Online Appendix for

Uncovering Financial Constraints

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This online appendix contains additional results.

Table IA.1: **Summary Statistics: Only Firm-Years with Hoberg and Maksimovic (2015) Measures**

This table presents summary statistics of the financial variables used as predictors in our model of financial constraints, constraint estimates, and additional variables used in our analysis. Each variable is measured at the annual frequency. Variable descriptions of the predictors used in our model (age–ppegt) are provided in Table 2 of the main text. HM Debt (Equity) are the standardized Hoberg and Maksimovic (2015) constraint measures. RF Debt (Equity) are the full-model random forest constraint estimates. RF Prim. Debt (Equity) are the "Primitive"-model random forest constraint estimates. The yearly change in payouts to shareholders (Δ Payout), the yearly change in equity issuance proceeds (Δ Equity Issuance), the change in other funding sources (Δ Other Funding), and change in firm size (Δ Size) are all defined as in Farre-Mensa and Ljungqvist (2016). The indicator for a firm omitting its dividend (Dividend Omission Dummy), the indicator for the firm increasing its dividend (Dividend Increase Dummy), and an indicator for a firm under-funding its pension (Underfund Pension Dummy) are defined as in Bodnaruk et al. (2015). The dividend-related indicators require the firm to have paid a dividend in the prior year and the underfunded pension dummy requires the firm to have a pension. We present summary statistics for the sub-sample of firms classified by Hoberg and Maksimovic (2015). In the main paper, we present summary statistics for all firm-years that are classified by the random forest.

Variable	Obs	Mean	Std. Dev.	P25	P50	P75
age	69982	16.085	12.976	7	12	21
at	69982	1343.229	4678.777	23.222	120.683	608.106
ceq	69982	497.075	1723.572	7.288	54.163	253.608
che	69982	131.261	443.915	1.92	14.093	70.76
dlc	69982	45.055	225.536	0	.891	7.7
dltt	69982	330.238	1184.156	0	3.094	109.047
dp	69982	58.46	212.601	.742	4.434	25.543
dvc	69982	18.158	98.526	0	0	0
dvp	69982	.386	2.046	0	0	0
ib	69982	49.47	275.373	-7.398	.295	19.249
sale	69982	1176.639	3961.603	15.196	103.61	567.365
seq	69982	502.585	1735.104	8.048	55.646	257.942
sic3 sales	69982	254450.6	292402.9	28559.94	121230.1	441241.8
txdb	69982	47.567	216.155	0	0	4.321
csho	69982	65.478	155.86	10.209	23.452	52.924
prcc f	69982	14.769	19.372	1.75	7.188	20.57
ppegt	69982	775.964	3132.891	5.664	35.87	252.998
Δ Payout	58479	.002	.053	0	0	.001
Δ Equity Issuance	63317	.031	.479	0	0	0
Δ Other Funding	43935	.077	1.141	-.123	.015	.181
Δ Size	69231	.03	.734	-.102	.039	.2
Dividend Omission Dummy	21019	.137	.344	0	0	0
Dividend Increase Dummy	21044	.546	.498	0	1	1
Underfund Pension Dummy	12458	.822	.382	1	1	1
HM Debt	69982	0	1	-.722	-.118	.62
HM Equity	69982	0	1	-.732	-.124	.606
RF Debt	69982	.005	.769	-.561	-.08	.499
RF Equity	69982	.003	.8	-.578	-.108	.467
RF Exog. Debt	69982	.003	.718	-.517	-.075	.457
RF Exog. Equity	69982	.004	.759	-.542	-.102	.445

Table IA.2: **Equity Recycling by Financial Constraint Classification - Robustness**

