0.44)	(-0.69)	(1.88)

Table A3: Alternative Sorting Strategies

This table reports equal weighted Carhart (1997) four-factor alphas (in percentages) sorted by takeover intensity and stock's short ratio. The sample runs from January 1985 to December 2018. At the beginning of each month, we first sort all the stocks into quintiles based on takeover intensity at the 2-digit SIC industry level, and within each quintile we sort the stocks further into quintiles (deciles) based on their short ratios in the past month. In columns 1 to 6 (7 to 10), we perform a five-by-five (five-by-ten) sequential sort. All variables are defined in Appendix A. We report Newey-West adjusted *t*-statistics in parentheses. For the long-short portfolios, we use *, ** and *** to indicate significance better than 10%, 5%, and 1% respectively.

Takeover Quintiles	Five-by-five Sorting Short Ratio Quintiles						Five-by-ten Sorting Short Ratio Deciles			
	1	2	3	4	5	1 - 5	1	5	10	1 - 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	0.25	0.25	0.01	-0.08	-0.22	0.47***	0.29	0.12	-0.26	0.55***
	(1.76)	(1.58)	(0.12)	(-0.81)	(-1.73)	(3.01)	(1.82)	(0.90)	(-1.81)	(2.85)
2	0.29	0.04	0.02	-0.08	-0.24	0.53***	0.09	0.12	-0.24	0.33
	(2.27)	(0.32)	(0.20)	(-0.57)	(-1.60)	(3.24)	(0.56)	(0.96)	(-1.42)	(1.61)
3	0.27	0.19	-0.01	-0.03	-0.42	0.68***	0.30	-0.01	-0.49	0.79***
	(2.03)	(1.78)	(-0.13)	(-0.23)	(-3.00)	(4.60)	(1.99)	(-0.05)	(-2.67)	(4.04)
4	0.42	0.23	0.09	0.03	-0.33	0.74***	0.41	0.13	-0.41	0.82***
	(3.54)	(2.03)	(0.80)	(0.28)	(-1.99)	(3.96)	(2.99)	(1.01)	(-2.11)	(3.49)
5	0.43	0.21	0.08	0.03	-0.38	0.81***	0.47	0.15	-0.52	0.99***
	(3.89)	(1.93)	(0.93)	(0.31)	(-3.30)	(7.02)	(3.32)	(1.21)	(-3.24)	(5.54)
5 - 1	0.18	-0.04	0.07	0.11	-0.16	0.33**	0.18	0.03	-0.26	0.44**
	(1.17)	(-0.29)	(0.59)	(0.95)	(-1.03)	(2.14)	(1.05)	(0.22)	(-1.39)	(2.11)

Table A4: Two-way Sorts on Takeover Intensity at the 3-digit SIC level and Stock Short Ratio

This table reports equal-weighted average returns, CAPM alphas, Carhart (1997) four-factor alphas, Fama and French (2016 and 2017) five factor alphas, Carhart (1997) four-factor plus Pástor and Stambaugh (2003) liquidity factor alphas (in percentages), and Hou, Xue, and Zhang's (2015) Q-factor alphas sorted by takeover intensity and stock's short ratio. The sample runs from January 1985 to December 2018. At the beginning of each month, we first sort all the stocks into terciles based on takeover intensity at the 3-digit SIC industry level, and within each tercile we sort the stocks further into deciles based on their short ratios in the past month. The time-series average of portfolio size is 66 stocks. All variables are defined in Appendix A. We report Newey-West adjusted *t*-statistics in parentheses. For the long-short portfolios, we use *, ** and *** to indicate significance better than 10%, 5%, and 1% respectively.

