Online Appendix for "Overconfidence, Information Diffusion, and Mispricing Persistence"

A Model

A.I Solving the Model

An agent of group i maximizes the expected utility of his wealth next period. The heterogeneous agent model can be solved by using backward induction.

In period $T-1$, optimal demands follow from solving a standard static CARA-normal portfolio choice problem and are given by

$$\frac{\mathbb{E}_{i,T-1}\left[p_T - p_{T-1}\right]}{\gamma_i Var_{i,T-1}\left[p_T - p_{T-1}\right]} = \frac{D_{i,T-1} + \hat{\alpha}_{i,T-1} - p_{T-1}}{\gamma_i \hat{\sigma}^2_{i,T-1}} \tag{A.1}$$

if an agent is long in the stock or

$$-\frac{\mathbb{E}_{i,T-1}\left[p_{T-1} - p_T\right] - c_{T-1}}{\gamma_i Var_{i,T-1}\left[p_T - p_{T-1}\right]} = -\frac{p_{T-1} - (D_{i,T-1} + \hat{\alpha}_{i,T-1}) - c_{T-1}}{\gamma_i \hat{\sigma}^2_{i,T-1}} \tag{A.2}$$

if an agent is short and has to pay the per-unit cost of borrowing the shares from $T-1$ to T, which we denote c_{T-1}. Following Barberis, Greenwood, Jin, and Shleifer (2018), we assume that agents perceive the conditional variance of price changes to be equal to the predictive posterior variance of the upcoming dividend innovation.

Let π_i be a measure of agents in group i and L_{T-1} (S_{T-1}) be the set of groups who are long (short) in period $T-1$. Market clearing on the stock market requires

$$\sum_{i\in L_{T-1}} \pi_i \left(\frac{D_{i,T-1} + \hat{\alpha}_{i,T-1} - p_{T-1}}{\gamma_i \hat{\sigma}^2_{i,T-1}}\right) = \sum_{i\in S_{T-1}} \pi_i \left(\frac{p_{T-1} - (D_{i,T-1} + \hat{\alpha}_{i,T-1}) - c_{T-1}}{\gamma_i \hat{\sigma}^2_{i,T-1}}\right) \tag{A.3}$$

Solving equation (A.3) for p_{T-1} yields

$$p_{T-1} = D_{m,T-1} + \hat{\alpha}_{m,T-1} + \frac{\sum_{i\in S_{T-1}} \Pi_{i,T-1}}{\sum_{i\in(L_{T-1}\cup S_{T-1})} \Pi_{i,T-1}} c_{T-1} \tag{A.4}$$

with $\Pi_{i,T-1} \equiv \frac{\pi_i}{\gamma_i \hat{\sigma}^2_{i,T-1}}$, $\hat{\alpha}_{m,T-1} \equiv \sum_{i\in(L_{T-1}\cup S_{T-1})} \left[\frac{\Pi_{i,T-1}}{\sum_{j\in(L_{T-1}\cup S_{T-1})} \Pi_{j,T-1}} \hat{\alpha}_{i,T-1}\right]$, and $D_{m,T-1} \equiv \sum_{i\in(L_{T-1}\cup S_{T-1})} \left[\frac{\Pi_{i,T-1}}{\sum_{j\in(L_{T-1}\cup S_{T-1})} \Pi_{j,T-1}} D_{i,T-1}\right]$.

In period $T-2$, agents maximize the expected utility of wealth in $T-1$. Their demand is equal to

$$\frac{\mathbb{E}_{i,T-2}\left[p_{T-1}\right] - p_{T-2}}{\gamma_i \hat{\sigma}^2_{i,T-2}} \tag{A.5}$$

if the agent is long or

$$-\frac{p_{T-2}-\mathbb{E}_{i,T-2}\left[p_{T-1}\right]-c_{T-2}}{\gamma_i\hat{\sigma}^2_{i,T-2}} \tag{A.6}$$

if the agent is short.
We assume that agents belief that next period all agents will hold the same belief as they do. As argued in more detail in the main text, this assumption implies that $\mathbb{E}_{i,T-2}\left[p_{T-1}\right] = \mathbb{E}_{i,T-2}\left[\mathbb{E}_{i,T-1}\left[D_T\right]\right] = D_{i,T-2}+2\hat{\alpha}_{i,T-2}$. After substituting $\mathbb{E}_{i,T-2}\left[p_{T-1}\right] = D_{i,T-2}+2\hat{\alpha}_{i,T-2}$ into equations (A.5) and (A.6), market clearing on the stock market requires

$$\sum_{i\in L_{T-2}}\pi_i\left(\frac{D_{i,T-2}+2\hat{\alpha}_{i,T-2}-p_{T-2}}{\gamma_i\hat{\sigma}^2_{i,T-2}}\right)=\sum_{i\in S_{T-2}}\pi_i\left(\frac{p_{T-2}-\left(D_{i,T-2}+2\hat{\alpha}_{i,T-2}\right)-c_{T-2}}{\gamma_i\hat{\sigma}^2_{i,T-2}}\right). \tag{A.7}$$

The equilibrium price in period $T-2$ is given by

$$p_{T-2}=D_{m,T-2}+2\hat{\alpha}_{m,T-2}+\frac{\sum_{i\in S_{T-2}}\Pi_{i,T-2}}{\sum_{i\in(L_{T-2}\cup S_{T-2})}\Pi_{i,T-2}}c_{T-2}. \tag{A.8}$$

Proceeding with backward induction from period $T-3$ to period 1, long demands, short demands, and the market clearing price p_t are given by equations (3) to (8) in the main text.

A.II Developing an Intuition for the Equilibrium Shorting Fee

We start with a hypothetical world in which search costs of the set of short sellers S_t are covered by a third party, while, at the same time, the set of short sellers S_t is fixed. That is, other agents, who are not part of the set S_t in an equilibrium with positive shorting costs, are not allowed to sell short shares in our thought experiment. In such a world, short sellers belonging to S_t can short for free and their shorting demand is

$$\sum_{i\in S_t}\Pi_{it}\left(p_t-\left(D_{it}+\hat{\alpha}_{it}(T-t)\right)\right) \tag{A.9}$$

Substitution of the equilibrium price from equation (5) into (A.9) and setting $c_t=0$ yields

$$\sum_{i\in S_t}\Pi_{it}\left(D_{mt}-D_{it}+(\hat{\alpha}_{mt}-\hat{\alpha}_{it})(T-t)\right) \tag{A.10}$$

Subtracting free lending supply λQ from equation (A.10) and multiplying with τ gives the shorting costs per share implied by this zero-cost demand. This expression is equal to the numerator of the equilibrium per-share shorting fee (see equation (12)). Multiplying the per-share shorting fee with short interest yields the total shorting costs implied by the zero-cost demand (and paid by the third party) as

$$\tau\left[\sum_{i\in S_t}\Pi_{it}\left(D_{mt}-D_{it}+(\hat{\alpha}_{mt}-\hat{\alpha}_{it})(T-t)\right)-\lambda Q\right] \Bigg/ \left[\sum_{i\in S_t}\Pi_{it}\left(D_{mt}-D_{it}+(\hat{\alpha}_{mt}-\hat{\alpha}_{it})(T-t)\right)\right] \tag{A.11}$$

Think now of a world in which short seller have to cover their shorting costs. This will affect equilibrium quantities and thereby the shorting demand of short sellers. Assume that per-share shorting costs rise from 0 to the new equilibrium level c_t. This has two effects on shorting demand. First, shorting demand will go down because the short seller now has to cover per-unit costs c_t. We call this the direct effect. Individual demand functions are given by $\frac{p_t-(D_{it}+\hat{\alpha}_{it}(T-t))-c_t}{\gamma_i\hat{\sigma}_{it}^2}$ (see equation (4)), so total demand decreases by $\sum_{i\in S_t}\Pi_{it}c_t$ due to the direct effect. Second, the equilibrium price will rise due to the non-zero shorting costs by $\frac{\sum_{i\in S_t}\Pi_{it}}{\sum_{i\in(L_t\cup S_t)}\Pi_{it}}c_t$ (see equation (5)). Short sellers would now like to short more due to the increased price. We call this the indirect effect. Because of the indirect effect, aggregated demand goes up by $\sum_{i\in S_t}\Pi_{it}\frac{\sum_{i\in S_t}\Pi_{it}}{\sum_{i\in(L_t\cup S_t)}\Pi_{it}}c_t$. The total effect is the sum of the direct and the indirect effect. The total shorting costs change from the expression in equation (A.11) to

$$C_t=c_tX_t=\tau\left[\sum_{i\in S_t}\Pi_{it}\left(D_{mt}-D_{it}+(\hat{\alpha}_{mt}-\hat{\alpha}_{it})(T-t)-c_t+\frac{\sum_{i\in S_t}\Pi_{it}}{\sum_{i\in(L_t\cup S_t)}\Pi_{it}}c_t\right)-\lambda Q\right] \Bigg/ \left[\sum_{i\in S_t}\Pi_{it}\left(D_{mt}-D_{it}+(\hat{\alpha}_{mt}-\hat{\alpha}_{it})(T-t)-c_t+\frac{\sum_{i\in S_t}\Pi_{it}}{\sum_{i\in(L_t\cup S_t)}\Pi_{it}}c_t\right)\right] \tag{A.12}$$