This table examines the difference in equity recycling behavior between the most constrained firms (top 20%) and the least constrained firms (bottom 20%). We follow the procedure of Farre-Mensa and Ljungqvist (2016). We regress the yearly change $(t-1 \rightarrow t)$ in payouts to shareholders on the yearly change in equity issuance proceeds (Δ Equity Issuance). We control for the change in other funding sources (Δ Other Funding) and change in firm size (Δ Size). All variables are scaled by the beginning-of-year $(t-1)$ total assets except size. We include industry-by-year fixed effects. In the main text, we present our baseline tests with payouts to shareholders including both dividends and repurchases and financial constraints classified in year $t-1$. We present variations on this test below. In Panel A, equity-related constraints are classified in year t (i.e., constraints are forward-looking). In Panel B, the dependent variable is the change in share repurchases (i.e., dividends are not included in the payouts to shareholders). In Panel C, we present the results using the main specification except we use the "Primitive" model of equity constraints. In Panel D, we present the results using the main specification except we modify the estimation of the *equity*-related constraints estimation to use all predictors except those related to dividends (i.e., we do not include DVP and DVC). In Panel E, we present the results using the main specification except we classify firms based on their *debt*-related constraints (instead of equity). We label the time period and what model is used to measure constraints in the column header. Standard errors are clustered at the firm level. We report the results of a Wald test comparing the coefficient of interest for constrained and unconstrained firms. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Panel A: Forward-looking Equity Constraints, Full Model.

	Entire Period		Pre-1997		Post-1997		HM Measure		Primitive	
	(1) Cons.	(2) Uncons.	(3) Cons.	(4) Uncons.	(5) Cons.	(6) Uncons.	(7) Cons.	(8) Uncons.	(9) Cons.	(10) Uncons.
Δ Equity Issuance	0.001***	0.018***	0.005***	0.029***	0.001**	0.013***	0.003***	0.006**	0.002***	0.017***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Δ Other Funding	0.000	0.011***	0.004***	0.012***	-0.000	0.010***	0.000	0.006***	0.001**	0.010***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Δ Size	0.002***	-0.012***	0.003***	-0.004	0.002***	-0.015***	0.002***	-0.006***	0.002***	-0.011***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Wald Test:	24.63***		8.16***		16.74***		24.63***		26.26***	
Observations	20204	22885	4807	6182	15397	16703	6688	8021	19498	21937
R^2	0.029	0.039	0.056	0.046	0.024	0.040	0.041	0.047	0.028	0.042

Panel B: Examine Change in Share Repurchases. Equity Constraints, Full Model.

	Entire Period		Pre-1997		Post-1997		HM Measure		Primitive	
	(1) Cons.	(2) Uncons.	(3) Cons.	(4) Uncons.	(5) Cons.	(6) Uncons.	(7) Cons.	(8) Uncons.	(9) Cons.	(10) Uncons.
Δ Equity Issuance	0.001***	0.014***	0.003***	0.025***	0.001***	0.012***	0.002***	0.006**	0.001***	0.014***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Δ Other Funding	-0.000	0.008***	0.001	0.008***	-0.000	0.008***	0.000	0.004***	-0.000	0.007***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Δ Size	0.001**	-0.012***	0.000	-0.013***	0.001**	-0.011***	0.000	-0.005***	0.000	-0.008***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Wald Test:	27.20***		11.45***		18.79***		3.47*		33.75***	
Observations	20207	21925	4659	5814	15548	16111	6929	7631	19842	20762
R^2	0.026	0.038	0.028	0.032	0.025	0.039	0.034	0.042	0.024	0.038

Panel C: Equity Constraints, "Primitive" Model.

	Entire Period		Pre-1997		Post-1997		HM Measure	
	(1) Constrained	(2) Unconstrained	(3) Constrained	(4) Unconstrained	(5) Constrained	(6) Unconstrained	(7) Constrained	(8) Unconstrained
Δ Equity Issuance	0.001***	0.023***	0.006***	0.029***	0.001*	0.022***	0.003***	0.012***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Δ Other Funding	0.000	0.012***	0.004***	0.017***	-0.000	0.011***	0.000	0.006***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Δ Size	0.000	-0.013***	-0.001	-0.009**	0.000	-0.014***	0.000	-0.008***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Wald Test:	39.36***		8.32***		30.71***		5.54**	
Observations	19443	20569	4814	5305	14629	15264	6673	7539
R^2	0.024	0.042	0.032	0.042	0.024	0.043	0.041	0.049

Panel D: Equity Constraints, Full Model Less Dividend Variables

	Entire Period		Pre-1997		Post-1997	
	(1) Constrained	(2) Unconstrained	(3) Constrained	(4) Unconstrained	(5) Constrained	(6) Unconstrained
Δ Equity Issuance	0.002***	0.027***	0.005***	0.052***	0.001***	0.024***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Δ Other Funding	0.000	0.013***	0.003**	0.011***	-0.000	0.013***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Δ Size	0.001	-0.018***	0.000	-0.013**	0.001	-0.020***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Wald Test:	37.07***		15.10***		26.98***	
Observations	19860	21747	4690	5746	15170	16001
R^2	0.032	0.041	0.035	0.042	0.032	0.042

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Panel E: Debt Constraints, Full Model.