Takeover Terciles	Returns Short Ratio Deciles				CAPM Alphas Short Ratio Deciles			
	1	5	10	1 - 10	1	5	10	1 - 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	1.09	1.11	0.67	0.42**	0.39	0.21	-0.44	0.83***
	(4.78)	(4.98)	(2.19)	(2.12)	(2.21)	(1.31)	(-2.04)	(4.61)
2	1.17	1.12	0.81	0.36*	0.37	0.15	-0.32	0.69***
	(5.01)	(4.69)	(2.71)	(1.95)	(1.86)	(0.92)	(-1.56)	(3.79)
3	1.29	1.19	0.56	0.74***	0.48	0.22	-0.59	1.07***
	(5.33)	(5.37)	(1.80)	(5.09)	(2.61)	(1.32)	(-2.97)	(7.38)
3 - 1	0.21*	0.07	-0.11	0.32**	0.09	0.01	-0.15	0.24*
	(1.85)	(0.70)	(-0.86)	(2.18)	(0.80)	(0.10)	(-1.21)	(1.79)

Takeover Terciles	Carhart four-factor Alphas Short Ratio Deciles				Fama-French Five-factor Alphas Short Ratio Deciles			
	1	5	10	1 - 10	1	5	10	1 - 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	0.34	0.08	-0.45	0.79***	0.16	-0.10	-0.62	0.78***
	(2.78)	(0.87)	(-3.08)	(4.39)	(1.14)	(-1.04)	(-3.88)	(3.97)
2	0.33	0.06	-0.24	0.56***	0.12	-0.16	-0.49	0.61***
	(2.61)	(0.57)	(-2.01)	(3.38)	(0.84)	(-1.49)	(-3.30)	(3.00)
3	0.42	0.16	-0.59	1.01***	0.25	-0.10	-0.80	1.05***
	(3.24)	(1.53)	(-4.98)	(6.56)	(1.83)	(-1.16)	(-5.93)	(7.13)
3 - 1	0.08	0.08	-0.14	0.22	0.10	-0.01	-0.18	0.27*
	(0.69)	(0.73)	(-1.08)	(1.61)	(0.82)	(-0.06)	(-1.25)	(1.77)

Takeover Terciles	Carhart-Pastor-Stambaugh Alphas Short Ratio Deciles				Q-factor Alphas Short Ratio Deciles			
	1	5	10	1 - 10	1	5	10	1 - 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	0.37	0.06	-0.47	0.84***	0.15	-0.13	-0.57	0.72***
	(2.98)	(0.65)	(-3.07)	(4.44)	(0.95)	(-1.18)	(-3.23)	(4.03)
2	0.35	0.07	-0.23	0.59***	0.17	-0.15	-0.36	0.53***
	(2.64)	(0.61)	(-1.93)	(3.30)	(1.09)	(-1.04)	(-2.08)	(2.88)
3	0.41	0.16	-0.63	1.04***	0.29	-0.03	-0.70	0.99***
	(3.13)	(1.54)	(-5.34)	(6.42)	(1.72)	(-0.20)	(-3.92)	(6.36)
3 - 1	0.04	0.10	-0.16	0.20	0.14	0.11	-0.13	0.27*
	(0.36)	(0.90)	(-1.18)	(1.45)	(1.29)	(0.91)	(-0.97)	(1.84)

Table A5: Two-way sorts on Firm-Level Takeover Risk and Stock Short Ratio

This table reports equal-weighted monthly average returns and Carhart (1997) four-factor alphas (in percentages) sorted by predicted firm-level takeover likelihood and stock's short ratio. The sample runs from January 1985 to December 2018. At the beginning of each month, we first sort all the stocks into decile based on firm-level predict takeover likelihood, and within each decile we sort the stocks further into deciles based on their short ratios in the past month. All variables are defined in Appendix A. We report Newey-West adjusted *t*-statistics in parentheses. For the long-short portfolios, we use *, ** and *** to indicate significance better than 10%, 5%, and 1% respectively.

Takeover	Returns (EW) Short Ratio Deciles				Carhart four-factor Alphas (EW) Short Ratio Deciles			
Decile	1	5	10	1-10	1	5	10	1-10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	0.88	0.95	0.69	0.19	-0.16	-0.16	-0.41	0.25
	(3.10)	(3.52)	(1.99)	(0.56)	(-0.70)	(-0.67)	(-1.67)	(0.80)
5	1.56	1.09	1.04	0.52	0.79	0.19	0.05	0.75**
	(5.70)	(3.85)	(2.74)	(1.41)	(4.14)	(0.87)	(0.17)	(2.07)
10	0.93	1.48	-0.18	1.11***	0.05	0.38	-1.44	1.49***
	(2.86)	(3.43)	(-0.36)	(2.97)	(0.21)	(1.29)	(-4.38)	(3.78)
10-1	0.05	0.53	-0.86**	0.92**	0.21	0.55	-1.02***	1.23***
	(0.17)	(1.27)	(-2.04)	(2.09)	(0.72)	(1.38)	(-2.82)	(2.85)