Dividing equation (A.12) by the total shorting demand X_t implicitly defines the new shorting costs per share

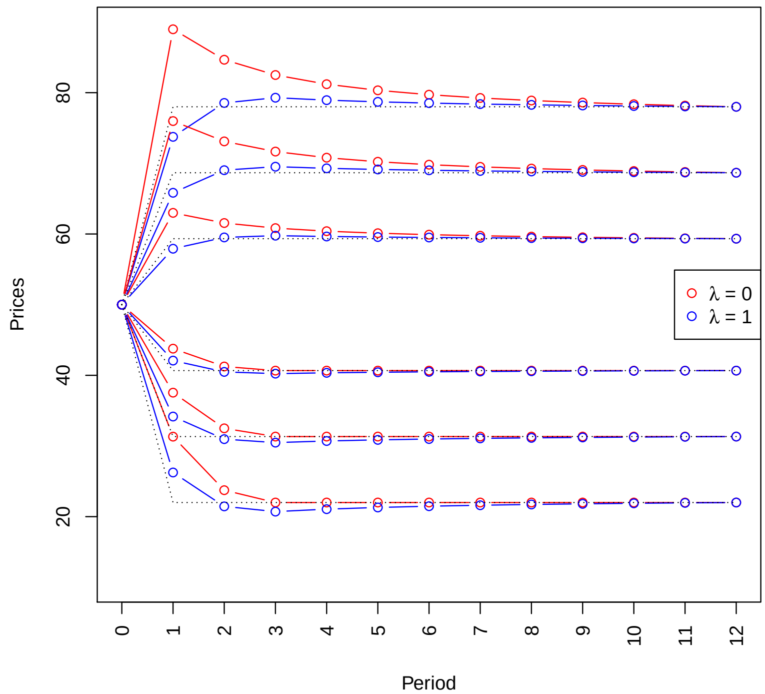
$$c_t=\tau\left[\sum_{i\in S_t}\Pi_{it}\left(D_{mt}-D_{it}+(\hat{\alpha}_{mt}-\hat{\alpha}_{it})(T-t)-c_t+\frac{\sum_{i\in S_t}\Pi_{it}}{\sum_{i\in(L_t\cup S_t)}\Pi_{it}}c_t\right)-\lambda Q\right] \tag{A.13}$$

Solving (A.13) for c_t yields the equilibrium shorting cost per share (if aggregated shorting demand exceeds institutional lending supply) as given in equation (12).

A.III Less Extreme Surprises

We look at less extreme surprises in this appendix. To do so, we multiply the extreme sub-surprises from the example in Section 3.4 with 2/3 and 1/3, while leaving all other parameters constant. Figure A.1 shows the results.

Figure A.1: Price-paths for shocks of different magnitudes.
This Figure continues the numerical example shown in Figure 2 by adding less extreme winners and losers. Less extreme shocks are obtained by multiplying the surprises of extreme stocks by 2/3 and 1/3, receptively. All other parameters stay the same.



The comparative statics of the price patterns look similar, but far less extreme. As those smaller surprises generate less disagreement, short sale constraints become less important. However, constrained stocks always lose. The negative price changes of constrained stocks are larger in absolute terms for stocks with more extreme surprises, i.e., for winners and for losers.

B Empirical Details

B.I Supplemental Data

To gain insights into the types of stocks in our portfolios, we calculate *idiosyncratic volatility (IVOL)*. It is based on daily CRSP returns and calculated as the residual standard deviation of a monthly regression of daily firm-excess returns on the three Fama and French (1993) factors, following Ang, Hodrick, Xing, and Zhang (2006).

Annual book-equity data is from Compustat. To calculate the monthly updated *book-to-market ratio*, we divide the most recently observed book-value by the sum of the most recent market equity of all equity securities (PERMNOs) associated with the company (PERMCO). Following Fama and French (1993), we assume that the book-value of calendar-year $t-1$ can be observed by investors starting at the end of June of year t.

Markit provides data on lending fees starting in August 2004.[47] We use the *indicative fee* (a proxy for marginal costs) and *simple average fee* (equal weight average of all contracts for a particular security) of the end of the month to assess the costs of short-selling within our portfolios.

One additional proxy that we use for short-sale costs is the put-call-parity violation, following Ofek, Richardson, and Whitelaw (2004). We measure it by the *volatility spread*, i.e., the open-interest-weighted average difference of implied volatilities of matched call/put option pairs. The volatility spread measure is provided by WRDS Option Suite, is based on data from Option Metrics and follows the calculation in Cremers and Weinbaum (2010).[48]

B.II Additional Data Cleaning

We identify some issues with the short interest data as well as the institutional ownership data. These issues shrink our sample and induce additional noise, which should strictly weaken our results. First, suppose a firm is identified as having high short interest but really had low short interest. We might include this firm in the constrained winner portfolio, while it really was not constrained. If the firm displays "regular" returns, it will bias the results of the portfolio towards a too high return. Second, we increase our sample size and thus the pool of potentially constrained firms, which again should reduce noise.

The short interest data come from four different sources. Compustat is available from 1973, but only starts NASDAQ coverage from July 2003. We have additional files from each exchange, NYSE (1988/01 – 2005/07), AMEX (1995/01 – 2005/07) and NASDAQ (1988/06 – 2008/07, except February and July of 1990). One file typically covers one month of data for one exchange. The format varies widely – most files have tickers, some do not. Tickers typically have the share class appended at the end. In CRSP, the share class is sometimes included in the ticker and sometimes it is not. Ordinary matching on tickers misses some stocks with multiple share classes and all files that do not include tickers. We thus apply the following procedure to improve matching:

- Within each file we identify issues of the same company by name matching.

[47] From August 2004 Markit data frequency is weekly and daily coverage begins in July 2006.

[48] We filter time-to-expiration between 30 and 365 days, moneyness between .8 and .95 for out-of-the-money puts, .95 to 1.05 for near-the-money Puts and .95 to 1.05 for near-the-money calls, and weight by open interest.

- We identify the share class from the name or the ticker within multiple issue companies.
- We match by ticker where uniquely possible.
- We match by ticker and share class where uniquely possible.
- We match the remaining firms by name and share class.

The name matching procedure for identifying multiple issues within files and for matching CRSP names with short interest file names first standardizes names by removing unnecessary whitespaces and punctuation, harmonizing abbreviations and acronyms and removing additional information (like "Class A" or "Incorporated"). We then calculate the Levenshtein distance to assess name similarity. We discount common words like "American" and put more weight on the unique part of company names. Additionally, we allow for word rotation.

In an early version of the paper we had 1,488,655 firm month observations with short interest until December 2014. After applying the procedure above and allowing for firms from all four sources within any given month, we end up with 1,652,034 firm month observations, a 11% increase, 2/3 of which come from the new matching and 1/3 comes from allowing all sources within a month. Our short interest data now covers 97% of all observations in CRSP in our full sample period.

There are also some apparent issues with institutional ownership data, which have recently been confirmed by WRDS.[49] We identify a few cases where institutional ownership decreases in one quarter by more than 50pp and increases by more than 50pp in the next quarter again. For example, Halliburton's institutional ownership falls from 83% to 0% in 06/2008 and is back at a level of 79% in the following quarter again. Thereby, Halliburton ends up in the corner portfolio in one month, while it is highly unlikely that it was actually short-sale constrained.

