

# **Arms Race or Détente ?**

## **How interfirm alliance announcements change the stock market valuation of rivals**

# Authors

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- **2009- Associate Editor, Management Science**
- **Research focus :**
  - international collaborative strategies (for technology development and commercialization)
  - how international differences in economic and institutional environments affect firm strategy and performance.



# Refereed Journal Articles

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- “*Arms Race or Détente? How Inter-Firm Alliance Announcements Change the Stock Market Valuation of Rivals*,” with Rachelle C. Sampson and Brian S. Silverman. Forthcoming, *Management Science*.
- “*Alliance Structure and the Scope of Knowledge Transfer: Evidence from US-Japan Agreements*,” with Tetsuo Wada, *Management Science*, 55(4), 2009.
- “*Using Hostages to Support Exchange: Dependence Balancing and Equity Ties in Japanese Automotive Supply Relationships*,” with Christina L. Ahmadjian, *Journal of Law, Economics and Organization*, 22(1), 2006.
- “*The Scope and Governance of International R&D Alliances*,” with Rachelle C. Sampson, *Strategic Management Journal*, 25 (8-9), 2004.
- “*International Franchising Practices in Mexico: Do Franchisors Customize Their Contracts?*” with Francine Lafontaine, *Journal of Economics and Management Strategy*, 13 (1), 2004.
- “*E-Commerce Readiness: Institutions and International Competitiveness*,” with Bernard Yeung, *Journal of International Business Studies*, 32 (4), 2001.

# Authors

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- **Ph.D., Business Administration**, University of Michigan (1999)  
*International R&D Alliances: The Role of Governance in Realizing Innovative Potential* (Chair: Bernard Yeung)
- **Bachelor of Law** , Queensland University of Technology (1992)
- **Assistant professor, University of Maryland**, Smith School of Business (since 2004)
- Assistant Professor, New York University, Stern School of Business (1999-2004)

### Research focus

- Strategic alliances
- Organization of corporate R&D.





## Refereed Journal Articles

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- “*Formal Contracts in the Presence of Relational Enforcement Mechanisms: Evidence from Technology Development Contracts.*” Ryall, Michael D. and Rachelle C. Sampson. (2009) *Management Science*.
- “*R&D Alliances & Firm Performance: The Impact of Technological Diversity and Alliance Organization on Innovation.*” Sampson, Rachelle C. (2007) *Academy of Management Journal*
- “*Experience Effects and Collaborative Returns in R&D Alliances.*” Sampson, Rachelle C. (2005) *Strategic Management Journal*
- “*The Cost of Misaligned Governance in R&D Alliances.*” Sampson, Rachelle C. (2004) *Journal of Law, Economics and Organization* 20(2): 484-526.
- “*Organizational Choice in R&D Alliances: Knowledge Based and Transaction Cost Perspectives.*” Sampson, Rachelle C. (2004) *Managerial and Decision Economics* 25: 421-36.
- “*The Role of Lawyers in Strategic Alliances.*” Sampson, Rachelle C. (2003) *Case Western Reserve Law Review* 53: 909-927.

# Authors

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- **MA**, University of California at Berkeley
- **Full Professor, Strategic Management**, Rotman School of Management, University of Toronto and J.R.S. Prichard and Ann Wilson Chair in Management,
- Magna International Professor of Strategy, Rotman School of Management (2003-2004)
- Associate Professor, Strategic Management, Rotman School of Management (2001-03)
- Assistant Professor, Competition and Strategy, Harvard Business School (98-2001)
- Assistant Professor, Strategic Management, Rotman School of Management (95-98)
- **Board Member, International Society of New Institutional Economics**
- **Research focus :**
  - Competitive strategy, cooperative strategy
  - Management of innovation
  - Theory of the firm.

