Web Appendix for Investment, Idiosyncratic Risk, and Ownership

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March 13, 2011

Table 1: Sales to large customers: descriptive statistics

Variable	Ncust	Csale/sales	H
Mean	0.790	0.140	0.045
Std. Dev.	1.293	0.238	0.118
25%	0	0	0
50%	1	0.045	0.001
75%	2	0.320	0.059
90%	4	0.630	0.202
95%	9	0.801	0.348

Table reports results on the distribution of the number of customers (Ncust), the ratio of reported customer sales to total firm sales (Csale/sales) and our concentration measure (H). We report unconditional means, standard deviations and selected percentiles for our entire sample of firms in the 1976-2005 period.

Table 2: Sales to large customers: by industry

Industry	ncust	Csale/sales	H
Consumer Non Durables	0.724	0.120	0.034
Consumer Durables	0.989	0.169	0.049
Manufacturing	0.805	0.126	0.035
Energy	1.136	0.226	0.075
Chemicals and Allied Products	0.737	0.100	0.028
Business Equipment	0.971	0.173	0.051
Telephone and Television Transmission	0.359	0.052	0.014
Wholesale, Retail, and Some Services	0.344	0.049	0.015
Healthcare	0.820	0.187	0.079
Other	0.694	0.120	0.041

Table reports results on the average number of customers (Ncust), the ratio of reported customer sales to total firm sales (Csale/sales) and our concentration measure (H) for firms in different industries. We use the Fama and French (1997) 12-industry classification, excluding financials and utilities. The sample period is 1976-2005.

Table 3: Characteristics of firms sorted on volatility and customer concentration

Idiosyncratic volatility sort	H sort	means				
		σ	H	I/K	Q	CF/K
L	L	22.74	0.00	9.18	1.14	14.89
	M	24.55	0.07	8.76	2.33	21.04
	H	24.07	2.52	9.06	1.21	14.91
2	L	31.25	0.00	10.77	1.18	15.72
	M	32.72	0.17	12.19	1.92	20.30
	H	32.84	4.19	10.49	1.25	15.21
3	L	40.09	0.00	11.90	1.46	14.75
	M	42.85	0.57	13.61	1.91	17.87
	H	42.26	6.27	11.70	1.51	14.07
4	L	51.05	0.00	11.18	1.68	10.24
	M	53.97	1.08	10.50	2.05	11.41
	H	52.62	8.67	11.26	2.01	9.48
H	L	68.09	0.00	8.25	1.93	-0.75
	M	71.41	1.50	7.82	2.06	-0.01
	H	70.82	10.45	8.02	2.02	-0.44

Table reports results on the average investment rate (I/K), Tobin's Q (Q) and profitability (CF/K) conditional on the level of idiosyncratic volatility (σ) and our customer concentration measure H. We first group firms into five quintiles based on the level of idiosyncratic volatility. Within each quintile, we group firms on terciles based on the level of customer concentration. The sample period is 1976-2005.

Table 4: Effect of insider ownership: alternative measures

I_t/K_{t-1}	(1)	(2)	(3)	(4)
$INSD_L \times \log(\sigma_{i,t-1})$	0.00927	0.0145	-0.00540	-0.0122
	(0.54)	(0.82)	(-0.62)	(-1.34)
$INSD_2 \times \log(\sigma_{i,t-1})$	-0.0129	-0.0140	-0.0279	-0.0144
	(-0.64)	(-0.71)	(-3.25)	(-1.82)
$INSD_3 \times \log(\sigma_{i,t-1})$	-0.00810	-0.00753	-0.0432	-0.0218
	(-0.44)	(-0.42)	(-4.23)	(-2.17)
$INSD_4 \times \log(\sigma_{i,t-1})$	-0.0122	-0.0250	-0.0282	-0.0106
	(-0.52)	(-1.20)	(-2.27)	(-0.97)
$INSD_H \times \log(\sigma_{i,t-1})$	-0.0356	-0.0333	-0.0296	-0.0277
	(-1.54)	(-1.68)	(-2.06)	(-2.21)
$INSD_H - INSD_L$	-0.0448	-0.0478	-0.0242	-0.0156
	0.029	0.012	0.065	0.195
Observations	14444	14444	31425	31425
Ownership measure	CEO	CEO	CSTAT	CSTAT
Fixed Effects	I	I, T	I	I, T
Controls	N	Y	N	Y

Table 4 reports estimation results of Equation (**??**) for firms with different levels of insider ownership using alternative measures. The first measure (CEO) uses data on ownership from Thomson Financial and contains all Table 1 transaction and holdings information filed on Forms $3, 4$ and 5. We restrict attention to insiders with role codes CEO, CFO, CI and CO. The sample period is $1986 - 2005$. The second measure (CSTAT) uses data on ownership from the COMPUSTAT executive compensation database. The sample period is $1992 - 2005$. We use the variables SHARES_EXCL_OPTS and SHARES_TOT when available.

