

The Determinants of Merger Waves

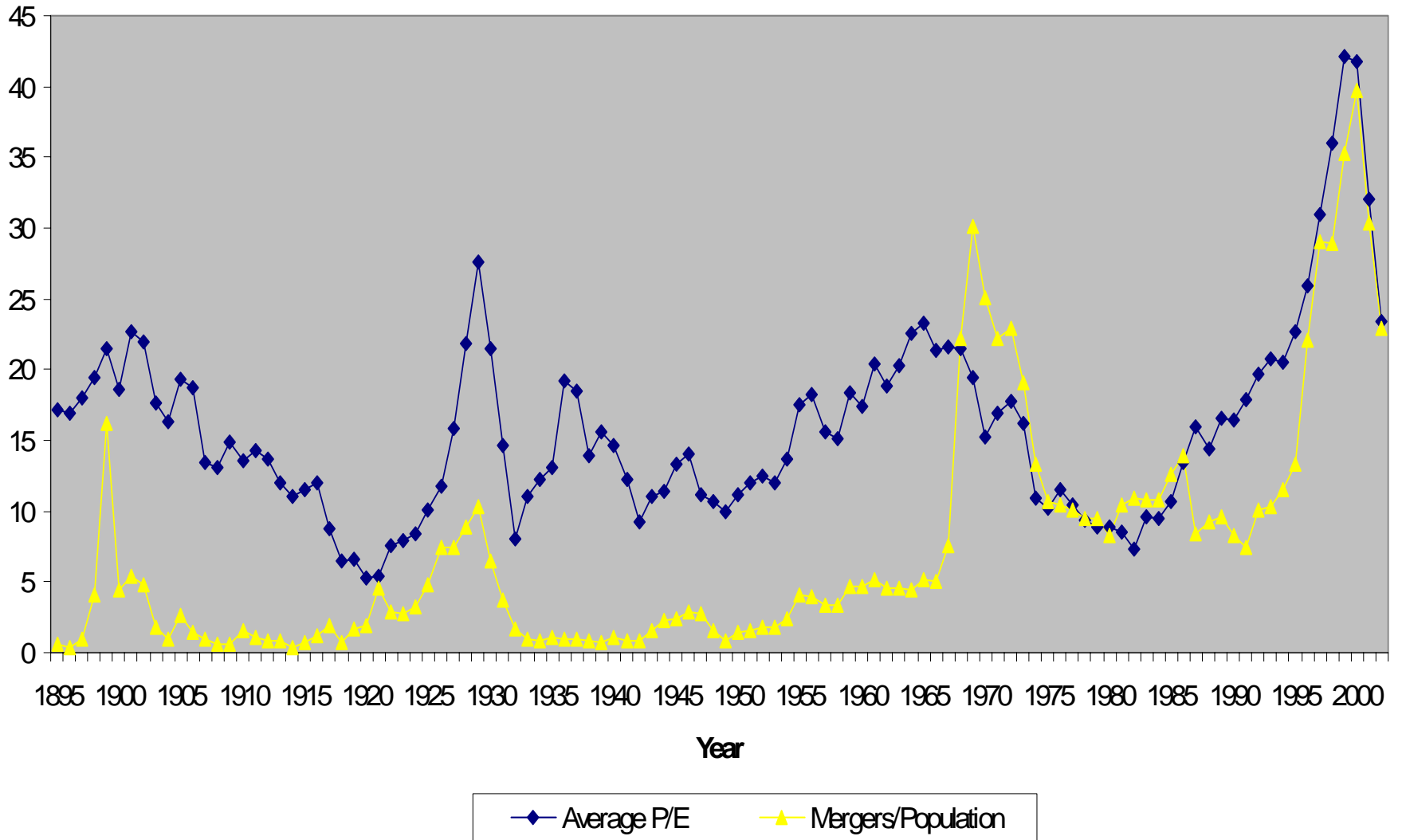
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Stylized facts on mergers

- Mergers come in waves
- Waves are positively correlated with share prices and price/earnings ratios