Table A6: The Horizon of Return Predictability of Short Interest

This table reports equal weighted Carhart (1997) four-factor alphas (in percentages) of long-short portfolios sorted by takeover intensity and stock's short ratio in months t+1 to t+6. The sample runs from January 1985 to December 2018. At the beginning of each month, we first sort all the stocks into terciles based on takeover intensity at the 2-digit SIC industry level, and within each tercile we sort the stocks further into deciles based on their short ratios in the past month. We then form the long-short portfolios. All variables are defined in Appendix A. We report Newey-West adjusted *t*-statistics in parentheses. For the long-short portfolios, we use *, ** and *** to indicate significance better than 10%, 5%, and 1% respectively.

Takeover Terciles	Long-short Portfolios Based On Short Ratio Deciles (1 - 10)					
	t + 1	t + 2	t + 3	t + 4	t + 5	t + 6
	(1)	(2)	(3)	(4)	(5)	(6)
1	0.57***	0.57***	0.53***	0.65***	0.65***	0.68***
	(3.42)	(3.34)	(2.85)	(3.93)	(4.66)	(3.68)
2	0.73***	0.58***	0.64***	0.68***	0.53***	0.64***
	(3.49)	(3.32)	(3.71)	(3.40)	(2.98)	(4.35)
3	0.94***	0.86***	0.88***	0.82***	0.71***	0.66***
	(5.43)	(4.74)	(5.65)	(4.63)	(4.22)	(3.45)
3 - 1	0.37**	0.30	0.35*	0.17	0.06	-0.01
	(2.37)	(1.64)	(1.84)	(0.77)	(0.34)	(-0.05)

Table A7: Industry Fixed Effects

The table reports estimates from the Fama and MacBeth (1973) regression of monthly stock returns for the period from January 1985 to December 2018. All variables are defined in Appendix A. We report Newey-West adjusted *t*-statistics in parentheses. ***, **, and * represent significance levels of 1%, 5%, and 10%, respectively.

Fama-MacBeth regression of returns with 2-digit SIC industry fixed effect				
	(1)	(2)	(3)	(4)
SR	-0.042***	-0.043***	-0.035***	-0.037***
	(-3.31)	(-3.56)	(-3.16)	(-3.32)
SR × HIGH_TAKEOVER	-0.026*	-0.026*	-0.028**	-0.028**
	(-1.88)	(-1.93)	(-2.08)	(-2.12)
Ln(LBM)	0.002***	0.002***	0.002***	0.002**
	(2.86)	(2.92)	(2.59)	(2.58)
Ln(ME)	0.000	0.000	0.000	0.000
	(0.99)	(0.34)	(-1.20)	(-1.60)
REV		-0.036***	-0.034***	-0.034***
		(-8.79)	(-8.29)	(-8.30)
MOM		0.004**	0.004**	0.004**
		(2.01)	(2.27)	(2.28)
IVOL			-0.164***	-0.163***
			(-4.27)	(-4.21)
IO				0.002
				(1.46)
N	761,905	755,794	754,478	754,478
R^2	0.086	0.099	0.103	0.104

Figure A1
Short Selling Around Acquisition Announcements: Weekly Frequency

The figure presents coefficient estimates from a regression estimating changes in short selling activity around takeover announcements. The sample consists of stock-day observations from 2007 to 2018. The dependent variable is *DAILY SR*, measured as daily number of shares on loan divided by the number of shares. The independent variables are binary variables indicating weeks around takeover announcements. We also include firm×quarter and day-of-the-week fixed effects to control for time varying firm characteristics and seasonality. The vertical lines indicate the 90% confidence intervals, with standard errors adjusted for firm clustering and year-quarter clustering.