Is Innovation a Factor in Merger Decisions? Evidence from a Panel of U.S. Firms

Mahdiyeh Entezarkheir Saeed Moshiri

Huron at Western University University of Saskatchewan

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Motivation

- Mergers in Innovative Industries
  (Narula and Hagedoorn, 1999; De Man and Dysters, 2005; Chirgui, 2009; Kats and Shelanski, 2005 and 2007)
- Merger Resources for Innovation
  (Becketti, 1986)
- Mergers and Knowledge Spillovers
  (Kats and Shelanski, 2005; Huck et al., 2000; Jost and Veldon, 2008)
- Empirical Evidence on Merger-Innovation Nexus
  (Bena and Li, 2014)

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Motivation

IPRs Lower Competition and Improve Consumer Welfare

Anti-trust Promotes Competition and Improve Consumer Welfare

Merger Enforcements should Consider Innovation in Merger Decisions

Motivation

Driving Factors of Mergers

- Business Cycles
  Nelson (1959, 1966), Weston (1961), Gort (1969)
  Melichner et al. (1983), Beckettie (1986)
  Maksimovic and Phillips (2001), Komlenovic et al. (2011)

Motivation

Driving Factors of Merger Waves

- Neoclassical Theory
  Gort (1969), Mitchell and Mulherin (1996)
  Andrade and Stafford (2004), Harford (2005)
  Komlenovic et al. (2011)

- Behavioural Theory
  Shleifer and Vishny (2003), Jovanovic and Rousseau (2002)

- Q Theory
  Hasbrouk (1985), Jovanovic and Rousseau (2002)

Our Analysis

Panel of Merging and Non-Merging Firms

Examine Innovation Impacts on Merger Decision

Examine Instrumented Innovation Impacts on Merger

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Business Cycles

Neoclassical, Behavioural, and Q-theories of Mergers

Heterogeneous Impact by Industry

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Innovation and Mergers

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\begin{aligned}
Prob(Merger_{it}) = {} & \beta_0 + \beta_1 logCitationPatent_{it-1} + \beta_2 BC_{t-1} \\
& + \beta_3 AssetTurnover_{it} + \beta_4 EmployGrowth_{it} \\
& + \beta_5 SaleGrowth_{it} + \beta_6 Profitability_{it} + \beta_7 ROA_{it} \\
& + \beta_8 CapitalExp_{it} + \beta_9 Tobin'sq_{it} + \beta_{10} HHI_{jt} \\
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Data Sources

Updated NBER Patent and Citation Data

- From 1976 to 2006

Compustat (Standard and Poors)