	Entire Period		Pre-1997		Post-1997		HM Measure		Primitive	
	(1) Cons.	(2) Uncons.	(3) Cons.	(4) Uncons.	(5) Cons.	(6) Uncons.	(7) Cons.	(8) Uncons.	(9) Cons.	(10) Uncons.
Δ Equity Issuance	0.031***	0.003***	0.038***	0.006***	0.029***	0.003***	0.017***	0.006***	0.024***	0.003***
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Δ Other Funding	0.009***	0.001**	0.011***	0.003*	0.008***	0.001**	0.004***	0.001**	0.008***	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Δ Size	-0.006***	-0.001**	-0.007***	-0.002	-0.006***	-0.001*	-0.006***	-0.003***	-0.010***	-0.001*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Wald Test:	48.27***		10.38***		36.89***		5.43**		42.46***	
Observations	18520	21456	4862	5322	13658	16134	6757	7510	18311	20796
R^2	0.045	0.030	0.042	0.028	0.045	0.031	0.045	0.047	0.040	0.027

Table IA.3: **Dividend Tests (Debt Constraint Classifications)**

This table examines the difference in behavior between the most *debt* constrained firms (top 20%) and the least constrained firms (bottom 20%). In Panel A, the dependent variable is a dividend omission dummy equal to one if the firm did not pay a dividend during the year and paid a dividend the previous year $(t-1 \rightarrow t)$. In Panel B, the dependent variable is a dividend increase dummy equal to one if a firm increased its dividend between the previous and current year $(t-1 \rightarrow t)$. The main independent variable of interest (Constrained Dummy) is a dummy variable equal to one (zero) if the firm is in the most (least) constrained quintile in year $t-1$. We control for the logarithm of market capitalization (year $t-1$), logarithm of book-to-market (year $t-1$) Winsorized at the 1% level, a negative earnings dummy (year $t-1$) and the firm's equity return in excess of the market in the previous year $(t-2 \rightarrow t-1)$. We only include firm-year observations in which the firm paid a dividend in year $t-1$. We include industry and year fixed effects. Standard errors are clustered at the industry and year level. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Panel A: Dividend Omissions

Model: Time Period:	(1) Full All Years	(2) Full Pre-1997	(3) Full Post-1997	(4) HM 1997-2015	(5) "Primitive" All Years
Constrained Dummy	-0.007	0.001	-0.017	-0.000	-0.018**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log(Mkt Cap)	-0.018***	-0.018***	-0.017***	-0.016***	-0.016***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log(Book-to-Market)	-0.003	-0.011	0.003	0.003	-0.004
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
Neg. Earnings Dummy	0.139***	0.153***	0.121***	0.112***	0.128***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)
Past Excess Return	-0.003	-0.012	0.005**	0.005	-0.001
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Observations	25136	14114	11022	5951	28098
R^2	0.095	0.093	0.098	0.097	0.098

Panel B: Dividend Increases

Model: Time Period:	(1) Full All Years	(2) Full Pre-1997	(3) Full Post-1997	(4) HM 1997-2015	(5) "Primitive" All Years
Constrained Dummy	0.013*	0.002	0.026*	0.036***	0.044***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log(Mkt Cap)	0.051***	0.066***	0.040***	0.042***	0.047***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log(Book-to-Market)	-0.035***	-0.048***	-0.022***	-0.017**	-0.045***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Neg. Earnings Dummy	-0.249***	-0.305***	-0.195***	-0.165***	-0.220***
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
Past Excess Return	0.038***	0.069***	0.010	0.011**	0.043***
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Observations	25150	14115	11035	5956	28109
R^2	0.154	0.191	0.136	0.143	0.151