# Refereed Journal Articles

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- "*The 'Problem' of Creating and Capturing Value*," Nickerson, J.A., B.S. Silverman and T.R. Zenger, *Strategic Organization*, 5(3), 2007, 211-225
- "*Churn, Baby, Churn: Strategic Dynamics Among Dominant and Fringe Firms in a Segmented Industry*," de Figueiredo, J.M. and B.S. Silverman, *Management Science*, 53(4), 2007, 632-650
- "*Profiting from Others' Technological Innovation: The Effect of Competitor Patenting on Firm Value*," McGahan, A.M. and B.S. Silverman, *Research Policy*, 35(8), 2006, 1222-1242
- "*The Returns to Lobbying: University Lobbying Efforts and the Allocation of 'Earmarked' Academic Grants*," de Figueiredo, J.M. and B.S. Silverman, *Journal of Law and Economics*, 49(2), 2006, 597-626
- "*Picking Winners or Making Them? Alliances, Patents, and Human Capital as Selection Criteria in Venture Financing and Performance of Biotechnology Startups*," Baum, J.A.C. and B.S. Silverman, *Journal of Business Venturing*, 19, 2004, 411-436
- "*R&D, Organization Structure, and the Development of Corporate Technological Knowledge*," Argyres, N.S. and B.S. Silverman, *Strategic Management Journal*, 25(8-9), 2004, 929-958

# Research question

## Article

- Published in August 2009 in Management Science

## Research question :

*Why do alliances create value for partners ? :*

*Alliances are effective vehicles for partners to acquire new skills*

or

*Alliances are used to attenuate competitive intensity*

**ARMS RACE OR DETENTE ?**

# Theoretical approaches

Industrial Organization

Resource Based Competitiveness

1950

1980

2010

## ALLIANCE MOTIVES ?

*Alliances are suspect  
Gain market power  
Even w/o collusion*



## ALLIANCE BENEFITS ?

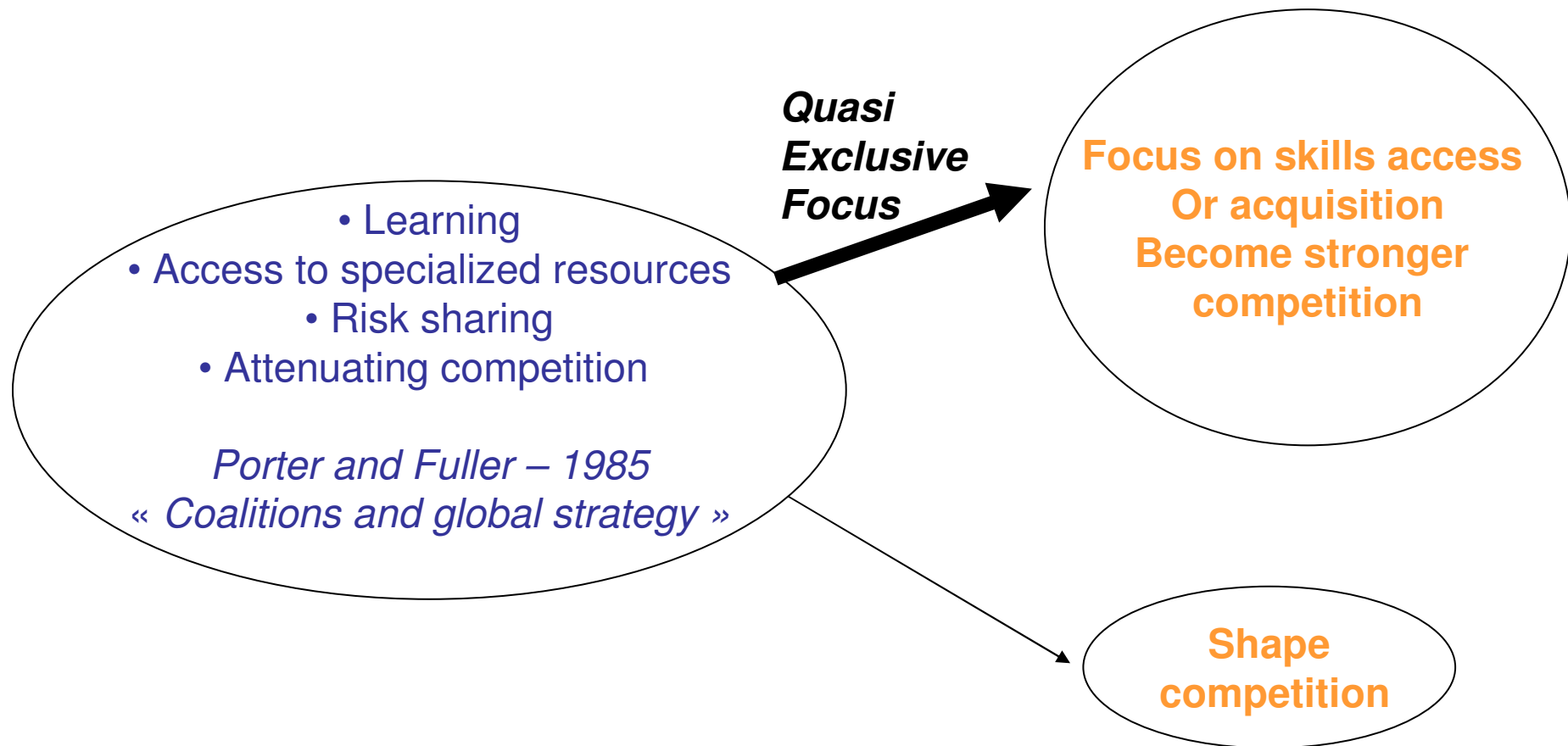
*Interpartner learning  
Co-specialization (e.g. Airbus)  
Cost sharing and risk hedging*

