Valuation waves and merger activity: The empirical evidence

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March 22, 2025

Overview

Why M&A happen

Methodologies

Empirical results

Discussion

Why M&A happen

Benefits

- Neoclassical view: asset redeploy to more prodcutive use
- Alternative: misvaluation

Who buys whom?

- RKV: misvaluation correlates with misinformation
- SV: target manager exploit SR misvaluation

Relative value prediction

Overvalued firms use stock to buy relatively undervalued firms when both firms are overvalued.

- SV: Only more overvalued firms have room in stock price to pay for a overvalued firm.
- RKV: Target is a Bayesian that have a prior that put more synergies, caused by a market-wide overvaluation. (implication: target unable to tell a firm specific overvaluation from potential synergies)

Relative value prediction

Overall merger activity will be higher in overvalued markets. On average, firms in overvalued sectors should use stock to buy firms in relatively less overvalued sectors

- SV: Cahs buyout only happen for undervalued target.
- RKV: Cash target still happen when synergies outweigh overvaluation.

From above:
Cash targets are more undervalued than stock targets. Cash acquirers are less overvalued than stock acquirers

Merger intensity predictions

firm level:

Increasing misvaluation increases the probability that a firm is in a merger, is the acquirer, and uses stock as the method of payment

- SV: The more overvalued, the more likely to win a bid.
- RKV: plus: probability of being a target also increase with sector-wide overvaluation.

sector level:

Increasing sector misvaluation increases merger activity, and the use of stock as method of payment, in that sector

Characteristics of merger sample

Year	Acquirers	Targets	All stock	All cash	Mixed	Mean size
1977	11	9	4	7	0	434.7
1978	11	11	1	4	0	88.3
1979	18	21	0	3	0	310.2
1980	61	44	1	4	0	856.5
1981	63	55	0	0	0	270.6
1982	95	94	2	9	1	307.8
1983	104	109	7	34	4	251.6
1984	113	110	17	55	16	406.2
1985	144	145	14	81	15	300.1
1986	164	168	25	95	25	273.7
1987	141	135	20	70	18	175.0
1988	141	123	28	66	15	362.6
1989	101	103	19	49	13	274.4
1990	108	90	31	32	16	233.8
1991	99	83	24	43	16	227.9
1992	170	147	51	69	27	460.4
1993	255	219	96	98	34	259.5
1994	315	284	100	124	58	568.8
1995	367	342	141	116	78	716.7
1996	413	411	157	116	103	713.4
1997	426	409	154	127	104	1840.1
1998	451	410	160	160	104	1420.9
1999	395	363	124	137	95	1665.7
2000	159	140	42	43	57	993.9
Total	4,325	4,025	1,218	1,542	799	839.4

Figure 1: Characteristics of merger sample

Characteristics of merger and nonmerger firms

Variable	Nonmerger	Merger	*t*(diff)	Target	Acquirer	*t*(diff)
Sample size	102,527	8,350		4,025	4,325	
Size measures						
Market value (assets)	2700.32	10743.50	−17.62	2425.89	18486.55	−18.66
Book assets	2352.61	6936.98	−14.95	2017.70	11516.44	−16.44
Market equity	889.40	5421.84	−16.15	789.94	9733.78	−16.79
Book equity	487.24	1467.56	−19.13	338.49	2518.64	−22.85
PP&E	515.42	1121.06	−12.52	319.76	1869.88	−17.06
Long-term debt	377.09	976.55	−12.65	308.85	1596.73	−14.53
Capital expenditure	93.97	271.89	−13.02	66.67	466.12	−15.37
Net income	53.72	223.37	−17.17	32.09	401.63	−19.90
Performance measures						
Return on assets	0.0267	0.0297	−1.78	0.005	0.052	−14.98
Return onequity	0.0796	0.1019	−6.97	0.046	0.152	−17.46
Market/book	2.75	3.13	−9.86	2.81	3.43	−7.89
Leverage measures						
Leverage (book)	0.54	0.58	−14.09	0.56	0.59	−7.00
Leverage (market)	0.43	0.44	−3.16	0.44	0.44	0.08
Quick ratio	2.46	2.21	5.25	2.42	2.00	5.43
Current ratio	3.15	2.76	7.97	3.01	2.52	6.17