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Table IA.4: **Dividend Tests (Equity Constraint Classifications - No Dividends)**
This table examines the difference in behavior between the most *equity* constrained firms (top 20%) and the least constrained firms (bottom 20%). Firms' equity-related constraints are estimated using all the predictors except for those related to dividends (i.e., we do not include DVP and DVC). In column 1, the dependent variable is a dividend omission dummy equal to one if the firm did not pay a dividend during the year and paid a dividend the previous year $(t - 1 \rightarrow t)$. In column 2, the dependent variable is a dividend increase dummy equal to one if a firm increased its dividend between the previous and current year $(t - 1 \rightarrow t)$. The main independent variable of interest (Constrained Dummy) is a dummy variable equal to one (zero) if the firm is in the most (least) constrained quintile in year $t - 1$. We control for the logarithm of market capitalization (year $t - 1$), logarithm of book-to-market (year $t - 1$) Winsorized at the 1% level, a negative earnings dummy (year $t - 1$) and the firm's equity return in excess of the market in the previous year $(t - 2 \rightarrow t - 1)$. We only include firm-year observations in which the firm paid a dividend in year $t - 1$. We include industry and year fixed effects. Standard errors are clustered at the industry and year level. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Panel A: Dividend Omissions

Model:	(1) Full	(2) Full	(3) Full
Time Period:	All Years	Pre-1997	Post-1997
Constrained Dummy	0.046***	0.039***	0.064***
	(0.01)	(0.01)	(0.02)
Log(Mkt Cap)	-0.014***	-0.012***	-0.016***
	(0.00)	(0.00)	(0.00)
Log(Book-to-Market)	-0.000	-0.006	0.005
	(0.00)	(0.01)	(0.00)
Neg. Earnings Dummy	0.140***	0.147***	0.123***
	(0.01)	(0.02)	(0.02)
Past Excess Return	0.001	-0.009	0.009
	(0.01)	(0.01)	(0.01)
Observations	26391	14999	11392
R^2	0.107	0.099	0.110

Panel B: Dividend Increases

Model:	(1) Full	(2) Full	(3) Full
Time Period:	All Years	Pre-1997	Post-1997
Constrained Dummy	-0.105***	-0.124***	-0.054*
	(0.02)	(0.02)	(0.03)
Log(Mkt Cap)	0.049***	0.057***	0.040***
	(0.00)	(0.00)	(0.00)
Log(Book-to-Market)	-0.047***	-0.081***	-0.017*
	(0.01)	(0.01)	(0.01)
Neg. Earnings Dummy	-0.210***	-0.258***	-0.185***
	(0.02)	(0.02)	(0.02)
Past Excess Return	0.047**	0.083***	0.021
	(0.02)	(0.02)	(0.01)
Observations	26394	14999	11395
R^2	0.159	0.193	0.139

Table IA.5: **Pension Underfunding Tests (Equity Constraint Classifications)**
This table examines the difference in pension funding behavior between more *equity* constrained firms (top 30%) and less constrained firms (bottom 30%). The dependent variable is a pension underfunded dummy equal to one if a firm's pension is underfunded in year t. The main independent variable of interest (Constrained Dummy) is a dummy variable equal to one (zero) if the firm is in the most (least) constrained 30% of firms in year $t-1$. We control for the lagged dependent variable (year $t-1$). We control for the logarithm of market capitalization (year $t-1$), logarithm of book-to-market (year $t-1$) Winsorized at the 1% level, a negative earnings dummy (year $t-1$) and the firm's equity return in excess of the market in the previous year ($t-2 \rightarrow t-1$). We only include firm-year observations in which the firm had pension obligations in the year $t-1$. We include industry and year fixed effects. Standard errors are clustered at the industry and year level. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

| | (1) Full | (2) Full | (3) Full | (4) HM | (5) "Primitive" |
| Model: | | | | | |
Time Period:	All Years	Pre-1997	Post-1997	1997-2015	All Years
Constrained Dummy	0.014**	0.031*	0.009	-0.001	0.012**
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Lag Underfund Dummy	0.587***	0.605***	0.564***	0.515***	0.583***
	(0.03)	(0.02)	(0.04)	(0.05)	(0.03)
Log(Mkt Cap)	-0.003*	-0.012***	-0.001	-0.001	-0.005***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log(Book-to-Market)	-0.010*	-0.045***	0.001	-0.005	-0.012**
	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)
Neg. Earnings Dummy	-0.000	0.002	0.002	0.001	-0.002
	(0.00)	(0.02)	(0.00)	(0.01)	(0.00)
Past Excess Return	0.002	0.017	-0.001	0.003	0.003
	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)
Observations	17929	5347	12582	6515	18623
R^2	0.624	0.413	0.485	0.468	0.630