We fix this issue by setting institutional ownership to the previous observation if we observe an extreme decrease of more than 50pp that reverses by more than 50pp in the following quarter. This happens 809 times in the sample – but even very few observations like Halliburton can have an influence on value-weighted portfolio returns. This fix further reduces noise in our results.

[49] See the note issued by WRDS on March 6, 2017, concerning "Data Quality problems in Thomson Reuters Ownership.,"

B.III Calculation of Abnormal Announcement Returns

For the abnormal return $AR_{i,t}$ for calendar day t, we estimate betas from daily returns for each individual stock i, where $m-12, m-1$ refers to the estimation window, which encompasses the 12 months prior to the earnings announcement month. For estimation, we use the methodology proposed by Frazzini and Pedersen (2014), i.e., correlations are estimated using overlapping 3-day log-returns and variances using daily log-returns.

$$AR_{i,t} = \beta^{Mkt}_{i;m-12,m-1} MktRF_t + \beta^{HML}_{i;m-12,m-1} HML_t + \beta^{SMB}_{i;m-12,m-1} SMB_t + \beta^{MOM}_{i;m-12,m-1} MOM_t$$

We then cumulate the abnormal returns for each individual stock over event days d up to D:

$$CAR_{i,D} = \sum_{d=-21}^{D} AR_{i,d}$$

and normalize by $CAR_{i,0}$:

$$CAR^0_{i,D} = CAR_{i,D} - CAR_{i,0}$$

The average CAR (ACAR) for all stocks in portfolio p is weighted by the buy-and-hold weight $w_{i,p,m}$, i.e., the weight at portfolio formation times the change in the value of that investment up to the day before the announcement:

$$ACAR^0_{D,p} = \sum_{m \in M} \sum_{j \in I_{p,m}} w_{i,p,m} CAR^0_{i,p,m,D}$$

where $w_{i,p,m} = \frac{W'_{i,p,m}}{\sum_{m \in M} \sum_{j \in I_{p,m}} W'_{j,p,m}}$ and $W'_{i,p,m} = \sum_{\tau \in T_m} \frac{ME_{i,\tau}}{\sum_{j \in J_{p,\tau}} ME_{j,\tau}} (1 + RET^x_{i;\tau,D-21})$. $I_{p,m}$ is the set of firms in portfolio p in month m when we measure earnings announcements; and $J_{p,\tau}$ is the set of firms in portfolio p at the end of formation-month τ. $ME_{i,\tau}$ is market equity (PRC*SHROUT) of firm i in formation month τ; and $RET^x_{i;\tau,D-21}$ is the ex-dividend return between the end of the formation month τ and 21 days prior to the earnings announcemnt in month m. T_m are all months to be considered to determine whether a stock belongs to portfolio p ($m-12$ to$m-1$ in Panel A; $m-60$ to $m-13$ in Panel B). We need the summation in the calculation of $W'_{i,p,m}$ to consider the possibility that a stock could have been allocated to portfolio p multiple times during the lookback-period T_m. $W'_{i,p,m}$ can be interpreted as the dollar-amount invested in firm i 21 days prior to an earnings announcement in an overlapping buy-and-hold portfolio. M are all months where we measure earnings announcement returns (July 1993 to December 2016 in Panel A; July 1998 to December 2016 in Panel B).

B.IV Additional Figures and Tables

Figure B.1: CAR of constrained portfolios.
We first calculate abnormal returns for each holding month k by regressing the time-series of month-k excess returns on the four Fama-French-Carhart factors. Returns are then cumulated and plotted for the constrained winner (W) and constrained loser portfolio, with stocks that were not constrained winners in the past 5 years (L($\notin$W))

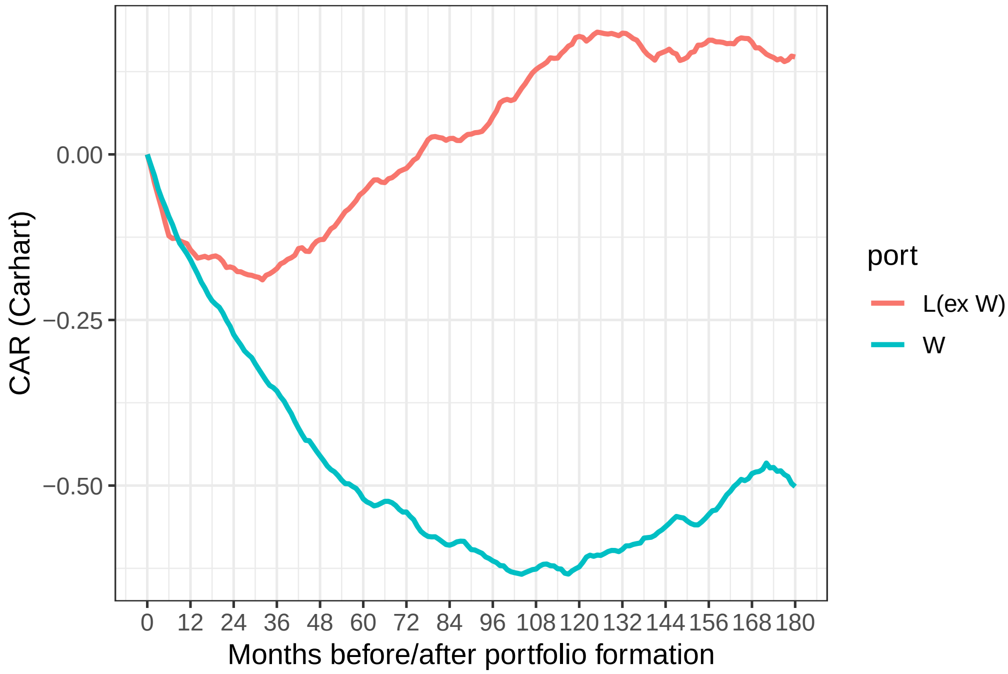


Table B.1: Explaining the returns of constrained portfolios.
We regress monthly portfolio excess returns of constrained portfolios on well-known factor-portfolios. Panels A and B report results for the constrained winners (W) and constrained losers that were not constrained winners in the past 5 years ($L(\notin W)$), with 12-month calendar-time buy-and-hold portfolios, and in Panels C and D, we use a 48-month holding period, skipping 12 months. Column (1) shows the raw average of that strategy, (2) displays results from a CAPM regression on the market excess return. (3) represents results from a Fama and French (1993) 3-factor regression. In (4) we add momentum, and in (5), IVOL as in Ang, Hodrick, Xing, and Zhang (2006). (6) and (7) add the short- and a long-term reversal from Ken French and the value-weighted CME factor from Drechsler and Drechsler (2016), respectively. (8) includes all of the aforementioned. Newey and West (1987) t-statistics are shown in parentheses.

Panel A: W from months $(t-12)$—$(t-1)$								
	1	2	3	4	5	6	7	8
Intercept	-0.25	-1.28	-1.28	-1.30	-1.20	-1.33	-1.04	-1.06
	(-0.57)	(-4.14)	(-5.58)	(-4.84)	(-4.38)	(-6.08)	(-3.51)	(-3.83)
MktRF		1.47	1.27	1.28	1.20	1.22	1.11	1.05
		(13.66)	(17.38)	(20.47)	(16.54)	(24.04)	(11.09)	(10.73)
HML			-0.23	-0.22	-0.11	-0.32	-0.07	-0.10
			(-2.70)	(-1.78)	(-0.87)	(-2.66)	(-0.73)	(-0.91)
SMB			1.07	1.07	0.90	0.99	0.91	0.82
			(10.81)	(11.62)	(7.98)	(7.51)	(11.21)	(8.04)
MOM				0.03	0.09	0.04	0.10	0.14
				(0.25)	(0.76)	(0.48)	(1.14)	(1.63)
IVOL					0.13			0.05
					(3.66)			(0.94)
STRev						0.24		0.22
						(2.85)		(2.60)
LTRev						0.21		0.11
						(1.85)		(1.01)
CMEVW							-0.26	-0.23
							(-3.89)	(-3.22)
R^2	0.0000	0.5785	0.7803	0.7806	0.7855	0.7931	0.8052	0.8145
No. of months	288	288	288	288	288	288	288	288
IR	-0.1053	-0.8288	-1.1476	-1.1656	-1.0817	-1.2252	-0.9892	-1.0347

Table B.1: (continued)