Figure 2: Characteristics of merger and nonmerger firms

Industrycharacteristics used in subsequent valuation models

Industry	Observations per year			Average multiples		Average market equity	Merger activity		
	Mean	Min.	Max.	p/e	M/B		Acquirers	Targets	Total
(1) Consumer nondurables	406	336	495	19.37	2.43	792.1	242	196	438
(2) Consumer durables	180	142	227	15.99	2.45	1033.4	106	99	205
(3) Manufacturing	796	639	904	16.51	2.44	445.4	453	377	830
(4) Energy	323	205	477	23.52	3.83	1454.4	161	141	302
(5) Chemicals	144	115	174	16.85	5.79	1211.7	104	80	184
(6) Computers, software, etc.	1,037	388	1,811	19.05	5.48	780	788	782	1570
(7) Telephone and TV	165	66	333	31.53	6.96	3948.8	233	156	389
(8) Utilities	191	103	222	12.74	1.5	987.4	103	84	187
(9) Wholesale	687	532	883	22.47	2.81	430.1	286	331	617
(10) Medical	489	133	838	17.57	8.29	1205.4	401	378	779
(11) Finance	630	298	897	16.9	6.42	812.5	983	908	1891
(12) Everything else	914	521	1,268	17.43	3.9	552.7	465	493	958

Methodologies

Decomposing market to book

Market value $\rightarrow$ true value $\rightarrow$ book value
$m - b = (m - v) + (v - b)$ Log-linear

- firm-specific error
- time-series sector error
- long-run value to book

$$m_{i,t} - b_{i,t} = m_{i,t} - v(\theta_{i,t}; \alpha_{j,t}) + v(\theta_{i,t}; \alpha_{j,t}) - v(\theta_{i,t}; \alpha_j) - v(\theta_{i,t}; \alpha_j) - b_{i,t} \quad (1)$$

$\theta_{i,t}$: firm-specific accounting information (fundamental)

Estimating market value

FCF measure

$$M_t = \int_t^{\infty} e^{-\int_t^{\tau} r(\eta) d\eta} \mathbf{FCF} d\tau \tag{2}$$

market value = book value + EVA RI: residual income

$$M_t = B_t + \int_t^{\infty} e^{-\int_t^{\tau} r(\eta) d\eta} \mathbf{RI} d\tau \tag{3}$$

RI = ROE - CoC

$$M_t = B_t + E_t \sum_{\tau=t+1}^{\infty} \frac{ROE_\tau - r_\tau B_{\tau-1}}{(1+r_\tau)^\tau} \tag{4}$$

Model 1: market value and book value

Identifying restriction

1. $E_t(ROE_t) = \lambda E_t r_\tau$
2. B_t grows at a constant rate

$$m_{i,t} = \alpha_{0,j,t} + \alpha_{1,j,t} b_{i,t} + \epsilon_{i,t} \tag{5}$$

$\alpha_{0,j,t}$: value of intangibles in average firm in industry j.

$$v(B_{i,t}; \hat{\alpha}_{0,j,t}, \hat{\alpha}_{1,j,t}) = \hat{\alpha}_{0,j,t} + \hat{\alpha}_{1,j,t} b_{i,t} \tag{6}$$

$$v(B_{i,t}; \bar{\alpha}_{0,j,t}, \bar{\alpha}_{1,j,t}) = \bar{\alpha}_{1,j,t} + \bar{\alpha}_{1,j,t} b_{i,t} \tag{7}$$