Table IA.6: **Summary Statistics for Data Used in Equity Issuance and Investment Analysis**

This table presents summary statistics for the outcome variables and control variables used in the equity issuance and firm investment analysis (results presented in Table 10 of the main text). Equity Iss./Assets is the equity issuance in year t divided by assets in year $t-1$. CAPX/K is capital expenditures in year t divided by PPE in year $t-1$. Log(Mrkt Cap) is the logarithm of the market capitalization in year $t-1$. Cash/Assets is cash in year $t-1$ divided by assets in year $t-1$. Debt/Assets is the book value of debt in year $t-1$ divided by assets in year $t-1$. B/M is the book value of equity to market value of equity in year $t-1$.

Variable	Obs	Mean	Std. Dev.	P25	P50	P75
Equity Iss./Assets	204097	.134	.474	0	.002	.024
CAPX/K	220078	.217	.372	.053	.107	.214
Log(Mrkt Cap)	221952	4.557	2.533	2.767	4.399	6.256
B/M	139217	.881	19.773	.31	.57	.999
Cash/Assets	207983	.189	.231	.028	.091	.258
Debt/Assets	207983	.288	.485	.032	.198	.367

Table IA.7: **Sentiment Proxies and Real Outcomes - Individual Components of Baker and Wurgler Index**
This table examines the relationship between firm real outcomes, sentiment, and constraints of equity-focused firms. We regress the firm outcome of interest on an interaction between the investor sentiment measure and dummies for the lagged quintiles of equity constraints. In Panel A, the outcome of interest is equity issuance to lagged assets. In Panel B, the outcome of interest is capital expenditures to lagged property, plant and equipment. The sentiment measure varies across the columns and is denoted at the top of the column. All five sentiment measures are sub-components of the Baker and Wurgler (2006) sentiment measure. They are the closed-end fund discount (cefd), dividend premium (pdnd), number of IPOs (nipo), the first-day return on IPOs (ripo), and equity share in new issues (s). We standardize all sentiment measures to mean of zero and standard deviation of 1. We include the quintile dummies independently as well (coefficients not reported for brevity). We denote at the top of each column the model used to estimate equity constraints (either the full model labeled Full or the model using "Primitive" predictors labeled "Prim"). We include the lagged logarithm of the firm's market capitalization, the lagged book-to-market, the lagged cash-to-assets ratio, and the lagged debt-to-assets ratio and each control variables' interaction with sentiment (coefficients not reported). Both firm fixed effects and industry $\times$ year-quarter fixed effects are included in the regressions. The main effect of sentiment is absorbed by the fixed effects. Standard errors are clustered at the year and firm-level. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Panel A: Equity Issuance/Assets

	(1) cefd Full Yes	(2) cefd "Prim" Yes	(3) pdnd Full Yes	(4) pdnd "Prim" Yes	(5) nipo Full Yes	(6) nipo "Prim" Yes	(7) ripo Full Yes	(8) ripo "Prim" Yes	(9) s Full Yes	(10) s "Prim" Yes
Sentiment:										
Model:										
Controls:										
LagConstraints Q2 $\times$ Sentiment	-0.001	-0.000	-0.003	-0.003**	0.007***	0.003**	0.004	0.001	0.002	0.003*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LagConstraints Q=3 $\times$ Sentiment	-0.001	-0.004**	-0.008***	-0.013***	0.008***	0.008***	0.006**	0.009**	0.004**	0.003
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LagConstraints Q=4 $\times$ Sentiment	-0.004*	-0.007**	-0.018***	-0.018***	0.015***	0.017***	0.011**	0.004	0.011***	0.009**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LagConstraints Q=5 $\times$ Sentiment	-0.019***	-0.013***	-0.032***	-0.020***	0.041***	0.031***	0.004	-0.005	0.016**	0.010
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)
Observations	134337	134337	134337	134337	134337	134337	127991	127991	134337	134337
R^2	0.368	0.367	0.370	0.369	0.369	0.368	0.370	0.370	0.367	0.367