« Alliance have become an increasingly prevalent organizational form »

Alliances are – on average – accompanied by a positive stock market response (event studies from 1985 to 2005)

Understand the link between interfirm collaboration and innovation and profitability

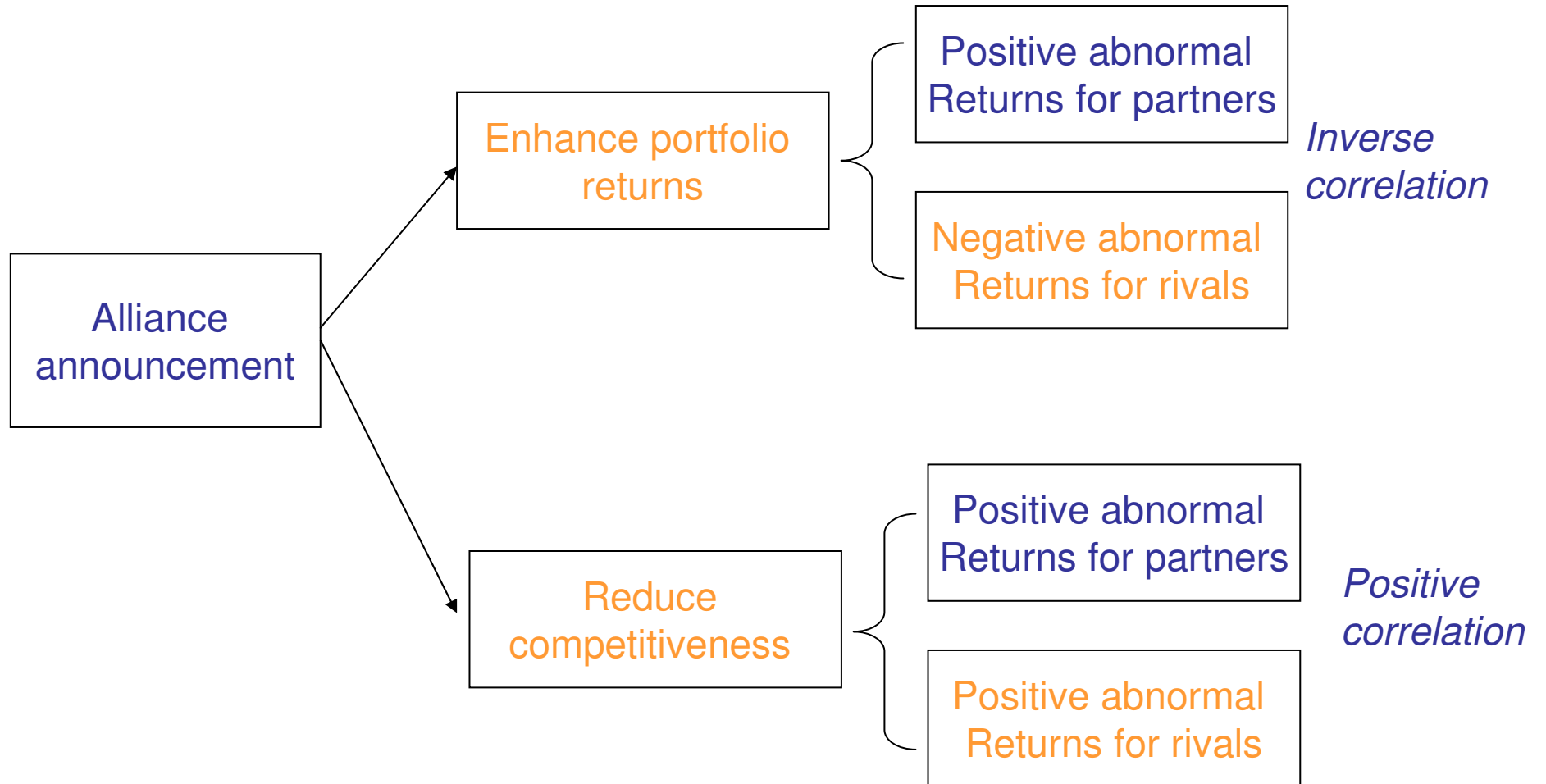
# Theoretical approaches



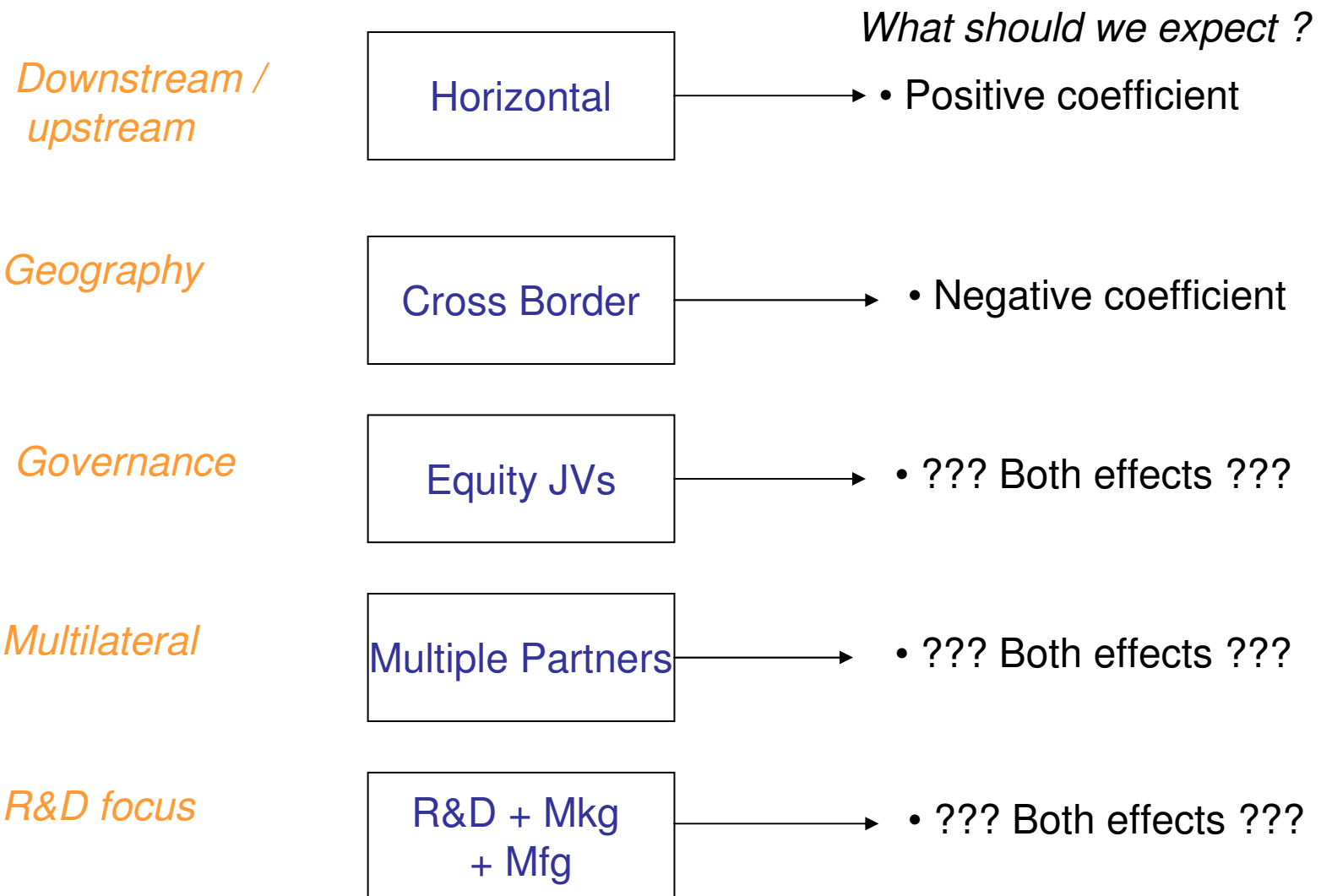
# Theoretical approaches : Prior event studies of alliance formation