Model 2: market value, book value, and net income

Identifying restriction
Net income grows at a constant rate

$$m_{i,t} = \alpha_{0,j,t} + \alpha_{1,j,t} b_{i,t} + \alpha_{2,j,t} ln(NI)^{+}_{i,t} + \alpha_{3,j,t} I_{(<0)} ln(NI)^{+}_{i,t} + \epsilon_{i,t} \tag{8}$$

$$v(B_{i,t}; \hat{\alpha}_{0,j,t}, \hat{\alpha}_{1,j,t}, \hat{\alpha}_{2,j,t}, \hat{\alpha}_{3,j,t}) = \hat{\alpha}_{0,j,t} + \hat{\alpha}_{1,j,t} b_{i,t} + \hat{\alpha}_{2,j,t} ln(NI)^{+}_{i,t} + \hat{\alpha}_{3,j,t} I_{(<0)} ln(NI)^{+}_{i,t} \tag{9}$$

$$v(B_{i,t}; \bar{\alpha}_{0,j,t}, \bar{\alpha}_{1,j,t}, \bar{\alpha}_{2,j,t}, \bar{\alpha}_{3,j,t}) = \bar{\alpha}_{0,j,t} + \bar{\alpha}_{1,j,t} b_{i,t} + \bar{\alpha}_{2,j,t} ln(NI)^{+}_{i,t} + \bar{\alpha}_{3,j,t} I_{(<0)} ln(NI)^{+}_{i,t} \tag{10}$$

Model 3: market value, book value, net income and leverage

Identifying restriction
Leverage affects CoC

$$m_{i,t} = \alpha_{0,j,t} + \alpha_{1,j,t} b_{i,t} + \alpha_{2,j,t} ln(NI)^{+}_{i,t} + \alpha_{3,j,t} I_{(<0)} ln(NI)^{+}_{i,t} + \alpha_{4,j,t} LEV + \epsilon_{i,t} \quad (11)$$

$$v(B_{i,t}; \hat{\alpha}_{0,j,t}, \hat{\alpha}_{1,j,t}, \hat{\alpha}_{2,j,t}, \hat{\alpha}_{3,j,t}) = \hat{\alpha}_{0,j,t} + \hat{\alpha}_{1,j,t} b_{i,t} + \hat{\alpha}_{2,j,t} ln(NI)^{+}_{i,t} + \hat{\alpha}_{3,j,t} I_{(<0)} ln(NI)^{+}_{i,t} + \hat{\alpha}_{4,j,t} L \quad (12)$$

$$v(B_{i,t}; \bar{\alpha}_{0,j,t}, \bar{\alpha}_{1,j,t}, \bar{\alpha}_{2,j,t}, \bar{\alpha}_{3,j,t}) = \bar{\alpha}_{0,j,t} + \bar{\alpha}_{1,j,t} b_{i,t} + \bar{\alpha}_{2,j,t} ln(NI)^{+}_{i,t} + \bar{\alpha}_{3,j,t} I_{(<0)} ln(NI)^{+}_{i,t} + \bar{\alpha}_{4,j,t} L \quad (13)$$