Mergers and Average P/E ratio



Neoclassical Hypotheses

- Efficiency, Market power
- However: these explanations do not account for mergers' wave pattern
- The industry shocks hypothesis
 - Mitchell and Mulherin (1996)
 - Harford (2003)
- The q -theory of mergers
 - Jovanovic and Rousseau (2002)

Behavioral hypotheses

The overvaluation hypothesis of mergers

Shleifer and Vishny (2003)

Rhodes-Kropf and Viswanathan (2003)

Rhodes-Kropf, Robinson and Viswanathan
(2003)

The managerial discretion hypothesis of
mergers

Marris (1964)

Mueller (1969)

The Industry Shocks Hypothesis

- *Underlying logic:*
 - Industry shocks make mergers profitable; several industries must enter a wave at the same time (macroeconomic liquidity)
- *Critique:*
 - Ignores association of wave and stock market boom (Harford, 2003)

Tests:

- ISH-DM. A set of industry-time dummies adds considerable explanatory power to an equation explaining merger activity over simply a set of time dummies.
- Spread between the commercial and industrial loan rate and the federal funds rate (C&I).
- ISH-TO. The variables used to explain acquisitions should have the same coefficients for tender offers and friendly mergers.
- ISH-SP1. Acquirers in both friendly mergers and tender offers make significant positive abnormal returns on their shares at the acquisition announcements, and normal returns over longer post-merger windows.
- ISH-SP2. The share performance of acquirers is consistent with ISH-SP1 for mergers taking place during both wave and non-wave years.

The q-Theory of Mergers

- *Underlying logic:*
 - Firms with $qs > 1$ can profitably expand by acquiring assets
- *Critique:*
 - Three options: new plant and equipment, used plant and equipment, purchase another company. Why only latter two? (Jovanovic and Rousseau, 2002); Premia rise in wave!

Tests:

- QH-DM1:
 - M_t is positively related to $(q_{it-1} - q_{Tt-1})$.

- QH-DM2:
 - When q_{it-1} and q_{Tt-1} are entered separately in the M_{it} equation, q_{it-1} has a positive coefficient and q_{Tt-1} a negative coefficient equal in absolute size to that of q_{it-1} .

The Overvalued Shares Hypothesis

- *Underlying logic:*
 - Shleifer and Vishny (2003); managers exchange their overvalued shares for real assets of another company
- *Critique:*
 - managers of overvalued firm maximize welfare of current shareholders at the expense of new ones; why pay high premia?

$$V_{i0} = \sum_{t=0}^{\infty} \frac{\pi_{it}}{(1+k_i)^t} \quad (1)$$

$$V_{i0} = \sum_{t=0}^{\infty} \frac{\pi_{i0} (1+g_i)^t}{(1+k_i)^t} = \frac{\pi_{i0}}{k_i - g_i} \quad (2)$$

$$\boxed{V}_{it} = \alpha \pi_{it} \quad (3)$$

$$O_{it} = V_{it} - \boxed{V}_{it} \quad (4)$$

Tests:

- OVH-DM1:
 - The assets acquired through mergers are positively related to O_{it}

- OVH-DM2:
 - The assets acquired through mergers are positively related to dO_{it} and O_t , and both variables have identical coefficients
 $(dO_{it} = O_{it} - O_t)$

- OVH-TO:
 - The OVH is better supported for friendly mergers than for tender offers.
- OVH-TC:
 - The probability that firm i is acquired in t is a positive function of VS_{it} and O_{it} .
- OVH-SP1:
 - The shares of acquiring firms earn large negative abnormal returns over long time spans following the mergers, but not immediately when they are announced.
- OVH-SP2:
 - The post-merger performance of acquirers' shares is worse for mergers undertaken during merger waves.