Authors	Theoretical focus/hypotheses	Data	Main findings
McConnell and Nantell (1985)	Joint ventures will generate synergy-based gains	136 joint ventures in multiple industries announced 1972–1979, compiled from <i>Mergers &amp; Acquisitions's</i> "Joint Venture Foster" and the <i>Wall Street Journal (WSJ)</i>	JVs produce positive abnormal return (0.73%). The smaller partner enjoys a larger return (in percentage terms) than the larger firm.
Woolridge and Snow (1990)	Test basic relationship between shareholder expectations and managers' investment decisions including JV establishment	Announcements of investment decisions from the <i>WSJ</i> for 1972–1987; 767 announcements involving 248 firms in 102 industries	JVs produce positive abnormal return (0.80%)
Koh and Venkatraman (1991)	Value of related joint ventures is greater than for unrelated ventures; applies to partner-venture relationship and relationship between partners	175 JVs involving 239 firms in IT sector compiled from the <i>WSJ</i> joint venture announcements, 1972–1986; supplementary samples of technology, marketing, and supply agreements	Mean two-day CAR 0.87% for JVs; tech exchange agreements also generated positive return (0.8%); related ventures create more value than unrelated; smaller partner has higher returns than larger partner
Das et al. (1998)	Strategic alliances particularly valuable to small firms in technology alliances—resource accumulation rationale	119 nonequity alliances announced in 1987–1991; bilateral alliances only; data from: Information Technology Strategic Alliances database, CRSP, and Compustat	Significant two-day CAR of 0.008%; insignificant return for marketing alliances
Anand and Khanna (2000)	Firms learn from experience, so market reaction to alliances increases the more alliances the firm does; greater learning associated with JVs than licenses and for R&D JVs versus prod. or marketing JVs	1976 manufacturing (SIC 20–39) joint ventures and licenses involving 147 firms, announced during 1990–1993; data sources are SDC, CRSP, and Compustat	Significant positive CARs for both JVs (0.78%) and licenses (1.78%); experience hypotheses confirmed
Reuer and Koza (2000)	JVs are more valuable (compared to acquisition) when desired assets are intertwined with assets that are not useful and when information asymmetries are stronger	297 JVs that terminated between 1985 and 1995; bilateral JVs only; data sources are Funk and Scott Index, Lexis-Nexis, and CRSP	JVs produce positive CAR (0.44%). CARs are significantly higher for JVs in which information asymmetry is expected to be high.
McGahan and Villalonga (2005)	Examines firm-specific and "deal program" effects on value generated by mergers, JVs, and divestments	7,714 deals announced by 86 members of <i>Fortune</i> 100 between 1990 and 1999; seven types of deals distinguished; data sources are SDC, CRSP, and Compustat	Average effect of all deal types is negative but small (two-day CAR is –0.053%); no significant difference among deal types; firm effects biggest contributor to variance; firm-governance choice interactions are also significant

# Hypothesis : base scenario



# Depending on the type of alliance ?



# Methodology

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## Event studies

- Examination of abnormal changes in stock prices of partners and rivals
- R&D related alliances
- Telecom sector (knowledge intensive industry)