Panel B: $L(\notin W)$ from months $(t-12)$—$(t-1)$								
	1	2	3	4	5	6	7	8
Intercept	-0.55	-1.72	-1.78	-1.28	-0.91	-1.21	-0.81	-0.65
	(-0.88)	(-3.78)	(-4.34)	(-3.16)	(-2.10)	(-2.82)	(-2.21)	(-1.72)
MktRF		1.67	1.48	1.23	0.95	1.23	0.93	0.85
		(12.50)	(11.71)	(14.25)	(8.67)	(13.64)	(12.13)	(8.97)
HML			0.03	-0.22	0.17	-0.58	0.05	-0.05
			(0.13)	(-1.15)	(0.64)	(-2.89)	(0.28)	(-0.19)
SMB			1.18	1.26	0.68	0.96	0.98	0.47
			(7.53)	(6.76)	(2.62)	(6.09)	(5.44)	(2.27)
MOM				-0.66	-0.44	-0.74	-0.52	-0.49
				(-4.85)	(-3.03)	(-5.50)	(-4.01)	(-3.00)
IVOL					0.45			0.28
					(2.77)			(2.25)
STRev						-0.14		-0.15
						(-0.99)		(-1.00)
LTRev						0.86		0.65
						(3.92)		(4.11)
CMEVW							-0.46	-0.34
							(-5.49)	(-5.65)
R^2	0.0000	0.4385	0.5622	0.6426	0.6777	0.6692	0.6887	0.7191
No. of months	288	288	288	288	288	288	288	288
IR	-0.1760	-0.7377	-0.8648	-0.6871	-0.5122	-0.6771	-0.4679	-0.3908

Table B.1: (continued)

Panel C: W from months $(t-60)$—$(t-13)$								
	1	2	3	4	5	6	7	8
Intercept	0.07	-0.68	-0.81	-0.75	-0.64	-0.75	-0.66	-0.60
	(0.14)	(-2.81)	(-4.44)	(-5.82)	(-4.91)	(-4.50)	(-4.24)	(-3.98)
MktRF		1.47	1.32	1.27	1.16	1.27	1.21	1.14
		(20.11)	(22.87)	(20.38)	(19.11)	(17.14)	(16.93)	(13.26)
HML			-0.10	-0.14	0.01	-0.18	-0.08	0.01
			(-0.99)	(-2.19)	(0.29)	(-1.44)	(-1.29)	(0.11)
SMB			0.74	0.77	0.55	0.73	0.70	0.53
			(8.15)	(8.79)	(5.05)	(6.70)	(7.94)	(4.02)
MOM				-0.10	-0.02	-0.11	-0.07	-0.02
				(-1.49)	(-0.30)	(-1.53)	(-1.00)	(-0.26)
IVOL					0.17			0.15
					(5.22)			(4.03)
STRev						-0.01		0.00
						(-0.10)		(0.01)
LTRev						0.10		0.03
						(0.70)		(0.26)
CMEVW							-0.10	-0.05
							(-3.13)	(-1.37)
R^2	0.0000	0.7431	0.8547	0.8588	0.8704	0.8595	0.8634	0.8716
No. of months	240	240	240	240	240	240	240	240
IR	0.0324	-0.6118	-0.9667	-0.9142	-0.8050	-0.9116	-0.8136	-0.7643

Table B.1: (continued)

Panel D: $L(\notin W)$ from months $(t-60)$—$(t-13)$								
	1	2	3	4	5	6	7	8
Intercept	1.01	0.28	0.12	0.23	0.36	0.23	0.37	0.41
	(2.02)	(0.89)	(0.49)	(0.85)	(1.34)	(0.87)	(1.33)	(1.51)
MktRF		1.43	1.27	1.19	1.06	1.16	1.10	1.01
		(17.13)	(17.66)	(17.24)	(13.86)	(16.23)	(13.99)	(14.14)
HML			0.02	-0.05	0.11	-0.23	0.02	-0.03
			(0.21)	(-0.69)	(1.13)	(-2.47)	(0.30)	(-0.24)
SMB			0.82	0.86	0.62	0.71	0.77	0.50
			(9.84)	(10.93)	(6.08)	(7.85)	(10.03)	(4.76)
MOM				-0.19	-0.10	-0.21	-0.14	-0.11
				(-2.74)	(-1.24)	(-2.84)	(-2.27)	(-1.44)
IVOL					0.19			0.15
					(3.86)			(2.84)
STRev						0.05		0.06
						(0.68)		(0.74)
LTRev						0.41		0.33
						(3.99)		(3.32)
CMEVW							-0.14	-0.08
							(-3.03)	(-1.70)
R^2	0.0000	0.6554	0.7716	0.7851	0.7989	0.7970	0.7947	0.8108
No. of months	240	240	240	240	240	240	240	240
IR	0.4470	0.2135	0.1152	0.2165	0.3542	0.2281	0.3579	0.4136

Table B.2: Calendar-time portfolio returns of stocks that were constrained within months $t-60$ to $t-1$ prior to formation.
See caption to Table 4. The only difference here is a holding-period of 60 instead of 12 months.

	L(∉W)	L(∈W)	L(∈W) - L(∉W)	L	M	W	W - L	W - L(∉W)
Panel A: Raw excess returns								
Average	0.66	0.24	-0.42	0.43	0.28	-0.02	-0.45	-0.68
	(1.26)	(0.40)	(-1.74)	(0.79)	(0.64)	(-0.04)	(-2.15)	(-2.98)
No. of months	240	240	240	240	240	240	240	240
AvgN	219	207		392	341	390		
SR	0.2795	0.0910	-0.3260	0.1824	0.1475	-0.0082	-0.4798	-0.5976
Panel B: Four-factor regressions								
Intercept	-0.14	-0.63	-0.49	-0.40	-0.48	-0.88	-0.47	-0.74
	(-0.55)	(-2.53)	(-1.75)	(-1.85)	(-2.77)	(-6.59)	(-2.70)	(-3.04)
MktRF	1.20	1.21	0.01	1.23	1.07	1.30	0.07	0.10
	(19.81)	(16.26)	(0.13)	(22.68)	(20.18)	(18.50)	(0.78)	(1.09)
HML	-0.12	-0.47	-0.35	-0.26	0.04	-0.18	0.08	-0.06
	(-1.49)	(-5.10)	(-3.07)	(-3.42)	(0.57)	(-2.23)	(1.09)	(-0.56)
SMB	0.97	1.20	0.23	1.04	0.80	0.78	-0.26	-0.19
	(13.44)	(12.46)	(2.63)	(13.16)	(17.00)	(10.01)	(-2.49)	(-1.91)
MOM	-0.25	-0.16	0.09	-0.19	-0.06	-0.04	0.15	0.21
	(-4.22)	(-2.36)	(1.25)	(-3.24)	(-1.41)	(-0.75)	(2.01)	(2.34)
R^2	0.8195	0.8275	0.1481	0.8745	0.8781	0.8664	0.1072	0.0896
IR	-0.1351	-0.5814	-0.4097	-0.4832	-0.7380	-1.0835	-0.5329	-0.6859

Table B.3: Constrained 48-month (skipping 12) calendar-time buy-and-hold portfolios - Spanning.

This table shows spanning regressions for constrained calendar-time buy-and-hold portfolios containing constrained stocks from months $((t-60) — (t-13))$. Portfolio formation is described in the caption to Table 5. In columns 1 to 4 (columns 5 to 8) excess returns of constrained winners (losers) are regressed on the excess return of a portfolio of constrained losers (winners) as well as a portfolio that combines all five constrained portfolios with equal weight (Constr). The four Fama-French-Carhart factors are also included in some regressions. Newey and West (1987) t-statistics are shown in parentheses.