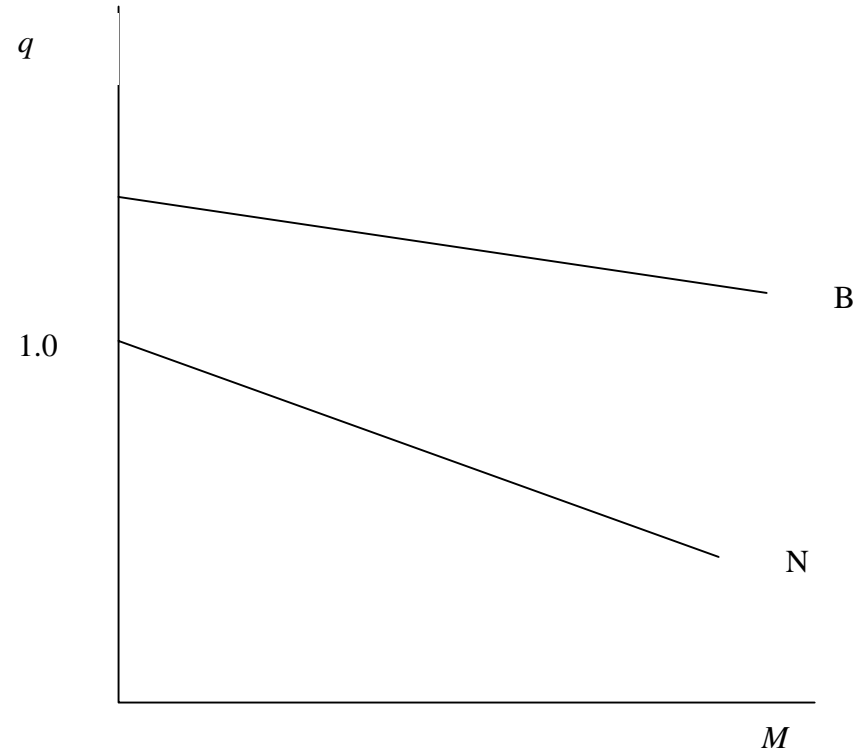
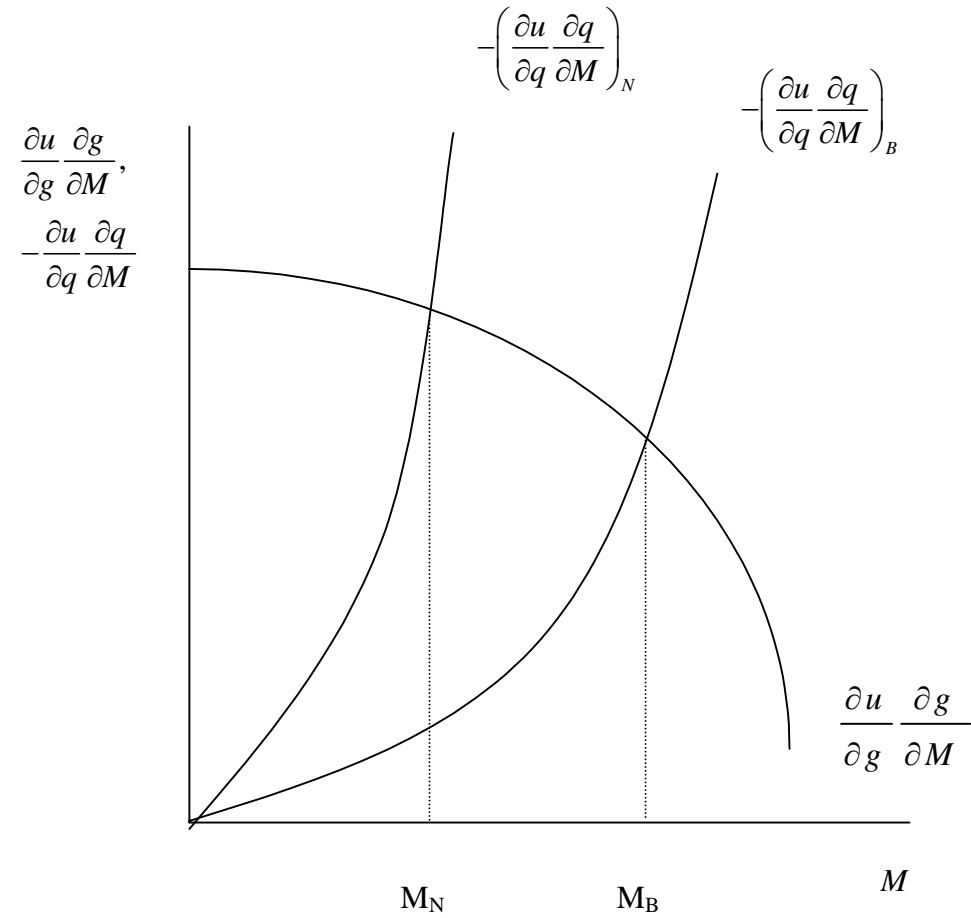
The Managerial-Discretion Hypothesis