## Data sample

- Period : January 1996 to December 2004
- Stock price between  $t - 170$  days and  $t + 3$  days
- 705 alliances based on SIC Codes
- Sample reduced following :
  - Cross check with DJ News (drop 137)
  - Exclusion of potential contamination alliances and strategic moves
  - Stock price data availability.
- Alliances : 289 on ALLSIC and 166 on PRIMSIC
- Rivals : 433 on ALLSIC and 184 on PRIMSIC

# Methodology

## Dependent variable

- Estimate daily return for stock price (t – 170 days and t – 21 days)

$$r_{it} = \alpha_i + \beta_i rm_t + \varepsilon_{it}$$

- Predict expected daily return over the « event windows » (t-1,t), (t-1,t+1), (t-3,t+3)

$$R_{it} = \alpha_i + \beta_i rm_t$$

- Compute abnormal return for each day over the event window

$$AR_{it} = R_{it} - r_{it}$$

- Compute Cumulative Abnormal Return (t-1,t), (t-1,t+1), (t-3,t+3)

$$CAR_i = \sum_{t=-1} AR_{it}$$

*For each partner and each rival for each relevant alliance event*

# Methodology

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## Independent variables : alliance characteristics

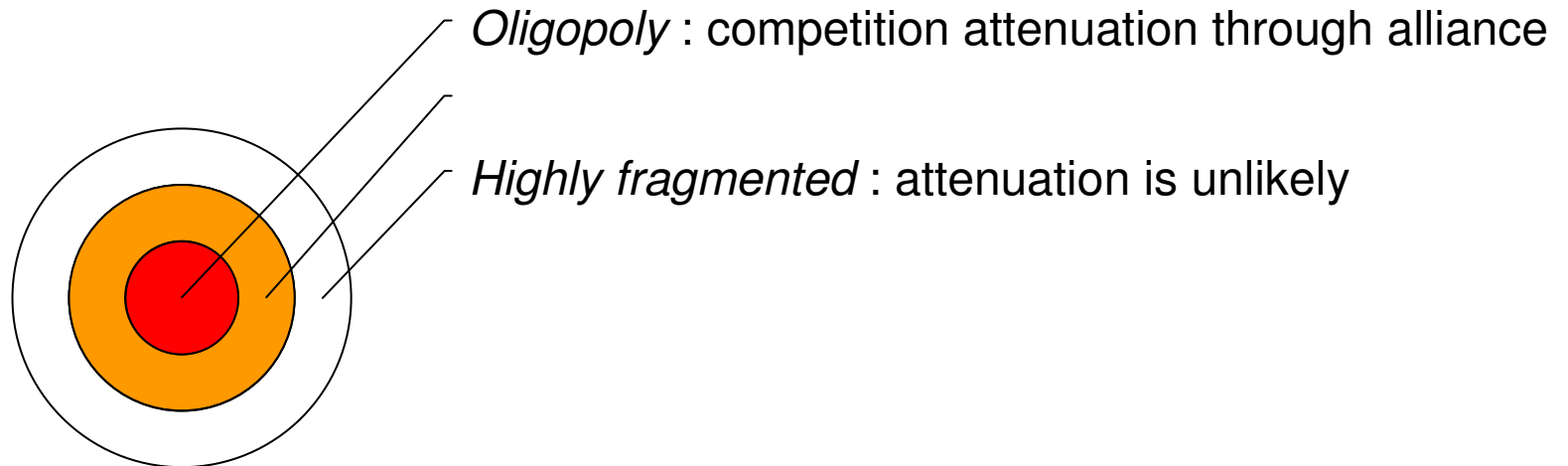
- Horizontal alliance
  - 1 if all partners have the same PRIMSIC, 0 otherwise
- Cross border alliance
  - 1 if at least 2 countries, 0 otherwise
- Joint venture
  - 1 if stand alone entity, 0 otherwise
- Multilateral
  - 1 if more than two partners, 0 otherwise

# Methodology

## Independent variables : industry characteristics

- C4 Ratio : Sales of the 4 largest firms / Aggregate sales
- C8 Ratio : Sales of the 8 largest firms / Aggregate sales

*What should we expect ?*



# Methodology

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## Firm characteristics and alliance context