	W	W	W	W	L	L	L	L
Intercept	-0.42	-0.59	-0.40	-0.52	0.55	0.22	0.05	0.12
	(-2.64)	(-4.64)	(-3.33)	(-4.39)	(3.16)	(1.26)	(0.60)	(1.61)
L	0.87	0.39						
	(19.97)	(7.47)						
W					0.95	0.45		
					(18.86)	(4.35)		
Oth			0.99	0.57			1.11	1.14
			(23.20)	(6.86)			(103.15)	(24.66)
MktRF		0.78		0.61		0.64		-0.09
		(8.47)		(4.51)		(5.07)		(-1.45)
HML		-0.03		-0.07		-0.16		-0.12
		(-0.49)		(-1.16)		(-2.66)		(-2.92)
SMB		0.42		0.29		0.63		-0.05
		(4.62)		(3.20)		(6.16)		(-1.37)
MOM		-0.05		-0.06		-0.07		-0.04
		(-0.75)		(-0.84)		(-1.05)		(-2.20)
R^2	0.8253	0.8784	0.8601	0.8880	0.8253	0.8722	0.9723	0.9749

Table B.4: Characteristics of triple sorted winner portfolios.
This table shows time-series averages of value-weighted mean characteristics of the 9 winner and 9 loser portfolios in the month of portfolio formation. Panel A displays the average number of stocks. Following are average market equity in billion US dollars (Panel B), return from month t-12 to the end of month t-2 in percent (Panel C), change in short interest from 11.5 months ago to 2 weeks ago in percentage points (Panel G), institutional ownership in percent of number of shares outstanding (Panel D) and the change over the preceding year (Panel E), level of short interest two weeks prior to portfolio formation (Panel F), the ratio of book equity of the previous December to last month's market equity in percent (Panel H) and the average standard deviation of daily idiosyncratic returns in each portfolio (daily, in %) over the month prior to formation (Ang, Hodrick, Xing, and Zhang, 2006, Panel I). Panels J and K show levels and changes over the preceding 12 months in turnover. Panel L presents the ratio of short interest to institutional ownership (SIRIO) as in Drechsler and Drechsler (2016). The open-interest weighted average of differences in implied volatilities between matched put and call option pairs at month-end, as in Cremers and Weinbaum (2010) is shown in Panel M. Panels N and O display the level and change (over the preceding 12 months) in the Markit Indicative loan fee, and Panels P and Q the level and change in the Markit simple average loan fee.

	Winners			Losers		
	Hi IOR	M	Lo IOR	Hi IOR	M	Lo IOR
Panel A: Number of stocks						
Lo SIR	25	121	189	16	118	257
M	183	261	122	91	214	164
Hi SIR	249	154	51	180	185	88
Panel B: Average Market Equity (B$)						
Lo SIR	17.74	81.28	21.66	7.91	48.83	13.76
M	34.72	71.28	8.04	15.10	49.95	4.98
Hi SIR	14.93	19.45	2.43	6.06	10.57	1.50
Panel C: Formation Period Return (%)						
Lo SIR	44	45	53	-26	-28	-35
M	44	45	62	-25	-27	-37
Hi SIR	55	60	85	-30	-35	-45
Panel D: Institutional Ownership (IOR, %)						
Lo SIR	73.52	43.74	12.99	72.58	42.50	11.13
M	73.30	49.79	15.43	73.05	48.22	14.42
Hi SIR	78.41	50.81	16.26	76.87	48.82	15.94

Table B.4: (continued)

	Winners			Losers		
	Hi IOR	M	Lo IOR	Hi IOR	M	Lo IOR
Panel E: Change in IOR over preceding year (PP)						
Lo SIR	3.99	1.71	0.16	2.51	-0.61	-1.34
M	2.13	1.51	-0.17	0.26	-0.78	-2.11
Hi SIR	4.22	3.89	1.35	0.49	-1.43	-2.81
Panel F: Short-interest (SIR, %)						
Lo SIR	0.39	0.39	0.23	0.37	0.37	0.22
M	1.56	1.26	1.30	1.71	1.37	1.47
Hi SIR	6.21	5.66	6.64	7.13	6.60	7.18
Panel G: Change in SIR over preceding year (PP)						
Lo SIR	-0.57	-0.28	-0.16	-0.48	-0.33	-0.33
M	-0.46	-0.26	-0.24	-0.14	-0.04	-0.28
Hi SIR	0.30	0.42	2.57	1.68	1.39	0.63
Panel H: Book-to-market ratio (%)						
Lo SIR	52	52	52	99	93	83
M	37	39	40	64	67	68
Hi SIR	36	36	27	67	74	65
Panel I: Idiosyncratic volatility (%, daily)						
Lo SIR	1.45	1.60	2.30	2.35	2.68	3.72
M	1.35	1.36	2.30	1.82	1.98	3.20
Hi SIR	1.70	1.83	3.17	2.15	2.47	3.90
Panel J: Turnover (%)						
Lo SIR	9.18	8.10	4.79	9.77	8.39	4.61
M	13.79	12.40	9.77	16.43	15.33	9.46
Hi SIR	26.01	25.03	32.60	28.76	27.09	24.58
Panel K: Change in turnover over preceding year (PP)						
Lo SIR	-0.10	-0.56	1.05	0.61	-0.35	-1.63
M	-0.48	-0.48	1.35	1.94	2.08	-2.08
Hi SIR	0.91	2.51	16.43	3.83	1.20	-5.88

Table B.4: (continued)

	Winners			Losers		
	Hi IOR	M	Lo IOR	Hi IOR	M	Lo IOR
Panel L: SIRIO (%)						
Lo SIR	0.46	0.65	4.12	0.43	0.65	7.12
M	1.94	2.30	21.41	2.11	2.60	37.19
Hi SIR	7.28	11.46	87.57	8.57	14.62	83.72
Panel M: Option volatility spread (%)						
Lo SIR	0.13	-0.24	-0.68	-0.07	0.22	-1.49
M	-0.36	-0.31	-1.17	-0.23	-0.18	-1.22
Hi SIR	-0.71	-1.13	-5.54	-0.99	-1.39	-6.24
Panel N: Ind.Fee (%)						
Lo SIR	0.41	0.45	1.11	0.67	0.57	2.19
M	0.42	0.42	1.29	0.43	0.43	2.26
Hi SIR	0.55	0.82	7.10	0.99	1.43	8.69
Panel O: Change in Ind.Fee over preceding year (PP)						
Lo SIR	-0.07	-0.07	-0.09	-0.03	-0.05	0.07
M	-0.03	-0.06	-0.32	-0.03	-0.03	-0.28
Hi SIR	-0.20	-0.57	1.84	0.34	0.28	2.08
Panel P: Simple Avg. Fee (SAF, %)						
Lo SIR	0.28	0.33	0.87	0.32	0.32	1.84
M	0.31	0.31	0.78	0.31	0.32	1.42
Hi SIR	0.47	0.69	5.07	0.89	1.36	7.62
Panel Q: Change in SAF over preceding year (PP)						
Lo SIR	-0.15	0.06	-0.38	-0.10	-0.05	0.48
M	-0.00	-0.02	-0.32	-0.02	-0.02	-0.32
Hi SIR	-0.13	-0.65	1.08	0.28	0.28	2.74

Table B.5: Size distribution of constrained winner portfolio.
This table shows the number of stocks and the market-capizalization share of these stocks within the value-weighted constrained winner portfolio by size-quintile. The last four columns show excess returns, as well as CAPM-, FF3- and Fama-French-Carhart- (FFC) alphas of the five sub-portfolios split by size quintile.

Size quintile	No of stocks	Mkt.Cap-share	Exc. Return	CAPM-α	FF3-α	FFC-α
1	7.70	1.58	-0.51 (-0.96)	-1.34 (-2.02)	-1.38 (-2.54)	-1.35 (-2.15)
2	16.69	11.40	-0.31 (-0.62)	-1.21 (-2.53)	-1.14 (-3.05)	-1.12 (-2.56)
3	16.27	27.45	-0.51 (-1.08)	-1.55 (-3.46)	-1.53 (-4.41)	-1.74 (-5.44)
4	8.26	33.78	-0.26 (-0.42)	-1.31 (-2.22)	-1.24 (-2.25)	-1.60 (-3.05)
5	1.61	25.79	0.26 (0.53)	-0.28 (-0.64)	-0.22 (-0.49)	-0.41 (-0.92)
All	50.55	100.00	-0.47 (-1.02)	-1.45 (-3.99)	-1.44 (-4.71)	-1.61 (-5.32)

Table B.6: Improving small-/medium-cap momentum strategies.
Shown are annualized Sharpe Ratios and monthly average excess returns as well as CAPM- and Fama-French αs of different momentum strategies. WML refers to the long-short "Winner minus Loser" portfolio and "Winners refers" to a long-only strategy that buys just past-winner stocks. "Regular" means that we form value-weighted portfolios from the universe of small- and medium-cap stocks, i.e., we exclude the 20% largest stocks in each cross-section. "Enhanced" means that we avoid constrained winners, i.e., winners that are in the top 30% of short-interest and bottom 30% of institutional ownership. The "difference" rows display statistics of a hypothetical strategy going long the enhanced and short the regular strategy. Newey and West (1987) t-statistics are shown in parentheses.