- *Underlying logic:*
 - Managers sacrifice profits for size and growth; constraints less binding in waves due to increased optimism, high share prices, and cash flows
- *Critique:*
 - The MDH departs from most neoclassical economics by assuming that managers pursue growth and not shareholder wealth, and that stock market psychology influences managers' decisions.

Figure 2: The Managerial Trade-off

(A)

(B)



Tests:

- Degree of speculation, Shiller (2000):
(P/E_t); annual mean value O_t

- ***MDH-DM:***

$$\frac{\partial M_t}{\partial CF_{t-1}} > 0, \frac{\partial M_t}{\partial (P/E)_t} > 0, \frac{\partial M_t}{\partial q_{t-1}} > 0, \frac{\partial M_t}{\partial (q_{t-1} \cdot CF_{t-1})} > 0, \frac{\partial M_t}{\partial S_{t-1}} > 0, \frac{\partial M_t}{\partial O_t} > 0$$

- ***MDH-TO:***

– *The MDH-DM receives less support for tender offers, TO_{it} , than for friendly mergers, FM_{it} .*

- MDH-SP1:
 - The shares of acquiring firms earn large negative abnormal returns over long time spans following the mergers, but not immediately when they are announced.
- MDH-SP2:
 - The post-merger performance of acquirers' shares is worse for mergers undertaken during merger waves.

Table 1: Number of Acquirers and Targets in Friendly Mergers (FM) and Tender Offers (TO) and Mean Tobin's q s

Year	FM	TO	%TO	Acquirers		Targets			
				FM	TO	FM	FM	TO	TO
				MV / TA	MV / TA	MV / TA	DV / TA	MV / TA	DV / TA
81	205	14	6.39%	1.275	0.664	1.011	0.756	1.066	0.787
82	311	23	6.89%	1.216	0.906	0.846	0.829	0.758	0.711
83	486	23	4.52%	1.377	0.781	1.052	1.018	0.797	0.804
84	478	29	5.72%	1.411	0.921	1.218	1.097	1.073	0.897
85	166	41	19.81%	1.154	0.902	1.085	1.465	1.075	1.754
86	156	56	26.42%	1.245	1.001	1.234	1.654	1.232	1.815
87	177	47	20.98%	1.380	1.118	1.204	1.564	1.140	1.662
88	181	60	24.90%	1.298	1.316	1.384	2.048	1.046	1.757
89	273	55	16.77%	1.327	0.998	1.306	1.588	1.266	2.008
90	318	26	7.56%	1.532	1.356	1.341	1.435	1.253	1.694
91	346	19	5.21%	1.459	1.282	1.397	1.857	1.274	2.144
92	513	16	3.02%	1.873	2.034	1.343	2.123	1.133	1.720
93	607	25	3.96%	1.681	1.557	1.384	2.096	1.706	2.548
94	726	33	4.35%	1.644	1.732	1.238	2.060	1.259	2.556
95	817	57	6.52%	1.623	1.570	1.147	2.292	1.503	2.951
96	960	55	5.42%	1.803	1.581	1.490	2.819	1.200	2.525
97	1001	73	6.80%	1.902	1.652	1.213	2.295	1.057	2.340
98	599	72	10.73%	2.004	1.732	1.590	3.095	1.274	2.602
99	588	63	9.68%	2.218	1.860	1.687	3.109	1.498	2.216
100	550	63	10.28%	2.708	1.646	2.012	2.340	1.886	2.076
101	453	47	9.40%	1.962	2.416	1.490	2.281	1.091	1.865
102	339	37	9.84%	1.705	2.006	0.862	1.000	1.017	1.468
Total	10250	934	8.35%	1.742	1.489	1.298	1.976	1.118	1.854
Wave	4515	383	7.82%	1.988	1.683	1.433	2.611	1.358	2.471
Non-wave	5735	551	8.77%	1.548	1.347	1.216	1.589	1.117	1.618