- From 1976 to 2006

Company Identifier Data

Thompson Financial SDC Platinum Merger Data

- 877 Merger Pairs from 1980 to 2003

Bloomberg

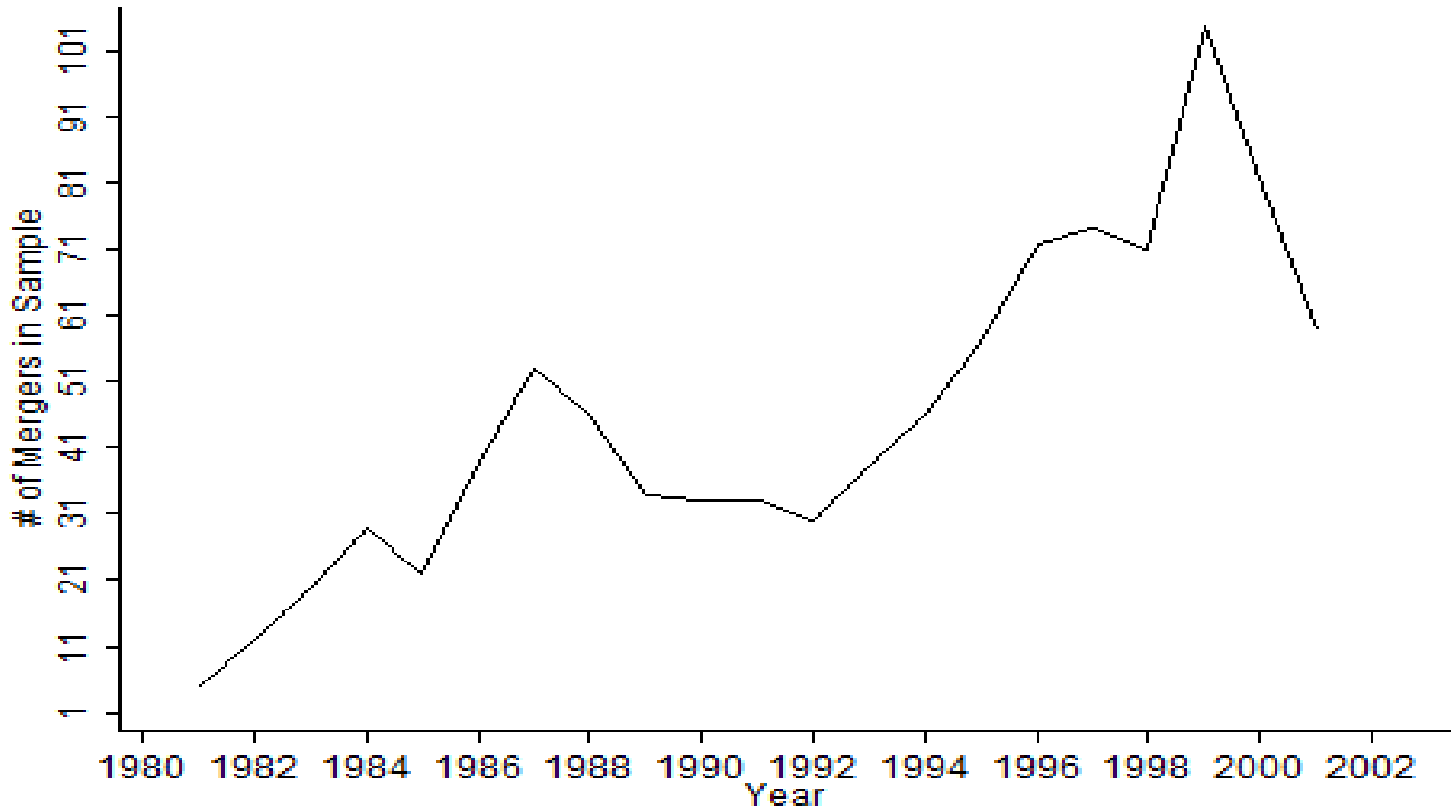
Sample

Unbalanced Panel of 6,030 Merging and Non-Merging

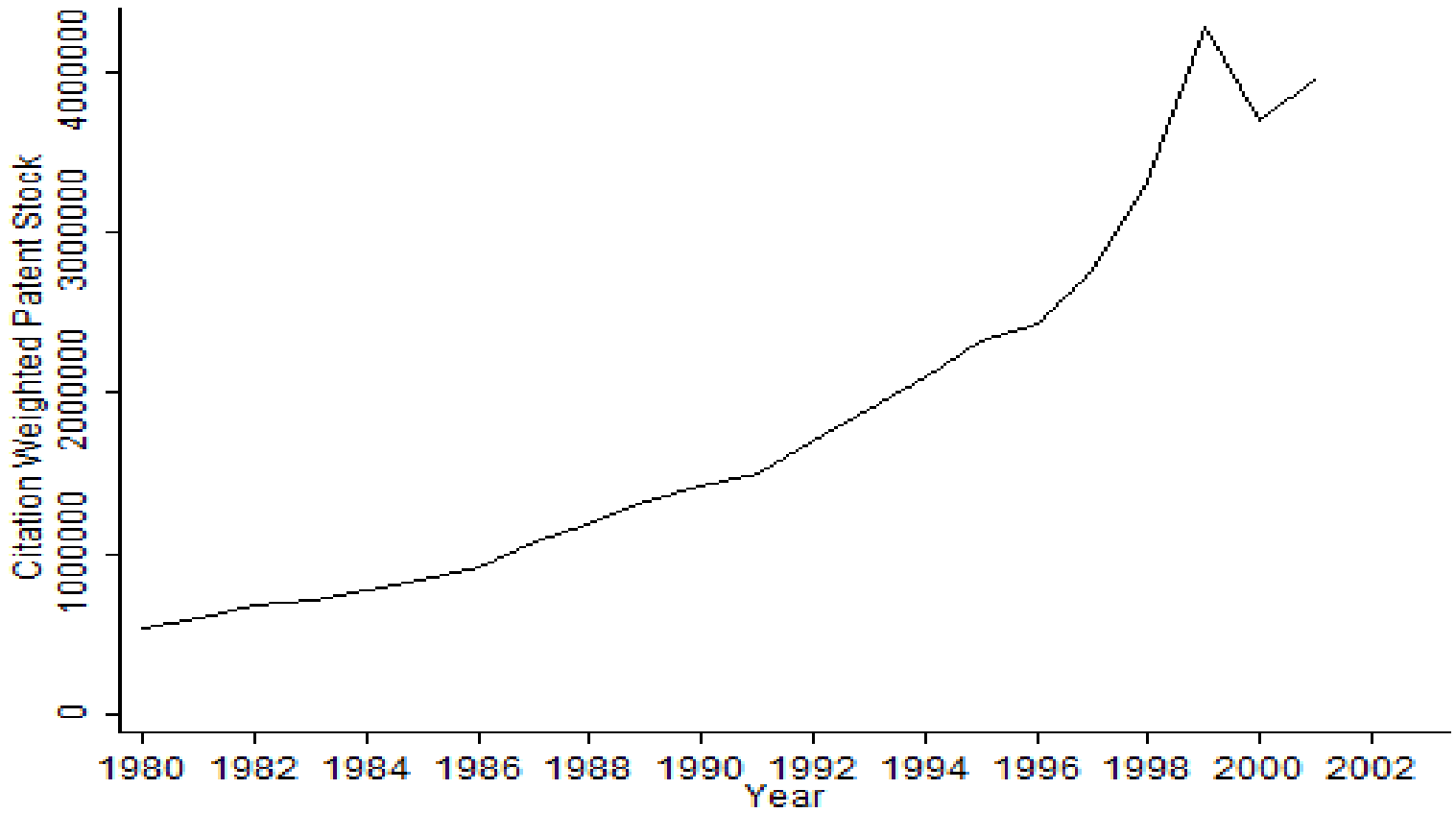
Publicly Traded U.S. Manufacturing Firms from 1980 to 2003