Panel B: Capital Expenditures/k

|	(1) cefd Full Yes	(2) cefd "Prim" Yes	(3) pdnd Full Yes	(4) pdnd "Prim" Yes	(5) nipo Full Yes	(6) nipo "Prim" Yes	(7) ripo Full Yes	(8) ripo "Prim" Yes	(9) s Full Yes	(10) s "Prim" Yes
Sentiment: Model: Controls:										
LagConstraints Q2 × Sentiment	0.001 (0.00)	0.002 (0.00)	0.000 (0.00)	-0.001 (0.00)	0.000 (0.00)	0.002 (0.00)	0.001 (0.00)	-0.004** (0.00)	0.004*** (0.00)	0.004** (0.00)
LagConstraints Q3 × Sentiment	0.002 (0.00)	0.001 (0.00)	-0.003 (0.00)	-0.002 (0.00)	0.003 (0.00)	0.006** (0.00)	-0.001 (0.00)	-0.006*** (0.00)	0.009*** (0.00)	0.006** (0.00)
LagConstraints Q4 × Sentiment	0.003 (0.00)	-0.002 (0.00)	-0.003 (0.00)	-0.011* (0.01)	0.003 (0.00)	0.010** (0.00)	-0.004 (0.00)	-0.009** (0.00)	0.015*** (0.00)	0.013*** (0.00)
LagConstraints Q5 × Sentiment	-0.005 (0.00)	-0.006 (0.00)	-0.016** (0.01)	-0.017*** (0.00)	0.014*** (0.00)	0.022*** (0.00)	-0.006 (0.00)	-0.007 (0.01)	0.015*** (0.00)	0.012** (0.01)
Observations	135830	135830	135830	135830	135830	135830	129405	129405	135830	135830
R^2	0.398	0.398	0.400	0.400	0.400	0.400	0.401	0.402	0.399	0.399

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Table IA.8: **Sentiment and Real Outcomes - Michigan Consumer Sentiment**
This table examines the relationship between firm real outcomes, sentiment, and constraints of equity-focused firms. We regress the firm outcome of interest on an interaction between the standardized University of Michigan Consumer Sentiment measure and dummies for the lagged quintiles of equity constraints. We include the quintile dummies independently as well (coefficients not reported for brevity). The outcomes of interest are equity issuance to lagged assets in columns 1–3, and capital expenditures to lagged property, plant and equipment in columns 4–6. In columns (1) and (4), we do not include controls. In the remaining regressions, we include the lagged logarithm of the firm's market capitalization, the lagged book-to-market, the lagged cash-to-assets ratio, and the lagged debt-to-assets ratio and each control variables' interaction with sentiment (coefficients not reported). We denote at the top of each column the model used to estimate equity constraints (either the full model or the model using "primitive" predictors). Both firm fixed effects and industry × year-quarter fixed effects are included in the regressions. The main effect of sentiment is absorbed by the fixed effects. Standard errors are clustered at the year and firm-level. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