Table 2a: Summary statistics, mean values

	All Acquisitions	Tender Offers	Friendly Mergers
<u>Acquirer characteristics:</u>			
Tobin's q	1.71	1.48	1.74
Overvaluation (% of Total assets)	69.7	55.3	71.6
Cash flow/Total assets	0.064	0.094	0.060
Total assets (Mn 1985 USD)	4828.1	8296.6	4461.0
<u>Target characteristics:</u>			
Tobin's q	1.28	1.18	1.33
Overvaluation (% of Total assets)	43.7	34.6	48.6
Cash flow/Total assets	0.037	0.079	0.021
Deal Value (Mn 1985 USD)	307.32	474.76	283.91
M_{it}	0.121	0.168	0.116
Non-merging firms:			
Tobin's q		1.50	
Overvaluation (% of Total assets)		37.6	
Cash flow/Total assets		0.014	
Total assets (Mn 1985 USD)		503.6	

Table 3: Tests of the Industry Shocks Hypothesis

Equation	Dummy variables	$C&I_t$	P/E_t	n	\bar{R}^2
1	12 2-year time dummies			89946	0.020
2	576 2-year time / industry dummies			89946	0.032
3	576 2-year time / industry dummies	-0.011 (3.39)		63206	0.028
4	576 2-year time / industry dummies	-0.0049 (1.38)	0.0009 (5.68)	63206	0.035

Table 4 Explaining the Amounts of Assets Acquired

Eq.	1	2	3	4	5	6	7	8
Hyp	QH	QH	QH	QH	OVH	OVH	OVH	OVH
Type	ALL	FM	TO	ALL	ALL	FM	TO	FM
Industry dummies	Yes	Yes	No	Yes	Yes	Yes	No	Yes
$q_{it-1}-q_{Tt-1}$	0.023 15.17	0.025 16.37	-0.004 0.84					
q_{it-1}				0.022 14.62				
q_{Tt-1}				0.440 25.06				
O_{it}					0.072 22.8	0.078 23.56	0.031 3.66	
dO_{it}								0.062 18.82
O_t								0.42 29.79
N	86697	85887	79432	86647	50897	50238	45974	50238
R ²	0.036	0.043	0.0001	0.058	0.06	0.073	0.002	0.11
Consistent?	Yes	Yes	No	No	Yes	Yes	Yes	No

Table 4 Explaining the Amounts of Assets Acquired

Eq.	9	10	11
Hyp	MDH	MDH	MDH
Type	FM	TO	FM
Industry dummies	Yes	No	Yes
q_{it-1}	0.027 16.69	0.0058 1.13	0.032 19.37
O_t			0.48 36.07
P/E_t	0.012 40.53	0.012 14.62	
CF_{it-1}	0.21 7.89	1.05 9.21	0.19 7.15
$q_{it} CF_{,it-1}$	0.022 3.70	-0.078 3.81	0.027 4.64
N	89182	82724	89182
R ²	0.137	0.102	0.122
Consistent?	Yes	Yes	Yes

Table 5: Explaining the Identities of Targets (Probit Estimates)

Eq.	1	2	3
Hypothesis	OVH	MDH	MCCH
Type of Acquisition	FM	FM	TO
O_{it}	0.005 (1.48)		
VS_{it}	$-2.6*10^{-6}$ (0.43)		
$VS_{it} * O_{it}$	$1.2*10^{-6}$ (0.70)		
q_{it-1}		-0.0013 (3.46)	-0.0021 (5.88)
CF_{it}		-0.0006 (2.25)	0.0042 (4.54)
K_{it-1}		$-2.5*10^{-7}$ (2.87)	$-6.9*10^{-8}$ (0.90)
L_{it-1}		0.0021 (0.82)	-0.0017 (1.00)
N	29642	85475	84209
Pseudo \bar{R}^2	0.008	0.012	0.026
Consistent with Hypothesis	No	Yes	Yes