Portfolio	Style	Sharpe Ratio	Excess Return	CAPM-α	FF3-α
WML	Regular	0.78	1.21 (3.68)	1.48 (5.12)	1.55 (5.40)
	Enhanced	0.85	1.33 (3.99)	1.61 (5.53)	1.67 (5.80)
	Difference	1.17	0.11 (5.93)	0.13 (6.09)	0.12 (6.85)
Winners	Regular	0.82	1.40 (4.25)	0.64 (2.46)	0.59 (4.18)
	Enhanced	0.90	1.51 (4.62)	0.77 (2.95)	0.71 (4.90)
	Difference	1.17	0.11 (5.93)	0.13 (6.09)	0.12 (6.85)

Table B.7: Descriptive statistics of earnings forecast dispersion change sorted portfolios.
Stocks are sorted based on their past 1-year change in earnings forecast dispersion into 10 portfolios. The time-series average of the number of stocks in the portfolios is displayed in the first column. The next columns show the time series mean of monthly value-weighted portfolio averages of market equity in B$, return of the previous year (skipping the last month) in %, institutional ownership ratio (IOR), short-interest in %, and SIRIO (short interest divided by institutional ownership) in %, all in the month of portfolio formation (t-1). The sample period is 1988/07 to 2018/06.

ΔEFD-Portf.	No. of stocks	ME_{t-1}	$Return_{t-12-t-2}$	IOR_{t-1}	SIR_{t-1}	$SIRIO_{t-1}$	EFD_{t-1}	EFD_{t-12}
1	249	21.69	15.34	63.65	4.11	8.04	16.53	80.19
2	248	33.15	15.02	64.04	2.88	4.93	5.90	12.03
3	248	60.43	15.60	62.43	2.19	3.79	3.54	6.00
4	248	64.33	14.54	62.08	1.87	3.43	2.37	3.49
5	248	70.10	13.83	62.27	1.73	2.91	1.83	2.32
6	249	73.56	11.58	61.42	1.66	2.97	2.14	2.05
7	249	66.66	8.82	61.70	1.97	3.60	3.53	2.78
8	248	54.30	4.45	61.60	2.38	4.11	6.34	4.03
9	249	33.94	-2.14	62.56	3.11	5.57	13.39	7.49
10	249	17.97	-10.73	63.31	4.48	8.91	109.70	22.35

C Robustness Checks

C.I 3x3x5 Sort on Past-Return, SIR and IOR

Figure C.1: Annual four-factor alphas of constrained buy-and-hold portfolios. See caption to Figure 1. The only difference here is that we use 5 institutional ownership quintiles instead of 3 buckets with 30% and 70% breakpoints.

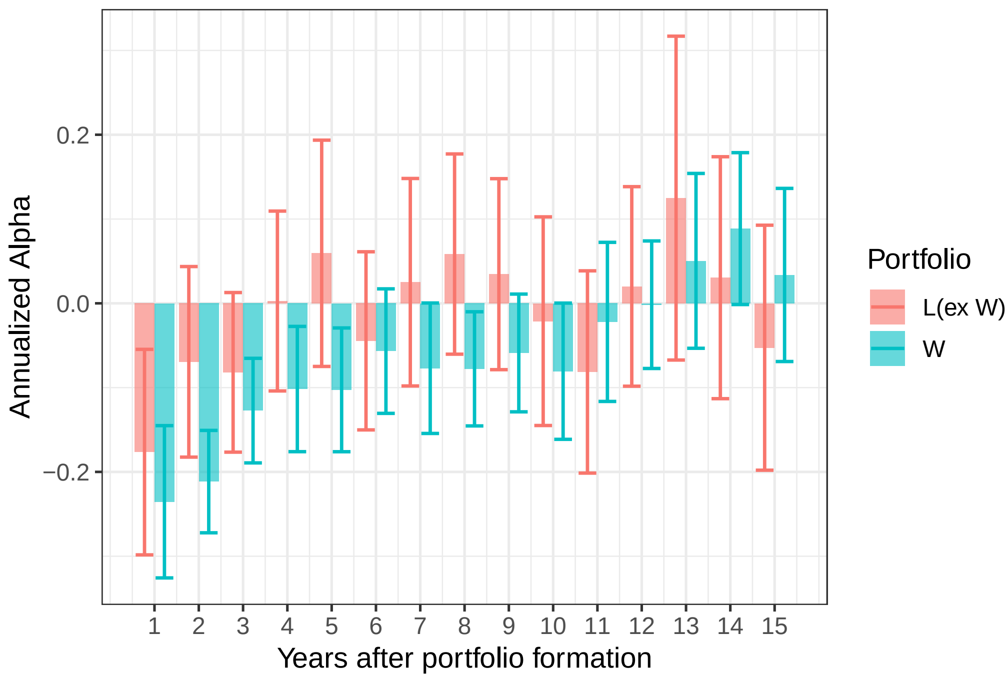


Table C.1: Calendar-time portfolio returns of stocks that were constrained within months $t-60$ to $t-13$ prior to formation.

See caption to Table 5. The only difference here is that we use 5 institutional ownership quintiles instead of 3 buckets with 30% and 70% breakpoints.

	L(∉W)	L(∈W)	L(∈W) - L(∉W)	L	M	W	W - L	W - L(∉W)
Panel A: Raw excess returns								
Average	0.61	0.08	-0.52	0.16	0.05	-0.46	-0.62	-1.07
	(1.06)	(0.13)	(-1.30)	(0.30)	(0.10)	(-1.05)	(-2.49)	(-3.41)
No. of months	240	240	240	240	240	240	240	240
AvgN	107	97		189	162	194		
SR	0.2501	0.0303	-0.2861	0.0691	0.0256	-0.2220	-0.6137	-0.7587
Panel B: Four-factor regressions								
Intercept	-0.14	-0.73	-0.59	-0.60	-0.73	-1.22	-0.62	-1.08
	(-0.43)	(-2.09)	(-1.61)	(-2.15)	(-3.73)	(-5.83)	(-2.46)	(-3.33)
MktRF	1.15	1.06	-0.09	1.10	1.06	1.09	-0.02	-0.06
	(12.28)	(12.83)	(-0.94)	(14.38)	(18.26)	(19.04)	(-0.22)	(-0.70)
HML	-0.05	-0.62	-0.56	-0.28	0.07	-0.07	0.21	-0.02
	(-0.57)	(-5.88)	(-4.81)	(-3.70)	(1.12)	(-1.06)	(3.07)	(-0.19)
SMB	0.89	1.32	0.43	0.98	0.89	0.87	-0.11	-0.03
	(8.72)	(9.05)	(2.59)	(11.05)	(11.94)	(12.69)	(-1.60)	(-0.32)
MOM	-0.28	-0.15	0.13	-0.17	-0.07	-0.11	0.06	0.17
	(-3.27)	(-1.71)	(1.46)	(-2.47)	(-1.26)	(-1.98)	(1.12)	(2.32)
R^2	0.7089	0.7336	0.1998	0.7954	0.8180	0.8110	0.0636	0.0469
IR	-0.1070	-0.5164	-0.3597	-0.5848	-0.8599	-1.3574	-0.6361	-0.7895

C.II Sort on Past-Return and SIRIO

Figure C.2: Annual four-factor alphas of constrained buy-and-hold portfolios. See caption to Figure 1. The only difference here is that we use one sort on SIRIO (ratio of short interest to institutional ownership) instead of the double sort on SIR and IOR to identify constrained stocks. We define constrained stocks as those with a SIRIO above the 95th percentile in a particular month, following Drechsler and Drechsler (2016).