- Rival's technology capability
  - Log Citation-Weighted Patents
- Overlap with alliance's technology
- Firm size
  - Log Sales
- Demonstration effect
  - Prior alliances in primary SIC
  - Prior alliances among partners

*What should we expect ?*

- *? positive coef Spillover effect on rival*
- *? positive coeff : Spillover effect on rival*
- *?? Negative coefficient*

# Results

## Returns to alliance participants : base case

	mean	std dev	min	max	nb of obs
PRIMSIC sample (%)					
<i>Partner CAR2</i>	<b>1,64**</b>	10,78	-16,39	130,4	403
<i>Partner CAR3</i>	2,26**	14,15	-16,68	163,8	403
<i>Partner CAR7</i>	2,34**	15,45	-41,33	168,5	403
ALLSIC sample					
<i>Partner CAR2</i>	<b>1,28**</b>	9,05	-17,55	130,4	740
<i>Partner CAR3</i>	1,60**	11,97	-46,89	163,8	740
<i>Partner CAR7</i>	1,68**	13,45	-50,36	168,6	740

\* $p < 0,10$ , \*\* $p < 0,05$



*Positive and abnormal returns for alliance participants*

# Results

## Returns to rivals : base case

	mean	std dev	min	max	nb of obs
PRIMSIC sample (%)					
<i>Partner CAR2</i>	<b>0,121</b>	0,08	-0,725	1,77	6,345
<i>Partner CAR3</i>	0,13	0,094	-0,949	1,66	6,345
<i>Partner CAR7</i>	0,221	0,14	-1,325	2,53	6,345
ALLSIC sample					
<i>Partner CAR2</i>	<b>-0,012</b>	0,097	-0,864	8,9188	25,073
<i>Partner CAR3</i>	-0,072	0,108	-1,201	8,862	25,073
<i>Partner CAR7</i>	-0.068**	0.151	-2.629	7.972	25,073



*No statistical difference from zero*

# Results : industry / firms characteristics

	<i>PRIMSIC Sample</i>			<i>ALLSIC Sample</i>		
<i>Partner CAR</i>	0.050* (0.030)	0.054** (0.027)	0.053* (0.028)	0.034** (0.015)	0.034** (0.015)	0.035** (0.015)
<i>Horizontal Alliance</i>	0.008* (0.005)	-0.019 (0.015)	-0.031 (0.020)	0.009* (0.005)	0.001 (0.017)	0.000 (0.025)
<i>Cross-Border Alliance</i>	-0.013*** (0.005)	-0.013*** (0.004)	-0.013*** (0.004)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)
<i>Joint Venture</i>	-0.001 (0.006)	-0.002 (0.006)	-0.002 (0.006)	-0.001 (0.003)	-0.001 (0.003)	-0.001 (0.003)
<i>R&amp;D Plus</i>	-0.008* (0.004)	-0.008* (0.004)	-0.008* (0.004)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)
<i>Multilateral Alliance</i>	0.002 (0.007)	0.004 (0.007)	0.005 (0.007)	0.003 (0.004)	0.003 (0.004)	0.003 (0.004)
<i>C4 Ratio</i>		-0.040*** (0.014)			-0.014** (0.007)	
<i>Horizontal * C4</i>		0.045** (0.022)			0.012 (0.025)	
<i>C8 Ratio</i>			-0.047*** (0.016)			-0.017** (0.008)
<i>Horizontal * C8</i>			0.052** (0.025)			0.010 (0.031)
<i>Constant</i>	0.000 (0.003)	0.025** (0.010)	0.025** (0.010)	-0.005*** (0.001)	0.004 (0.005)	0.008 (0.007)
<i>N</i>	6,345	6,345	6,345	25,073	24,946	24,946
<i>R-square</i>	0.015	0.025	0.024	0.004	0.005	0.005
<i>F-statistic</i>	2.91**	7.64***	8.56***	1.90*	2.60***	2.61***
<i>No. of clusters</i>	166	166	166	289	285	285

*Note.* OLS regression, robust standard errors, clustered on deal.