|	Equity Iss./Assets			CAPX/k		
	(1)	(2)	(3)	(4)	(5)	(6)
Model:	Full	Full	"Primitive"	Full	Full	"Primitive"
Controls:	No	Yes	Yes	No	Yes	Yes
LagConstraints Q2 × Sentiment	0.000	0.001	-0.002	-0.001	-0.002	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LagConstraints Q3 × Sentiment	0.003	0.004	0.008	0.001	-0.003	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LagConstraints Q4 × Sentiment	0.010	0.011**	0.017***	0.002	-0.001	0.013**
	(0.01)	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)
LagConstraints Q5 × Sentiment	0.021	0.016*	0.021***	0.009	0.011	0.011*
	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Observations	191379	124497	124497	192274	125899	125899
R^2	0.387	0.365	0.365	0.323	0.402	0.403
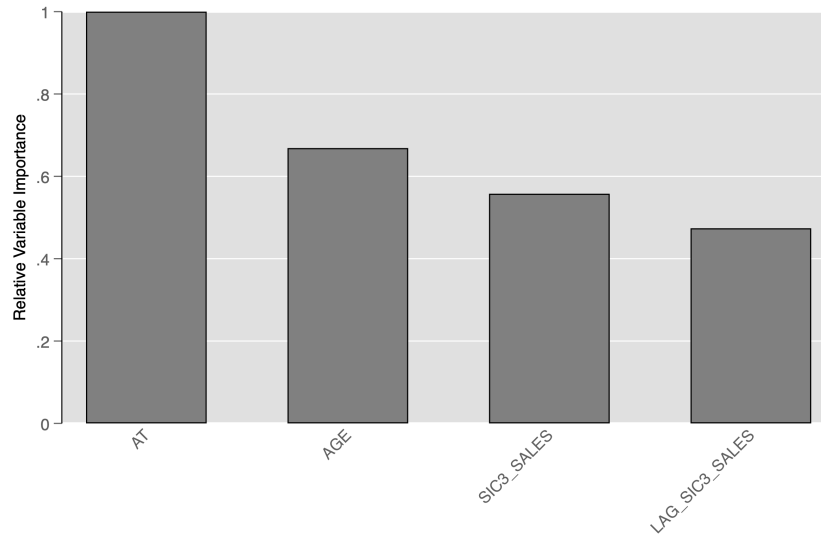
(a) Equity Constraints
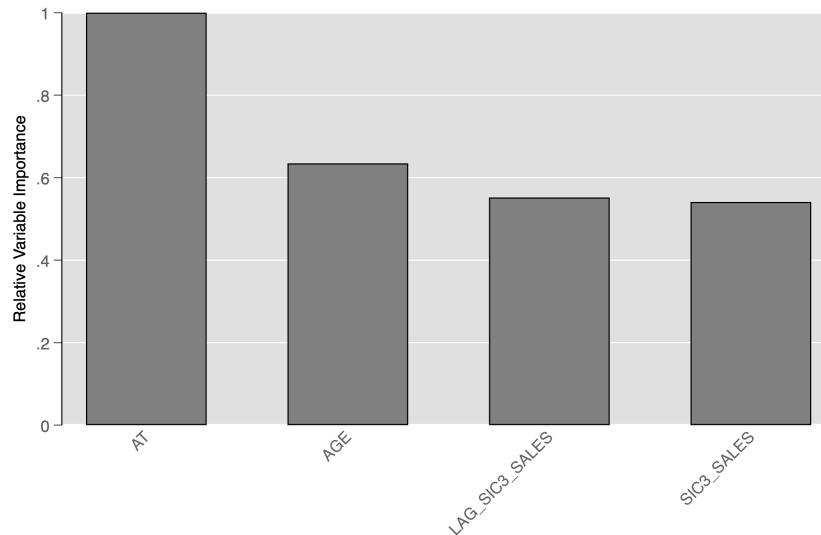
(b) Debt Constraints