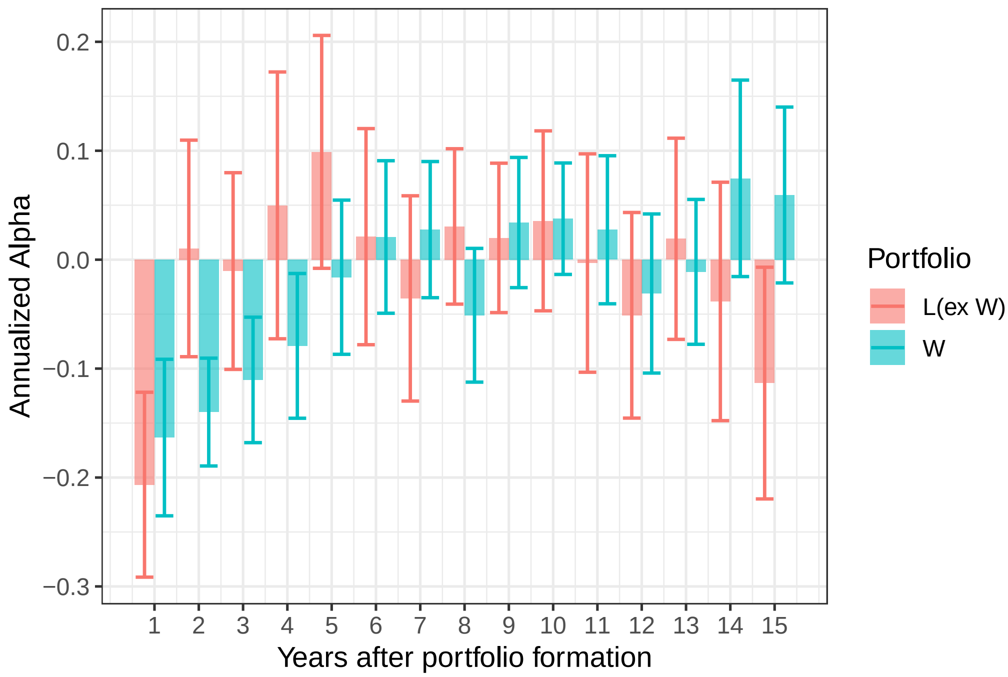


Table C.2: Calendar-time portfolio returns of stocks that were constrained within months $t-60$ to $t-13$ prior to formation.
See caption to Table 4. The only difference here is that we use one sort on SIRIO (ratio of short interest to institutional ownership) instead of the double sort on SIR and IOR to identify constrained stocks. We define constrained stocks as those with a SIRIO above the 95th percentile in a particular month, following Drechsler and Drechsler (2016).

	L(∉W)	L(∈W)	L(∈W) - L(∉W)	L	M2	M3	M4	W	W - L	W - L(∉W)
Panel A: Raw excess returns										
Average	1.12	0.38	-0.74	0.85	0.46	0.55	0.52	0.14	-0.71	-0.98
	(1.92)	(0.63)	(-2.09)	(1.51)	(0.97)	(1.29)	(1.25)	(0.30)	(-2.60)	(-3.43)
No. of months	241	241	241	241	241	241	241	241	241	241
AvgN	214	200		385	348	303	294	376		
SR	0.4101	0.1410	-0.3699	0.3375	0.2245	0.2924	0.2766	0.0681	-0.6387	-0.6411
Panel B: Four-factor regressions										
Intercept	0.38	-0.51	-0.89	0.07	-0.37	-0.21	-0.22	-0.55	-0.62	-0.93
	(1.00)	(-1.78)	(-2.70)	(0.20)	(-1.73)	(-1.53)	(-1.38)	(-2.80)	(-2.17)	(-2.85)
MktRF	1.30	1.14	-0.16	1.25	1.21	1.05	1.05	1.08	-0.17	-0.22
	(11.64)	(16.13)	(-1.44)	(14.44)	(25.72)	(30.76)	(28.65)	(19.38)	(-2.31)	(-2.13)
HML	-0.05	-0.44	-0.39	-0.24	-0.02	-0.04	-0.12	-0.39	-0.14	-0.34
	(-0.31)	(-4.01)	(-2.61)	(-2.02)	(-0.32)	(-0.87)	(-2.18)	(-5.31)	(-1.53)	(-2.49)
SMB	0.81	1.42	0.60	0.93	0.74	0.83	0.78	0.84	-0.10	0.02
	(4.51)	(15.73)	(3.35)	(7.17)	(12.89)	(13.07)	(14.21)	(12.93)	(-0.78)	(0.15)
MOM	-0.42	-0.14	0.28	-0.27	-0.01	-0.02	-0.04	-0.17	0.10	0.25
	(-3.43)	(-2.35)	(2.26)	(-3.18)	(-0.29)	(-0.50)	(-0.76)	(-3.04)	(1.70)	(2.91)
R^2	0.6783	0.7952	0.2294	0.7609	0.8498	0.8658	0.8567	0.8357	0.1004	0.1872
IR	0.2455	-0.4162	-0.5066	0.0545	-0.4677	-0.3076	-0.3040	-0.6410	-0.5895	-0.6788

C.III Equal-Weight Calendar-Time Portfolios

Table C.3: Constrained 12-month equal-weight calendar-time portfolios. See caption to Table 4. The only difference here is that, to get the calendar-time portfolio return, each month, the portfolios formed in in each of the last 12 months are held with equal weight, while within portfolios, stocks are still value-weighted.

	L(∉W)	L(∈W)	L(∈W) - L(∉W)	L	M	W	W - L	W - L(∉W)
Panel A: Raw excess returns								
Average	-0.50	-0.49	0.01	-0.46	0.08	-0.27	0.19	0.23
	(-0.83)	(-0.89)	(0.02)	(-0.87)	(0.20)	(-0.63)	(0.52)	(0.53)
No. of months	288	288	288	288	288	288	288	288
AvgN	97	115		208	156	164		
SR	-0.1573	-0.1819	0.0029	-0.1707	0.0422	-0.1139	0.1224	0.1022
Panel B: Four-factor regressions								
Intercept	-1.20	-1.21	-0.01	-1.20	-0.76	-1.32	-0.12	-0.11
	(-3.02)	(-3.64)	(-0.02)	(-4.36)	(-3.76)	(-5.09)	(-0.37)	(-0.28)
MktRF	1.24	1.10	-0.14	1.19	1.10	1.27	0.08	0.04
	(13.49)	(13.26)	(-1.70)	(16.34)	(19.39)	(20.55)	(0.93)	(0.33)
HML	-0.17	-0.45	-0.29	-0.30	0.09	-0.22	0.09	-0.05
	(-0.89)	(-4.48)	(-1.25)	(-2.41)	(0.96)	(-1.78)	(0.49)	(-0.21)
SMB	1.28	1.27	-0.02	1.22	0.77	1.08	-0.14	-0.20
	(7.04)	(10.38)	(-0.12)	(11.42)	(14.55)	(12.35)	(-1.03)	(-1.02)
MOM	-0.76	-0.42	0.34	-0.55	-0.17	0.01	0.56	0.78
	(-6.34)	(-5.48)	(2.19)	(-6.90)	(-3.51)	(0.15)	(5.52)	(4.53)
R^2	0.6731	0.7210	0.0926	0.7791	0.8179	0.7874	0.2542	0.2571
IR	-0.6670	-0.8513	-0.0042	-0.9466	-0.9289	-1.1997	-0.0882	-0.0600

Table C.4: Constrained 48-month (skipping 12) equal-weight calendar-time portfolios.
See caption to Table 5. The only difference here is that, to get the calendar-time portfolio return, each month, the portfolios formed in in each of the last 12 months are held with equal weight, while within portfolios, stocks are still value-weighted.

	L(∉W)	L(∈W)	L(∈W) - L(∉W)	L	M	W	W - L	W - L(∉W)
Panel A: Raw excess returns								
Average	1.00	0.37	-0.63	0.65	0.38	0.10	-0.55	-0.89
	(1.95)	(0.63)	(-2.34)	(1.20)	(0.88)	(0.21)	(-3.06)	(-3.97)
No. of months	240	240	240	240	240	240	240	240
AvgN	167	169		314	281	322		
SR	0.4402	0.1457	-0.4733	0.2841	0.2046	0.0486	-0.6899	-0.8724
Panel B: Four-factor regressions								
Intercept	0.21	-0.49	-0.70	-0.18	-0.37	-0.69	-0.51	-0.90
	(0.88)	(-1.99)	(-2.62)	(-0.85)	(-2.11)	(-5.18)	(-2.90)	(-3.69)
MktRF	1.20	1.19	-0.01	1.22	1.04	1.21	-0.00	0.02
	(19.17)	(18.00)	(-0.11)	(22.66)	(20.61)	(29.99)	(-0.08)	(0.31)
HML	-0.06	-0.46	-0.40	-0.24	0.03	-0.09	0.15	-0.03
	(-0.83)	(-5.31)	(-3.81)	(-3.53)	(0.48)	(-1.89)	(2.34)	(-0.40)
SMB	0.87	1.18	0.30	0.96	0.83	0.81	-0.15	-0.06
	(11.40)	(13.55)	(3.60)	(12.99)	(17.25)	(11.01)	(-2.21)	(-0.83)
MOM	-0.21	-0.13	0.08	-0.14	-0.06	-0.14	-0.01	0.06
	(-3.05)	(-2.15)	(1.20)	(-2.22)	(-1.22)	(-2.82)	(-0.07)	(0.65)
R^2	0.8078	0.8211	0.1853	0.8663	0.8657	0.8858	0.0839	0.0115
IR	0.2121	-0.4522	-0.5823	-0.2158	-0.5420	-0.9673	-0.6777	-0.8870

C.IV Simple Value-Weighted Portfolios

Table C.5: Simple VW portfolios of stocks that were constrained within months $t-12$ to $t-1$ prior to formation.
See caption to Table 4. Here, we just include any stock, that falls into portfolio p at any point in time during the formation period (months $t-12$ to $t-1$ here) with the market equity at the end of the formation period $t-1$ as the weight. The main difference to the buy-and-hold approach is that a stock that fell into a portfolio more than once is only considered once.