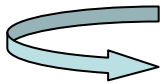
\*, \*\*, \*\*\*Significant at 10%, 5%, and 1% levels, respectively, for two-tailed tests. Robust standard errors are in

# Results

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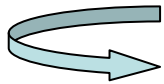
## Effect of alliance characteristics and industry characteristics

### Horizontal alliance



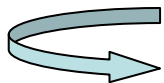
Positive and significant interaction for rivals in concentrated industry

### Cross border alliance



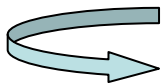
Negative and significant correlation (PRIMSIC) – New skills developed

### Joint venture



Insignificant

### Multilateral



Insignificant

# Results : alternative explanations

	PRIMSIC sample			ALLSIC sample		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Partner CAR</i>	0.051** (0.026)	0.079** (0.040)	0.075* (0.039)	0.035** (0.015)	0.039 (0.025)	0.039 (0.025)
<i>Horizontal Alliance</i>	-0.020 (0.014)	-0.024 (0.016)	-0.024 (0.016)	-0.001 (0.017)	-0.009 (0.017)	-0.012 (0.017)
<i>Cross-Border Alliance</i>	-0.012** (0.005)	-0.015*** (0.005)	-0.014*** (0.005)	-0.004 (0.003)	-0.004 (0.003)	-0.007* (0.004)
<i>Joint Venture</i>	-0.003 (0.006)	-0.001 (0.007)	-0.002 (0.007)	-0.001 (0.003)	-0.000 (0.004)	-0.001 (0.004)
<i>R&amp;D Plus</i>	-0.008** (0.004)	-0.010** (0.004)	-0.010** (0.005)	-0.002 (0.002)	-0.001 (0.003)	-0.001 (0.003)
<i>Multilateral Alliance</i>	0.008 (0.007)	0.006 (0.008)	0.010 (0.008)	0.004 (0.004)	0.004 (0.005)	0.004 (0.005)
<i>C4 Ratio</i>	-0.041*** (0.014)	-0.045*** (0.015)	-0.045*** (0.015)	-0.017** (0.007)	-0.017** (0.008)	-0.021*** (0.008)
<i>Horizontal × C4</i>	0.045** (0.021)	0.057** (0.027)	0.057** (0.027)	0.014 (0.024)	0.027 (0.027)	0.031 (0.026)
<i>Prior Alliances Among Partners</i>	-0.002*** (0.001)		-0.002*** (0.001)	0.000 (0.001)		0.000 (0.001)
<i>Prior Alliances in Primary SIC</i>	-0.000 (0.000)		-0.000 (0.000)	0.000 (0.000)		0.000*** (0.000)
<i>Log Sales (rival)</i>		0.002** (0.001)	0.002** (0.001)		0.001* (0.000)	0.001** (0.000)
<i>Log Citation-Weighted Patents (rival)</i>		-0.002* (0.001)	-0.002* (0.001)		-0.000 (0.000)	-0.001 (0.000)
<i>Technological Overlap (rival-partner)</i>		0.004 (0.006)	0.004 (0.005)		0.002 (0.005)	0.001 (0.005)
<i>Constant</i>	0.026** (0.011)	0.021* (0.011)	0.020* (0.012)	0.004 (0.005)	0.001 (0.006)	0.000 (0.006)
<i>N</i>	6,345	5,491	5,491	24,946	16,282	16,282
<i>R-square</i>	0.027	0.037	0.040	0.007	0.007	0.012
<i>F-statistic</i>	7.57***	6.57***	6.04***	3.19***	1.82*	2.92***
<i>No. of clusters</i>	166	152	152	285	285	285

Note. OLS regression, robust standard errors, clustered on deal.

\*, \*\*, \*\*\*Significant at 10%, 5%, and 1% levels, respectively, for two-tailed tests. Robust standard errors are in parentheses.



# Conclusion and limits

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- Both views are true, alliances can create values by :
  - Softening competition in an industry
  - Or by resource accumulation and interpartner learning
- Which effect dominates ? It depends on
  - Type of alliance
  - Industry and context
- Limitations :
  - Focus on R&D alliances only
  - Focus on high tech industry (vs. utilities)
  - Focus on alliances vs. M&A
- This is based on market expectations over 7 days after the alliance announcement
  - This assumes market efficiency ?
  - What about value creation later in the process ?