Figure IA.1: **"Primitive" Predictor Variable Importance**
This figure depicts the relative importance of each predictor used in our "primitive" random forest model for equity constraints (Panel A) and debt constraints (Panel B). Variable importance is based on the average reduction in variance for each predictor variable. We normalize the variable importance of each predictor by the importance measure of the predictor with the highest importance.
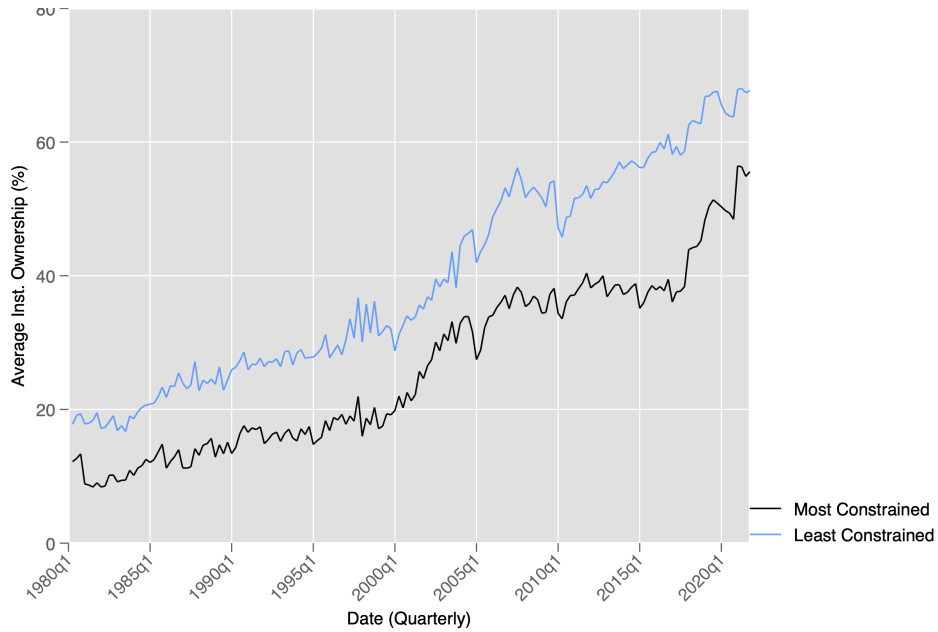
(a) Full Random Forest Model Equity Constraints
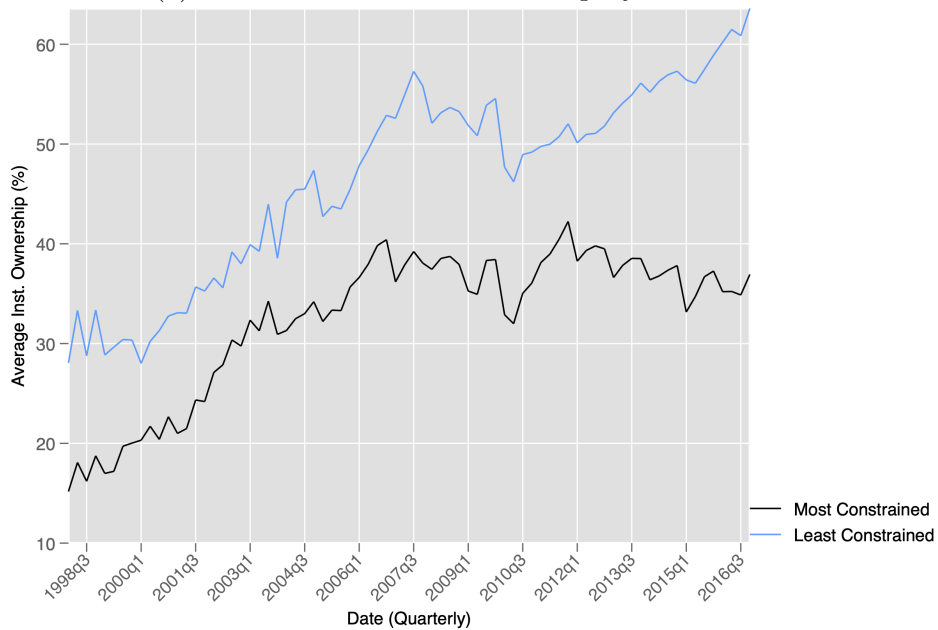
(b) Hoberg and Maksimovic (2015) Equity Constraints

Figure IA.2: **Institutional Ownership and Equity Constraints Over Time - Alternative Constraint Measures**

This figure shows the average ownership of institutions for firms in the top and bottom quintiles of equity constraints. Each year firms are sorted by their previous year equity constraint quintile. In the main text, we present the results using the full random forest model. Here, we present the results using the "Primitive" model (Panel A) and the Hoberg and Maksimovic (2015) measures (Panel B).

References

Baker, M. and Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *The Journal of Finance*, 61(4):1645–1680.

Bodnaruk, A., Loughran, T., and McDonald, B. (2015). Using 10-K Text to Gauge Financial Constraints. *Journal of Financial and Quantitative Analysis*, 50(4):623–646.

Farre-Mensa, J. and Ljungqvist, A. (2016). Do Measures of Financial Constraints Measure Financial Constraints? *The Review of Financial Studies*, 29(2):271–308.

Hoberg, G. and Maksimovic, V. (2015). Redefining Financial Constraints: A Text-Based Analysis. *Review of Financial Studies*, 28(5):1312–1352.