Table 5: Alternative measures of growth opportunities and systematic volatility

I_t/K_{t-1}	Q^{ibes}		β^{imc}		$\beta^{imc} + Q^{ibes}$	
$\log(\sigma_{i,t-1})$	-0.0213	-0.0078	-0.0569	-0.0184	-0.0091	-0.0125
	(-5.69)	(-1.77)	(-18.23)	(-5.14)	(-2.07)	(-2.90)
$\log(\sigma^{syst}_{i,t-1})$	0.0070	-0.0032	0.0170	-0.0146	0.0003	-0.0039
	(4.11)	(-1.61)	(11.15)	(-2.31)	(0.16)	(-1.76)
Q^{ibes}_{t-1}	0.0429	0.0315			0.0247	0.0122
	(16.55)	(1.54)			(5.98)	(1.00)
β^{imc}_{t-1}			0.0041	0.0327	0.0015	0.0025
			(4.08)	(2.23)	(0.87)	(1.12)
$\log(Q_{t-1})$					0.0511	0.0120
					(14.84)	(1.06)
Observations	33626	22678	76981	52801	24902	16839
AR(2) test (p-value)		0.832		0.787		0.101
Sargan J-test (p-value)		0.139		0.272		0.118
Fixed Effects	F,T	F,T	F,T	F,T	F,T	F,T
Controls	Y	Y	Y	Y	Y	Y
Estimation Method	OLS	GMM	OLS	GMM	OLS	GMM

Table 5 reports estimation results of a modified version equation (**??**), where the dependent variable is the investment rate (I_t/K_{t-1}). Q^{ibes} is constructed from analysts' forecasts as in Cummins, Hassett and Oliner (2006). β^{imc} refers the firm's univariate beta with a portfolio long the capital-producing sector and short the consumption-producing sector (IMC), see Kogan and Papanikolaou (2010) for more details. Columns 1,3 and 5 presents estimation results using OLS. columns 2, 4 and 6 present estimation results using the Arrellano-Bond estimator, where the lagged investment rate is included in the specification. We report the LM-test of second-order serial correlation and the Sargan J-test of over-identifying restrictions.

Table 6: Effect of insider ownership: Instrumental Variables

I_t/K_{t-1}	(1)	(2)	(3)	(4)
$INSD_L \times \log(\sigma_{i,t-1})$	-0.0592	-0.0402	-0.0815	-0.0291
	(-1.98)	(-1.14)	(-2.16)	(-0.68)
$INSD_2 \times \log(\sigma_{i,t-1})$	-0.0976	-0.0622	-0.1427	-0.0756
	(-2.70)	(-1.56)	(-3.15)	(-1.61)
$INSD_3 \times \log(\sigma_{i,t-1})$	-0.1141	-0.0671	-0.1391	-0.0564
	(-2.53)	(-1.35)	(-2.31)	(-0.88)
$INSD_4 \times \log(\sigma_{i,t-1})$	-0.1095	-0.1009	-0.1485	-0.1172
	(-2.26)	(-2.10)	(-2.27)	(-1.91)
$INSD_H \times \log(\sigma_{i,t-1})$	-0.2315	-0.2098	-0.2854	-0.2280
	(-3.73)	(-3.01)	(-3.78)	(-2.91)
$INSD_H \times \log(\sigma_{i,t-1})$	-0.1723	-0.1696	-0.2039	-0.1988
	(0.005)	(0.015)	(0.006)	(0.013)
Observations	41017	41017	32462	32462
Kleibergen-Paap rk Wald F statistic	16.572	15.375	17.783	14.271
Fixed Effects	I	I, T	I	I, T
Controls	N	Y	N	Y
Option-adjusted Ownership	N	N	Y	Y

Table 6 reports estimation results of Equation (**??**) for firms with different levels of insider ownership using instrumental variables. We instrument our baseline measure of idiosyncratic risk (σ_{t-1}) with the concentration of a firm's customer base, $H_{i,t}$, constructed using customer data from the COMPUSTAT segment files (see text for details). Depending on the specification, we include Industry (I) and/or year (T) fixed effects. In all columns we include the lagged investment rate and the firm's total sales (scaled by industry sales at the 3-digit sic level) as controls. In columns 2 and 4 we include additional controls: Tobin's Q, operating cashflows, the firm's stock return, and leverage (see notes to Table **??** for details). The standard errors are clustered at the firm-level, and t-statistics are reported in parenthesis. We report the Kleibergen-Paap rk LM test of weak instruments along with the p-value.