Conditional regression multiples

	Fama and French industry classification											
Parameter	1	2	3	4	5	6	7	8	9	10	11	12
Model 1: $m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \varepsilon_i$												
$E_t(\hat{\alpha}_0)$	0.98	1.65	1.19	1.46	1.47	1.70	2.06	0.66	1.13	1.97	1.16	1.70
	0.06	0.11	0.06	0.08	0.09	0.07	0.12	0.10	0.07	0.05	0.07	0.05
$E_t(\hat{\alpha}_1)$	0.87	0.71	0.81	0.79	0.83	0.77	0.74	0.92	0.85	0.77	0.80	0.72
	0.01	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
R^2	0.68	0.65	0.74	0.80	0.77	0.68	0.76	0.88	0.72	0.73	0.75	0.65
Model 2: $m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} ni_{it}^{+} + \alpha_{3jt} (I_{(<0)} ni^{+})_{it} + \varepsilon_i$												
$E_t(\hat{\alpha}_0)$	1.86	2.39	1.79	1.87	2.26	2.24	2.31	1.21	1.87	2.29	1.83	2.17
	0.06	0.13	0.05	0.08	0.06	0.07	0.07	0.09	0.06	0.06	0.05	0.05
$E_t(\hat{\alpha}_1)$	0.47	0.35	0.51	0.62	0.39	0.49	0.55	0.66	0.50	0.54	0.49	0.48
	0.02	0.03	0.02	0.02	0.03	0.03	0.03	0.04	0.02	0.02	0.02	0.01
$E_t(\hat{\alpha}_2)$	0.38	0.38	0.33	0.18	0.46	0.33	0.21	0.27	0.37	0.28	0.32	0.26
	0.02	0.02	0.02	0.02	0.04	0.02	0.05	0.04	0.02	0.02	0.01	0.01
$E_t(\hat{\alpha}_3)$	−0.35	−0.35	−0.22	−0.15	−0.23	−0.22	0.18	−0.03	−0.25	0.02	−0.14	−0.18
	0.04	0.10	0.04	0.04	0.07	0.04	0.06	0.04	0.05	0.05	0.06	0.05
R^2	0.73	0.71	0.78	0.82	0.82	0.73	0.79	0.89	0.77	0.77	0.79	0.68
Model 3: $m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} ni_{it}^{+} + \alpha_{3jt} I_{(<0)} (ni^{+})_{it} + \alpha_{4jt} \mathrm{Lev}_{it} + \varepsilon_i$												
$E_t(\hat{\alpha}_0)$	2.39	2.56	2.20	2.35	2.38	2.55	2.91	2.15	2.44	2.68	2.21	2.60
	0.04	0.11	0.05	0.06	0.11	0.05	0.10	0.13	0.05	0.04	0.04	0.05
$E_t(\hat{\alpha}_1)$	0.64	0.56	0.64	0.66	0.64	0.59	0.60	0.85	0.62	0.61	0.58	0.60
	0.01	0.02	0.01	0.02	0.05	0.02	0.03	0.03	0.01	0.02	0.01	0.01
$E_t(\hat{\alpha}_2)$	0.27	0.30	0.27	0.23	0.31	0.29	0.26	0.12	0.28	0.26	0.30	0.25
	0.01	0.02	0.01	0.02	0.04	0.01	0.04	0.03	0.01	0.01	0.01	0.01
$E_t(\hat{\alpha}_3)$	0.08	0.05	0.10	0.00	0.13	−0.03	0.27	0.17	0.01	−0.09	−0.16	0.00
	0.03	0.06	0.03	0.04	0.06	0.04	0.05	0.04	0.04	0.05	0.05	0.04
$E_t(\hat{\alpha}_4)$	−2.59	−2.36	−2.09	−2.13	−2.43	−2.55	−2.27	−2.52	−2.11	−2.42	−1.06	−2.15
	0.05	0.09	0.07	0.15	0.19	0.11	0.18	0.23	0.06	0.10	0.05	0.09
R^2	0.84	0.80	0.86	0.88	0.90	0.83	0.87	0.94	0.86	0.85	0.82	0.80