Table 6: The Returns to Acquiring Firms

Window	Period of Acquisition	Friendly Mergers			Tender Offers			All Acquisitions		
		N	Mean	Median	N	Mean	Median	N	Mean	Median
Month of Acquisition	Non-Wave	1624	0.021 (0.09)	-0.32	180	0.92 (1.39)	-0.00	1804	0.11 (0.21)	-0.29
	Wave	1396	0.37 (1.42)	0.00	165	2.23 (2.56)	1.01	1561	0.56 (0.25)	0.13
	Difference		-0.35 (1.00)	-0.32		-1.31 (1.09)	-1.01		-0.45 (0.33)	-0.42
One Year after Acquisition	Non-Wave	1645	-5.21 (5.85)	-8.43	184	-2.78 (2.61)	-6.09	1829	-4.97 (0.84)	-8.31
	Wave	1524	-7.95 (7.36)	-10.83	171	-10.88 (3.05)	-12.43	1695	-8.24 (1.02)	-10.97
	Difference		2.73 ^b (1.95)	2.40 ^a		8.09 ^b (4.00)	6.34 ^b		3.27 ^b (1.32)	2.66 ^a
Two Years after Acquisition	Non-Wave	1636	-15.37 (10.18)	-22.17	183	-2.63 (4.73)	-13.98	1819	-14.09 (1.44)	-21.18
	Wave	1513	-20.75 (12.35)	-27.11	169	-31.19 (4.42)	-37.36	1682	-21.80 (1.58)	-28.35
	Difference		5.37 ^b (2.39)	4.94 ^a		28.55 ^a (6.50)	23.38 ^a		7.70 ^a (2.13)	7.17 ^a
Three Years after Acquisition	Non-Wave	1625	-23.38 (11.24)	-34.63	183	-12.09 (6.37)	-23.82	1808	-22.23 (1.98)	-33.47
	Wave	1480	-31.20 (13.93)	-42.62	167	-45.85 (6.14)	-58.55	1647	-32.68 (2.11)	-44.58
	Difference		7.81 ^a (2.55)	7.99 ^a		33.75 ^a (8.89)	34.73 ^a		10.45 ^a (2.89)	11.11 ^a

Table 7: Overvaluation and Returns to Acquiring and Non-merging Firms

Equation	Period	Sample	Intercept	O_{t-1}	dO_{it-1}	Size	N	\bar{R}^2	Predicted Return at Mean Size and $O_{t-1}=dO_{it-1}=0$	Predicted Return at Means
1	Whole Period	Non-merging	0.845 (18.63)	-0.746 (11.44)	-0.035 (4.02)	0.000 (0.04)	10015	0.014	0.846	0.536
2	Non-Wave	Non-merging	0.806 (15.83)	-0.421 (5.25)	-0.056 (5.07)	-0.009 (1.25)	8258	0.006	0.761	0.608
3	Wave	Non-merging	0.598 (3.80)	-0.942 (3.99)	-0.005 (0.37)	0.040 (3.02)	1757	0.012	0.799	0.240
4	Whole Period	Friendly Mergers	-0.005 (0.07)	-0.333 (2.91)	-0.060 (3.49)	-0.015 (1.52)	2029	0.010	-0.104	-0.274
5	Non-Wave	Friendly Mergers	-0.076 (0.68)	-0.158 (1.02)	-0.098 (3.76)	-0.015 (1.15)	1114	0.011	-0.173	-0.238
6	Wave	Friendly Mergers	0.503 (2.35)	-1.098 (3.41)	-0.015 (0.59)	-0.019 (1.21)	915	0.012	0.373	-0.282

Conclusion

Based on our empirical results we offer the following account of merger waves:

- At some points in time, shareholder optimism begins to rise.
- This optimism in the market allows managers to undertake wealth-destroying acquisitions, and not have their announcements met by immediate declines in their companies' share prices.
- The number of wealth-destroying mergers increases dramatically during a stock market boom creating a merger wave.
- As the market learns about the mergers, it realizes that they will not produce synergies, and that the theories behind them were false.
- The market's optimism disappears and the share prices of acquiring firms fall relative to those of other companies. Because of the premia paid for the targets and the transaction costs of integrating separate companies, the losses to shareholders of companies making acquisitions are greater than one expects, simply because the acquiring companies were overvalued.