Table 7: Effect of Insider Ownership, controlling for market power

I/K	(1)	(2)	(3)	(4)	(5)	(6)
$INSD_L \times \log(\sigma_{i,t-1})$	-0.0061	-0.0037	0.0104	0.0030	-0.0075	-0.0013
	(-0.67)	(-0.45)	(0.87)	(0.24)	(-0.96)	(-0.16)
$INSD_2 \times \log(\sigma_{i,t-1})$	-0.0183	-0.0064	0.0147	-0.0014	-0.0185	-0.0073
	(-2.00)	(-0.69)	(1.16)	(-0.11)	(-2.52)	(-1.00)
$INSD_3 \times \log(\sigma_{i,t-1})$	-0.0257	-0.0161	-0.0122	-0.0283	-0.0253	-0.0156
	(-2.60)	(-1.72)	(-0.92)	(-2.06)	(-2.64)	(-1.60)
$INSD_4 \times \log(\sigma_{i,t-1})$	-0.0299	-0.0085	-0.0050	-0.0040	-0.0355	-0.0142
	(-3.21)	(-0.95)	(-0.36)	(-0.32)	(-3.77)	(-1.56)
$INSD_H \times \log(\sigma_{i,t-1})$	-0.0461	-0.0326	-0.0058	-0.0248	-0.0359	-0.0307
	(-4.28)	(-3.20)	(-0.40)	(-1.88)	(-3.04)	(-2.95)
$INSD_H - INSD_L$	-0.0400	-0.0289	-0.0162	-0.0278	-0.0284	-0.0294
(p-value)	0.0003	0.0049	0.2471	0.0371	0.0116	0.0047
Observations	41206	41206	18319	18319	41055	41055
Measure of market power	S/I	S/I	S/C	S/C	PM	PM
Fixed Effects	F	F, T	F	F, T	F	F, T
Controls	N	Y	N	Y	N	Y

Table 7 reports estimation results of equation (**??**) separately for firms with different levels of insider ownership, controlling for market power. Every year, we sort firms into 5×5 groups: based on the degree of market power and then on the level of insider ownership. We use three measures of market power: i) the ratio of the firm's sales relative to the industry sales (S/I), where the industry is defined at the 3-digit sic code level; ii) the ratio of the firm's sales relative to it's competitors in the product market (S/C), using the VIC classification of Hoberg and Phillips (2010); iii) the firm's profit margin (PM), defined as the ratio of operating cashflows (data14+data18) to total sales (data12). The sample period is $1987 - 2005$. Depending on the specification, we include Firm (F), and/or year (T) fixed effects. The set of controls includes Tobin's Q, operating cashflows, firm size, the firm's stock return, and leverage (see notes to Table **??** for details). We interact time and firm fixed effects with quintile dummies. The standard errors are clustered at the firm-level, and t-statistics are reported in parenthesis. We report the difference in coefficients on idiosyncratic risk across quintiles 1 and 5 and the associated Chow-test p-value for the null hypothesis that the coefficients are equal.

Table 8: Effect of Financial Constraints

I/K	(1)	(2)	(3)	(4)
$FINCON_L \times \log(\sigma_{i,t-1})$	-0.0168	-0.0105	-0.0031	-0.0005
	(-4.38)	(-3.05)	(-0.53)	(-0.09)
$FINCON_2 \times \log(\sigma_{i,t-1})$	-0.0287	-0.0156	-0.0096	-0.0092
	(-5.81)	(-3.41)	(-1.97)	(-1.69)
$FINCON_3 \times \log(\sigma_{i,t-1})$	-0.0306	-0.0144	-0.0187	-0.0063
	(-5.43)	(-2.80)	(-2.76)	(-0.84)
$FINCON_4 \times \log(\sigma_{i,t-1})$	-0.0577	-0.0158	-0.0503	-0.0230
	(-8.73)	(-2.59)	(-5.00)	(-2.35)
$FINCON_H \times \log(\sigma_{i,t-1})$	-0.0487	-0.0210	-0.0394	-0.0215
	(-6.81)	(-3.22)	(-13.99)	(-8.20)
$FINCON_H - FINCON_L$	-0.0319	-0.0105	-0.0362	-0.0210
(p-value)	0.000	0.152	0.000	0.000
Observations	103888	103888	103914	103914
Fin. Const. Measure	WW	WW	Rating	Rating
Fixed Effects	F	F, T	F	F, T
Controls	N	Y	N	Y