Components of the decomposed market-to-book ratio

M/B component	Definition
$m_{it} - b_{it}$	The natural log of the market-to-book ratio for firm i at time t
$\bar{m}_t - \bar{b}_t$	In Table 10, this notation refers to sector-average market-to-book in year t
$v(\theta_{it}; \alpha_{jt})$	The fundamental value of the firm obtained by applying annual, sector-average regression multiples to firm-level accounting values. The individual time t values of the αs from Table 4 are used to obtain this number. Using model II, for instance, we would have $v = \hat{\alpha}_{0jt} + \hat{\alpha}_{1jt}\mathbf{ln(B)}_{it}$
$v(\theta_{it}; \bar{\alpha}_j)$	The fundamental value of the firm obtained by applying long-run industry average multiples to firm-level accounting values. The long-run average values of α_j from Table 4 are used to obtain this number. Using Model 2, for instance, $v = \bar{\alpha}_{0j} + \bar{\alpha}_{1j}\mathbf{ln(B)}_{it}$
$m_{it} - v(\theta_{it}; \alpha_{jt})$	The component of $m_{it} - b_{it}$ that results from firm-specific deviations from valuations implied by sector valuation multiples calculated at time t. This is called firm-specific error
$v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \bar{\alpha}_j)$	The component of $m_{it} - b_{it}$ that results from valuations implied by current sector multiples deviating from valuations implied by long-run multiples. In Table 6, this notation refers to firm-level observations calculated by applying sector multiples to firm-specific accounting information. This is called time-series sector error
$\bar{v}(\alpha_{jt}) - \bar{v}(\bar{\alpha}_j)$	In Table 10, this notation refers to sector average time-series sector error
$v(\theta_{it}; \bar{\alpha}_j) - b_{it}$	The component of $m_{it} - b_{it}$ that is attributable to the difference between valuations implied by long-run multiples and current book values. In Table 6, this notation refers to firm-level observations calculated by applying long-run sector multiples to firm-specific accounting information. This is called long-run value to book
$\bar{v}(\alpha_{jt}) - \bar{b}_t$	In Table 10, this notation refers to sector average long-run value to book

Figure 5: Components of the decomposed market-to-book ratio

Implication

Everything that is not accounted for by book value, net income, and leverage is pricing error
Does it hold?

Empirical results

Deomposition of MB ratio at firm level

Valuation component	Overall comparison			Only mergers			Only all cash			Only mixed			Only all stock		
	Nonmerger	Merger	t(diff)	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)
$m_{it} - b_{it}$	0.59	0.76	−15.81	0.69	0.83	−6.95	0.61	0.79	−5.13	0.61	0.77	−3.29	0.87	1.12	−6.97
Model I:															
$m_{it} - v(\theta_{it}; \alpha_{jt})$	−0.02	0.26	−26.81	0.01	0.50	−25.12	−0.11	0.49	−18.34	0.04	0.46	−9.20	0.11	0.64	−16.60
$v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \vec{z_j})$	0.07	0.15	−27.70	0.13	0.18	−8.08	0.13	0.19	−6.10	0.14	0.17	−2.54	0.18	0.26	−7.09
$v(\theta_{it}; \vec{z_j}) - b_{it}$	0.54	0.34	33.64	0.54	0.16	37.91	0.59	0.11	29.61	0.43	0.14	12.95	0.58	0.23	18.97
Model II:															
$m_{it} - v(\theta_{it}; \alpha_{jt})$	−0.01	0.22	−24.48	0.02	0.41	−22.00	−0.09	0.38	−15.45	0.04	0.39	−8.27	0.11	0.57	−15.65
$v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \vec{z_j})$	0.06	0.15	−26.19	0.12	0.18	−9.11	0.12	0.19	−7.16	0.14	0.17	−2.65	0.17	0.25	−6.90
$v(\theta_{it}; \vec{z_j}) - b_{it}$	0.54	0.39	22.69	0.55	0.25	24.77	0.58	0.22	17.53	0.43	0.20	8.00	0.60	0.30	13.30
Model III:															
$m_{it} - v(\theta_{it}; \alpha_{jt})$	−0.01	0.18	−25.21	0.03	0.32	−20.21	−0.08	0.29	−15.01	0.17	0.29	−3.46	0.05	0.44	−16.09
$v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \vec{z_j})$	0.03	0.10	−24.20	0.07	0.12	−8.73	0.06	0.14	−8.40	0.08	0.12	−3.97	0.12	0.17	−5.21
$v(\theta_{it}; \vec{z_j}) - b_{it}$	0.57	0.48	10.69	0.58	0.39	12.52	0.62	0.37	9.97	0.36	0.36	0.20	0.71	0.51	6.94