with 60,736 Observations and 877 Pairs of Merging Firms

Number of Mergers Over Years



Innovation by Year



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Merger Decision and Innovation

DV $Merger_{it}$	(1)	(2)	(3)	(4)(RE)
$logCiteStock_{it-1}$	0.181***	0.293***	0.254**	0.274***
	(0.031)	(0.061)	(0.061)	(0.031)
BC_{t-1}	0.314 ***	0.348***	0.248**	0.252**
	(0.051)	(0.057)	(0.088)	(0.087)
$AssetTurnover_{it}$	-1.232 ***	-1.178 ***	-1.136 ***	-0.430***
	(0.177)	(0.256)	(0.270)	(0.130)
$Tobin'sq_{it}$		-0.079	-0.109	-0.192**
		(0.162)	(0.179)	(0.071)
Firm FE	Yes	Yes	Yes	No
Other Controls	No	No	Yes	Yes

Panel IV Estimates of Merger and Innovation

First Stage IV **Panel Fixed Effects Estimator**			
DV: $logCitePatent_{it-1}$	(1)	(2)	(3)
F	84.19 [0.000]	207.71 [0.000]	194.84[0.000]
$logCitePatent_{it-2}$	0.395***		0.303***
	(0.014)		(0.014)
$logCitePatent_{it-3}$		0.307***	0.188***
		(0.016)	(0.014)
Second Stage IV **Panel Logit Estimator**			
DV: $Merger_{it}$			
$logCitePatent_{it-1}$	0.192***	0.230***	0.174***
	(0.056)	(0.052)	(0.052)
Firm FE	Yes	Yes	Yes
J-test			4.157[5.024]

Merger Decision and Innovation by Industry

DV: $Merger_{it}$	Chemical	Computers	Drugs	Electrical	Mechanical
Marginal	0.018	0.016	0.116	0.072	0.046
	(0.161)	(0.110)	(0.087)	(0.089)	(0.081)
Total	0.257*	0.255**	0.355***	0.311***	0.286***
	(0.155)	(0.095)	(0.063)	(0.055)	(0.055)

Mixed Model Estimation of Mergers and Innovation

DV $Merger_{it}$	(1)	(2)	(3)
$logCiteStock_{it-1}$	0.318***	0.316***	0.263**
	(0.016)	(0.016)	(0.024)
BC_{t-1}	0.330***	0.342***	0.250**
	(0.044)	(0.045)	(0.079)
$AssetTurnover_{it}$		-0.311***	-0.234 **
		(0.069)	(0.104)
$Tobin'sq_{it}$			-0.038*
			(0.023)
Observation	54705	54625	26580
No of Groups	219	219	219
Other Controls	No	No	Yes

Conclusion

- Innovations Increase Merger Likelihood
- Instrumented Innovations Increase Merger Likelihood
- Mergers are Pro-cyclical at the Firm Level
- Heterogeneous Impact of Innovation across Industries

Future Research

- Mergers and Knowledge Spillovers
- Mergers and R&D Advancements
- Mergers and Attainment of Intangible Assets