Table 8 reports estimation results of Equation (**??**) separately for firms with different degree of financial constraints. We use two measures of financial constraints: the Whited and Wu (2006) index (WW), and the firm's S&P credit rating. We split firms into 5 groups: group 1 contains firms rated AA- or better, group 2 contains firms rated A, group 3 contains firms rated BBB, group 4 contains firms rated BB+ or worse and group 5 contains unrated firms. The sample period is $1970 - 2005$. Depending on the specification, we include Firm (F), Industry (I) and/or year (T) fixed effects. The set of controls includes Tobin's Q, operating cashflows, firm size, the firm's stock return, and leverage (see notes to Table **??** for details). We interact time and firm fixed effects with quintile dummies. The standard errors are clustered at the firm-level, and t-statistics are reported in parenthesis. We report the difference in coefficients on idiosyncratic risk across quintiles 1 and 5 and the associated Chow-test p-value for the null hypothesis that the coefficients are equal.

Table 9: Effect of Financial Constraints - IV estimation

I/K	(1)	(2)	(3)	(4)
$FINCON_L \times \log(\sigma_{i,t-1})$	-0.0794	-0.1427	-0.0954	-0.0323
	(-1.46)	(-1.75)	(-0.90)	(-0.29)
$FINCON_2 \times \log(\sigma_{i,t-1})$	-0.0725	-0.1720	-0.2090	-0.1344
	(-1.53)	(-2.25)	(-1.81)	(-1.00)
$FINCON_3 \times \log(\sigma_{i,t-1})$	-0.1581	-0.3815	-0.3289	-0.3098
	(-3.19)	(-4.18)	(-0.97)	(-0.51)
$FINCON_4 \times \log(\sigma_{i,t-1})$	-0.1992	-0.4455	-0.0476	-0.0256
	(-3.87)	(-4.67)	(-0.32)	(-0.18)
$FINCON_H \times \log(\sigma_{i,t-1})$	-0.4145	-0.8183	-0.1384	-0.2086
	(-5.65)	(-5.22)	(-7.43)	(-7.37)
$FINCON_H - FINCON_L$	-0.335	-0.676	-0.0430	-0.176
	0.000	0.000	0.686	0.098
Observations	90424	90424	90471	90471
Fin. Const. Measure	WW	WW	Rating	Rating
Fixed Effects	F	F, T	F	F, T
Controls A	Y	Y	Y	Y
Controls B	N	Y	N	Y

Table 9 reports estimation results of Equation (**??**) separately for firms with different degree of financial constraints using instrumented variables. For the left panel, we sort firms every year, into quintiles based on the value of the Whited and Wu (2006) index. The right panel reports estimation results of Equation (**??**) separately for firms with and without rated debt. The data on credit ratings are from Standard and Poor's. The sample period is $1970 - 2005$. The dependent variable is the investment rate (I_t/K_{t-1}). The regressors include lagged values of our baseline measure of idiosyncratic volatility (σ_{t-1}), Tobin's Q (Q_{t-1}), operating cashflows (CF_{t-1}/K_{t-2}), the firm's capital stock relative to the aggregate ($\hat{K}_{t-1} = K_{i,t}/\frac{1}{N_f}\sum_i^{N_f} K_{i,t}$), the firm's stock return (R_{t-1}), and leverage (E_{t-1}/A_{t-1}), sales (S_{t-1}/K_{t-2}), and the investment rate (I_{t-1}/K_{t-2}). The top panel forces the coefficients on controls to not depend on the quintile of insider ownership, the bottom panel allows the coefficients on controls to vary with the quintile of ownership. The standard errors are clustered at the firm-level, and t-statistics are reported in parenthesis. We report the Chow χ^2 test and the associated p-value for the null that the coefficient on idiosyncratic volatility, σ_{t-1}, is the same for quintiles 1 and 5.

Table 10: Summary Statistics: 5 Portfolios Sorted on Insider Ownership, controlling for market power or financial constraints

	Insider Ownership				
MP×OWN	**1**	**2**	**3**	**4**	**5**
Insider Ownership (%)	0.06	0.34	1.10	3.53	17.49
Sales / industry sales (%)	0.74	0.76	0.79	0.74	0.76
MP(vic)×OWN	**1**	**2**	**3**	**4**	**5**
Insider Ownership (%)	0.06	0.39	1.26	4.02	18.38
Sales / competitor sales (%)	0.36	0.37	0.36	0.35	0.35
PM×OWN	**1**	**2**	**3**	**4**	**5**
Insider Ownership (%)	0.06	0.32	1.01	3.41	17.47
Profit Margin (%)	6.95	7.07	6.96	7.02	6.91
WW×OWN	**1**	**2**	**3**	**4**	**5**
Insider Ownership (%)	0.06	0.40	1.25	3.71	17.39
Whited-Wu index (%)	-24.44	-25.26	-25.28	-24.87	-24.16