Figure 6: Deomposition of MB ratio at firm level

Robustness of firm level market-to-book decomposition

Valuation component	Pre-1996 only			Within industry			Across industry			No LBO firms			Quick-closing deals		
	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)
$m_{it} - b_{it}$	0.6	0.73	−5.87	0.63	0.8	−7.25	0.76	0.83	−2.29	0.69	0.83	−6.95	0.69	0.72	−0.48
Model 1:															
$m_{it} - v(\theta_{it}; \alpha_{jt})$	−0.03	0.43	−23.01	0	0.47	−20.81	0.07	0.58	−16.72	0.01	0.5	−25.12	0.02	0.49	−8.34
$v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \bar{\alpha_j})$	0.08	0.09	−1.98	0.13	0.19	−14.65	0.12	0.17	−6.48	0.13	0.18	−8.08	0.08	0.12	−2.94
$v(\theta_{it}; \bar{\alpha_j}) - b_{it}$	0.56	0.21	28.63	0.5	0.14	43.93	0.57	0.08	35.81	0.54	0.16	37.91	0.59	0.1	18.43
Model 2:															
$m_{it} - v(\theta_{it}; \alpha_{jt})$	−0.02	0.36	−20.07	0	0.39	−17.67	0.08	0.47	−13.91	0.02	0.41	−22	0.01	0.39	−7.04
$v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \bar{\alpha_j})$	0.06	0.08	−2.96	0.12	0.19	−14.51	0.11	0.17	−7.03	0.12	0.18	−9.11	0.06	0.13	−3.93
$v(\theta_{it}; \bar{\alpha_j}) - b_{it}$	0.56	0.29	18.24	0.51	0.22	23.36	0.57	0.19	21.24	0.55	0.25	24.77	0.62	0.2	11.65
Model 3:															
$m_{it} - v(\theta_{it}; \alpha_{jt})$	0.02	0.29	−17.3	0.04	0.31	−14.96	0.05	0.37	−13.8	0.03	0.32	−20.21	−0.02	0.28	−6.98
$v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \bar{\alpha_j})$	0.04	0.05	−2.26	0.07	0.13	−10.67	0.06	0.12	−7.43	0.07	0.12	−8.73	0.02	0.09	−5.05
$v(\theta_{it}; \bar{\alpha_j}) - b_{it}$	0.55	0.39	8.43	0.51	0.36	10.41	0.65	0.34	14.12	0.58	0.39	12.52	0.69	0.35	7.72