	L(∉W)	L(∈W)	L(∈W) - L(∉W)	L	M	W	W - L	W - L(∉W)
Panel A: Raw excess returns								
	L(∉W)	L(∈W)	L(∉W)-L(∈W)	L	M	W	W-L	W-L(∉W)
Average	-0.40	-0.61	0.21	-0.48	-0.08	-0.15	0.34	0.26
	(-0.60)	(-1.13)	(0.57)	(-0.83)	(-0.19)	(-0.32)	(1.04)	(0.60)
No. of months	288	288	288	288	288	288	288	288
AvgN	97	115		208	156	164		
SR	-0.1323	-0.2382	0.1034	-0.1812	-0.0383	-0.0637	0.2257	0.1257
Panel B: Four-factor regressions								
Intercept	-1.16	-1.45	0.30	-1.27	-0.95	-1.18	0.09	-0.02
	(-2.98)	(-4.80)	(0.84)	(-3.88)	(-4.68)	(-4.77)	(0.32)	(-0.06)
MktRF	1.31	1.20	0.11	1.26	1.17	1.27	0.01	-0.04
	(12.15)	(14.15)	(1.10)	(12.32)	(20.20)	(18.80)	(0.14)	(-0.34)
HML	-0.20	-0.21	0.01	-0.23	-0.05	-0.24	-0.01	-0.04
	(-0.87)	(-1.56)	(0.05)	(-1.14)	(-0.52)	(-1.97)	(-0.05)	(-0.19)
SMB	1.06	1.16	-0.10	1.08	0.89	0.98	-0.10	-0.08
	(8.70)	(11.71)	(-0.80)	(9.31)	(15.44)	(12.84)	(-0.95)	(-0.67)
MOM	-0.68	-0.35	-0.33	-0.53	-0.19	0.03	0.56	0.71
	(-7.17)	(-4.07)	(-3.45)	(-6.94)	(-2.57)	(0.35)	(8.11)	(7.31)
R^2	0.6733	0.7435	0.0713	0.7738	0.8402	0.8047	0.2856	0.2625
IR	-0.6650	-1.1149	0.1514	-1.0011	-1.1484	-1.1625	0.0732	-0.0135

Table C.6: Simple VW portfolios of stocks that were constrained within months $t-60$ to $t-13$ prior to formation.

See caption to Table 5. Here, we just include any stock, that falls into portfolio p at any point in time during the formation period (months $t-60$ to $t-13$ here) with the market equity at the end of the formation period $t-1$ as the weight. The main difference to the buy-and-hold approach is that a stock that fell into a portfolio more than once is only considered once.

	L(∉W)	L(∈W)	L(∈W) - L(∉W)	L	M	W	W - L	W - L(∉W)
Panel A: Raw excess returns								
	L(∉W)	L(∈W)	L(∉W)- L(∈W)	L	M	W	W-L	W- L(∉W)
Average	0.84	0.30	0.53	0.63	0.40	0.12	-0.51	-0.72
	(1.70)	(0.50)	(1.82)	(1.21)	(0.79)	(0.26)	(-2.20)	(-2.65)
No. of months	240	240	240	240	240	240	240	240
AvgN	167	169		314	281	322		
SR	0.3946	0.1235	0.4213	0.2910	0.1927	0.0591	-0.4454	-0.5638
Panel B: Four-factor regressions								
Intercept	0.03	-0.59	0.62	-0.19	-0.45	-0.69	-0.50	-0.73
	(0.13)	(-2.83)	(2.26)	(-1.04)	(-3.01)	(-4.41)	(-2.11)	(-2.40)
MktRF	1.13	1.29	-0.16	1.17	1.19	1.27	0.10	0.14
	(15.43)	(21.25)	(-1.81)	(21.86)	(25.89)	(16.16)	(1.12)	(1.26)
HML	-0.05	-0.38	0.33	-0.17	-0.07	-0.01	0.15	0.03
	(-0.53)	(-3.44)	(3.29)	(-2.12)	(-0.92)	(-0.19)	(1.68)	(0.36)
SMB	0.88	1.01	-0.14	0.92	0.84	0.52	-0.40	-0.36
	(8.09)	(10.49)	(-1.60)	(11.23)	(10.95)	(6.21)	(-3.09)	(-2.15)
MOM	-0.06	-0.07	0.01	-0.08	-0.01	0.05	0.12	0.10
	(-0.83)	(-0.95)	(0.13)	(-1.39)	(-0.19)	(0.78)	(1.41)	(0.96)
R^2	0.7933	0.8466	0.1292	0.8620	0.8756	0.8109	0.1413	0.0757
IR	0.0325	-0.6112	0.5234	-0.2415	-0.6119	-0.7936	-0.4731	-0.5922

Table C.7: Simple VW portfolios of stocks that were constrained within months $t-60$ to $t-1$ prior to formation.
See caption to Table B.2. Here, we just include any stock, that falls into portfolio p at any point in time during the formation period (months $t-60$ to $t-1$ here) with the market equity at the end of the formation period $t-1$ as the weight. The main difference to the buy-and-hold approach is that a stock that fell into a portfolio more than once is only considered once.

	L(∉W)	L(∈W)	L(∈W) - L(∉W)	L	M	W	W - L	W - L(∉W)
Panel A: Raw excess returns								
	L(∉W)	L(∈W)	L(∉W)-L(∈W)	L	M	W	W-L	W-L(∉W)
Average	0.58	0.09	0.49	0.40	0.31	0.00	-0.39	-0.57
	(1.11)	(0.15)	(1.94)	(0.75)	(0.63)	(0.01)	(-1.79)	(-2.33)
No. of months	240	240	240	240	240	240	240	240
AvgN	219	207		392	341	390		
SR	0.2663	0.0369	0.4194	0.1800	0.1519	0.0018	-0.3571	-0.4754
Panel B: Four-factor regressions								
Intercept	-0.17	-0.79	0.62	-0.38	-0.52	-0.81	-0.43	-0.63
	(-0.67)	(-3.46)	(2.36)	(-1.66)	(-3.51)	(-5.93)	(-1.82)	(-2.34)
MktRF	1.13	1.29	-0.16	1.16	1.18	1.24	0.08	0.12
	(15.40)	(19.67)	(-2.18)	(18.06)	(25.48)	(17.72)	(0.90)	(1.22)
HML	-0.10	-0.28	0.18	-0.19	-0.05	-0.00	0.19	0.10
	(-0.83)	(-2.21)	(1.48)	(-1.63)	(-0.57)	(-0.00)	(2.11)	(0.98)
SMB	0.86	1.04	-0.18	0.92	0.85	0.54	-0.38	-0.32
	(7.07)	(9.93)	(-2.06)	(8.64)	(12.70)	(7.49)	(-2.85)	(-2.24)
MOM	-0.18	-0.14	-0.04	-0.18	-0.03	0.06	0.25	0.24
	(-2.54)	(-1.97)	(-0.55)	(-3.00)	(-0.80)	(1.15)	(3.44)	(2.93)
R^2	0.8012	0.8474	0.1069	0.8577	0.8898	0.8390	0.2081	0.1259
IR	-0.1800	-0.8220	0.5618	-0.4566	-0.7698	-1.0350	-0.4381	-0.5619