Table 10 shows time-series averages of characteristics of the 5 portfolios sorted by levels of insider ownership (OWN), controlling for market power or financial constraints. Every year, we sort firms into 5×5 groups: based on a firm characteristic and then on the level of insider ownership. We use the following charcteristics: i) the ratio of the firm's sales relative to the industry sales (MP), where the industry is defined at the 3-digit sic code level; ii) the ratio of the firm's sales relative to it's competitors in the product market (MP(vic)), using the VIC classification of Hoberg and Phillips (2010); iii) the firm's profit margin (PM), defined as the ratio of operating cashflows (data14+data18) to total sales (data12); iv) the Whited and Wu (2006) index (WW). We report the time-series average of median portfolio characteristics. The sample period is $1986 - 2005$.

Table 11: Summary Statistics: 3 Portfolios Sorted on Insider Ownership, controlling for investment irreversibility and market power or industry competition

	Insider Ownership		
IRREV1×COMP×OWN	**1**	**2**	**3**
Insider Ownership (%)	0.15	0.95	8.55
Herfindahl Index	12.44	12.37	12.16
Used capital price discount	29.47	25.66	26.61
IRREV2×COMP×OWN	**1**	**2**	**3**
Insider Ownership (%)	0.12	1.01	9.18
Herfindahl Index	14.24	14.30	14.15
Industry beta	0.41	0.38	0.38
IRREV3×COMP×OWN	**1**	**2**	**3**
Insider Ownership (%)	0.12	1.01	9.15
Herfindahl Index	14.23	14.19	14.09
Depreciation rate (%)	11.94	12.19	12.11
IRREV4×COMP×OWN	**1**	**2**	**3**
Insider Ownership (%)	0.12	1.02	9.17
Herfindahl Index	14.09	14.09	14.10
I_{new}/I_{total} (%)	95.86	95.86	95.87
IRREV5×COMP×OWN	**1**	**2**	**3**
Insider Ownership (%)	0.12	1.01	9.09
Herfindahl Index	14.01	14.24	14.15
Capital Sales / Capital (%)	2.09	2.07	2.08

	Insider Ownership		
IRREV1×MP×OWN	**1**	**2**	**3**
Insider Ownership (%)	0.15	0.93	8.26
Sales / industry sales (%)	0.72	0.61	0.63
Used capital price discount	37.64	28.60	29.66
IRREV2×MP×OWN	**1**	**2**	**3**
Insider Ownership (%)	0.12	1.06	9.21
Sales / industry sales (%)	0.78	0.76	0.77
Industry beta	0.40	0.39	0.38
IRREV3×MP×OWN	**1**	**2**	**3**
Insider Ownership (%)	0.12	1.03	9.20
Sales / industry sales (%)	0.79	0.76	0.78
Depreciation rate (%)	12.15	12.25	12.13
IRREV4×MP×OWN	**1**	**2**	**3**
Insider Ownership (%)	0.12	1.03	9.20
Sales / industry sales (%)	0.77	0.77	0.75
I_{new}/I_{total} (%)	95.86	95.86	95.92
IRREV5×MP×OWN	**1**	**2**	**3**
Insider Ownership (%)	0.12	1.04	9.11
Sales / industry sales (%)	0.77	0.77	0.76
Capital Sales / Capital (%)	2.08	2.06	2.10

Table 11 shows time-series averages of characteristics of the 3 portfolios sorted by levels of insider ownership (OWN), controlling for the degree of investment irreversibility and industry competition or firm market power. Every year, we sort firms into $3 \times 3 \times 3$ groups: based on the degree of industry irreversibility, then on the degree of firm market power (top panel) or industry competition (bottom panel) and then on the level of insider ownership. We use 5 measures of investment irreversibility: age-adjusted price discount between new and old capital (IRREV1) using data from Ramey and Shapiro (2001), the mean depreciation rate of the industry (IRREV2), the firm's beta with the corresponding industry portfolio (IRREV3), the ratio of new to used investment at the industry level from the Census Bureau (IRREV4) and the average ratio of sales of property plant and equipment to capital for the industry during the 1970-80 period (IRREV5). We use the Herfindahl index as a measure of industry competition (COMP) and the ratio of firm sales to total industry sales as a measure of firm market power (MP). Industries are defined at the 3-digit SIC code. We report the time-series average of median portfolio characteristics. The sample period is $1987 - 2005$.

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