Figure 7: Robustness of firm level market-to-book decomposition

Transaction size and the components of market to book

Valuation component	Quintile 1 (Smallest)			Quintile 2			Quintile 3			Quintile 4			Quintile 5 (Largest)		
	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)	Tar.	Acq.	t(diff)
$m_{it} - b_{it}$	0.69	0.86	−2.85	0.55	0.75	−4.19	0.54	0.82	−6.40	0.68	0.94	−6.11	0.92	0.93	−0.15
Model 1:															
$m_{it} - v(\theta_{it}; \alpha_{jt})$	−0.23	0.34	−10.72	−0.32	0.31	−15.24	−0.19	0.45	−16.99	0.07	0.65	−15.64	0.51	0.80	−6.46
$v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \bar{\alpha}_j)$	0.10	0.14	−2.47	0.09	0.14	−3.83	0.11	0.18	−5.24	0.14	0.20	−4.73	0.20	0.25	−3.30
$v(\theta_{it}; \bar{\alpha}_j) - b_{it}$	0.82	0.39	15.81	0.78	0.30	22.00	0.62	0.19	22.14	0.47	0.09	20.11	0.21	−0.12	16.73
$v(\theta_{it}; \alpha_{jt}) - b_{it}$	0.92	0.52	12.39	0.87	0.44	17.25	0.73	0.37	15.61	0.61	0.30	13.69	0.41	0.14	11.45
Model 2:															
$m_{it} - v(\theta_{it}; \alpha_{jt})$	−0.19	0.26	−9.22	−0.26	0.25	−13.81	−0.16	0.39	−16.28	0.09	0.55	−13.27	0.45	0.67	−5.17
$v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \bar{\alpha}_j)$	0.07	0.13	−3.30	0.08	0.14	−4.44	0.10	0.18	−5.60	0.14	0.20	−4.58	0.20	0.25	−3.55
$v(\theta_{it}; \bar{\alpha}_j) - b_{it}$	0.81	0.47	9.30	0.73	0.36	12.89	0.61	0.26	13.72	0.46	0.19	11.40	0.27	0.01	10.81
$v(\theta_{it}; \alpha_{jt}) - b_{it}$	0.88	0.60	7.18	0.81	0.50	10.18	0.71	0.44	9.81	0.59	0.39	7.72	0.47	0.26	7.47
Model 3:															
$m_{it} - v(\theta_{it}; \alpha_{jt})$	−0.18	0.19	−8.87	−0.18	0.20	−12.22	−0.09	0.31	−13.77	0.08	0.44	−12.65	0.37	0.48	−3.63
$v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \bar{\alpha}_j)$	0.02	0.09	−4.89	0.04	0.09	−3.68	0.06	0.12	−5.21	0.09	0.14	−4.59	0.14	0.19	−4.12
$v(\theta_{it}; \bar{\alpha}_j) - b_{it}$	0.85	0.59	5.63	0.69	0.47	6.10	0.58	0.39	5.52	0.51	0.36	4.88	0.42	0.26	5.20
$v(\theta_{it}; \alpha_{jt}) - b_{it}$	0.87	0.67	4.00	0.73	0.55	4.72	0.64	0.51	3.46	0.60	0.50	2.84	0.56	0.45	3.02

Figure 8: Transaction size and the components of market to book

Firm-level merger intensity

Valuation component	Baseline		Model 1		Model 2		Model 3	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Merger = 1, *Nonmerger* = 0								
$m_{it} - b_{it}$	0.088	−0.034						
	(15.95)	(1.19)						
$m_{it} - v(\theta_{it}; z_{jt})$			0.153	0.119	0.162	0.151	0.209	0.206
			(23.63)	(3.26)	(22.86)	(3.74)	(24.13)	(4.02)
$v(\theta_{it}; z_{jt}) - v(\theta_{it}; z'_{jt})$			0.671	0.075	0.537	−0.011	0.722	−0.233
			(30.95)	(0.72)	(27.36)	(0.12)	(28.38)	(1.90)
$v(\theta_{it}; z'_{jt}) - b_{it}$			−0.392	−0.462	−0.174	−0.317	−0.083	−0.125
			(31.90)	(7.32)	(17.63)	(5.63)	(10.59)	(3.28)
Log likelihood	−29492	−14867	−28189	−14831	−28631	−14840	−28782	−14850
χ^2	258.14	1.43	2864.90	71.43	1857.24	53.46	1555.31	32.78
Panel B. Acquirer = 1, *Target* = 0								
$m_{it} - b_{it}$	0.097							
	(6.86)							
$m_{it} - v(\theta_{it}; z_{jt})$			0.279		0.302		0.379	
			(16.77)		(17.60)		(18.00)	
$v(\theta_{it}; z_{jt}) - v(\theta_{it}; z'_{jt})$			0.208		0.226		0.491	
			(3.81)		(4.71)		(8.39)	
$v(\theta_{it}; z'_{jt}) - b_{it}$			−0.974		−0.526		−0.229	
			(30.13)		(20.15)		(11.27)	
Log likelihood	−5758		−4971		−5302		−5483	
χ^2	46.84		1621.19		937.73		575.22	
Panel C. Stock = 1, *Not stock* = 0								
$m_{it} - b_{it}$	0.232	0.179						
	(14.35)	(10.11)						
$m_{it} - v(\theta_{it}; z_{jt})$			0.158	0.141	0.174	0.151	0.146	0.116
			(8.99)	(7.94)	(9.20)	(7.98)	(6.33)	(5.02)
$v(\theta_{it}; z_{jt}) - v(\theta_{it}; z'_{jt})$			0.707	0.404	0.636	0.374	0.643	0.373
			(13.33)	(6.52)	(12.88)	(6.81)	(10.53)	(5.70)
$v(\theta_{it}; z'_{jt}) - b_{it}$			0.326	0.331	0.239	0.225	0.236	0.219
			(10.55)	(10.44)	(9.06)	(8.35)	(10.87)	(9.92)
Log likelihood	−4891	−4676	−4839	−4658	−4843	−4662	−4852	−4660
χ^2	215.28	102.11	320.36	167.68	292.50	144.09	274.03	148.17
Fixed effects?		Year		Year		Year		Year

Valuation waves, merger intensity, and method of payment

Valuation component	Using market to book alone (Columns 1–5)					Using M/B decomposition (Columns 6–10)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Dependent variable is merger count in industry j, year t										
$\bar{m}_t - \bar{b}_t$	24.673	12.676	24.640	8.260	19.117					
	(3.82) **	(1.82)	(3.81) **	(1.24)	(3.06) **					
$\bar{v}(\alpha_{jt}) - \bar{v}(\vec{z}_j)$						54.675	39.079	54.539	42.197	56.096
						(6.97) **	(4.11) **	(6.93) **	(4.10) **	(6.59) **
$\bar{v}(\vec{z}_j) - \bar{b}_t$						−27.281	−21.054	−27.077	−17.403	−18.655
						(2.73) **	(2.04) *	(2.69) **	(2.02) *	(2.23) *
Total mergers,			0.004		0.005			0.001		0.002
Year t			(0.83)		(0.94)			(0.27)		(0.42)
Total mergers,				0.013	0.012				0.015	0.015
Sector j				(5.25) **	(4.69) **				(6.05) **	(5.98) **
Fixed effects	Sector	Sector, year	Sector	Year	None	Sector	Sector, year	Sector	Year	None
R^2	0.05	0.20	0.05	0.12	0.13	0.16	0.25	0.16	0.18	0.23
Panel B. Dependent variable is stock-financed merger count in industry j, year t										
$\bar{m}_t - \bar{b}_t$	8.733	5.165	8.713	3.395	6.668					
	(2.83) **	(1.52)	(2.82) **	(1.04)	(2.23) *					
$\bar{v}(\alpha_{jt}) - \bar{v}(\vec{z}_j)$						20.067	15.822	19.911	18.132	21.246
						(5.23) **	(3.37) **	(5.17) **	(3.57) **	(5.12) **
$\bar{v}(\vec{z}_j) - \bar{b}_t$						−10.961	−8.449	−10.728	−7.721	−8.255
						(2.24) *	(1.66)	(2.18) *	(1.82)	(2.02) *
Total mergers,			0.002		0.003			0.001		0.002
Year t			(1.06)		(1.16)			(0.63)		(0.74)
Total mergers,				0.006	0.005				0.007	0.006
Sector j				(4.59) **	(4.33) **				(5.26) **	(5.31) **
Fixed effects	Sector	Sector, year	Sector	Year	None	Sector	Sector, year	Sector	Year	None
R^2	0.03	0.14	0.03	0.09	0.10	0.10	0.18	0.10	0.14	0.17

Discussion

From a investor's perspective

Do investors like single segment firm better or conglomerates?
Investment portfolio vs business portfolio

The End