Firms' innovation strategy under the shadow of analyst coverage

JFE 2019.02

汇报人：崔易

2019年9月16日

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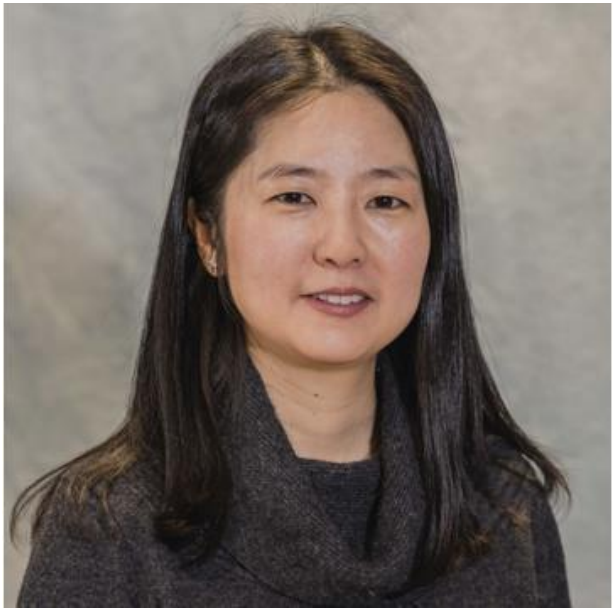

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Publications:

[1] Guo, B., Lou, Y. & Pérez-Castrillo, D.: "Investment, duration, and exit strategies for corporate and independent venture capital-backed start-ups", Journal of Economics and Management Strategy vol. 24 (2), Verano 2015, 411-451.

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Publications:

[1]Endogeneous matching in university-industry collaboration: Theory and empirical evidence from the UK (with A. Banal-Estañol and I. Macho-Stadler). Management Science, 64(4), 1591–1608, 2017

[2] Discrimination in a Model of Contests with Incomplete Information about Ability (with D. Wettstein), International Economic Review, 57(3), 881-914, 2016

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Publications:

[1] Toldrá, A. & Reboul, J.: "The strategic behaviour of firms with debt", Journal of Financial and Quantitative Analysis vol. 51 (5), October 2016, 1611-1636.
[2] Toldrá, A., Sapienza, P. & Zingales, L.: "Understanding trust", The Economic Journal vol. 123 (573), December 2013, 1313-1332.

1. Introduction

2. Relation to the existing literature

3. Sample selection, variables, and summary statistics

4. Empirical strategy

5. Baseline results

6. Direct versus indirect effect of the number of analysts

7. Discussion of innovation outcomes

8. EPS pressure and innovation strategy

9. Conclusion

Abstract

- We study the effect of analyst coverage on firms' innovation strategy and outcome.
- Using data of US firms from 1990 to 2012, we find evidence that an increase in financial analysts leads firms to cut research and development expenses, acquire more innovative firms, and invest in corporate venture capital.
- We attribute the first result to the effect of analyst pressure and the others to the informational role of analysts.
- We also find that financial analysts encourage firms to make more efficient investments related to innovation, which increases their future patents and citations and influences the novelty of their innovations.

1.Introduction

A. Background

- Long-term growth in profits depends significantly on firms' investment in innovation activities.However, firms may not invest in innovation in an optimal way. Some distortions arise because the decisions as to whether and how to invest in innovation are not only affected by their long-term expected benefits but also by other considerations. Among the factors that can distort firms' incentives to innovate, the recent literature has highlighted the recommendations or reports issued by financial analysts.

B. The main work

We contribute to our understanding of the effect of financial analysts on firm innovation by isolating the **information** and **pressure** effects of analysts in a unified framework. To do so, we study **three different channels** through which firms can invest in innovation and show that the information and pressure effects affect each of these investment channels differently.

2. Relation to the existing literature

- A theoretical paper by Manso(2011) shows that the best way to motivate managers toinnovate is by offering managerial contracts that tolerate failure in the short run and reward success in the long run.Empirically, some papers analyze **the effects of financial contracting** like institutional ownership (Aghion et al., 2013), corporate venture capital (Chemmanur et al.,2014), financial derivatives (Blanco and Wehrheim, 2017） characteristics of board of directors (Balsmeier et al., 2017),or corporate tax (Mukherjee et al., 2017) on innovation.
- The **closest paper** to ours is a recent paper by He and Tian (2013), which shows that analyst coverage reduces firms' innovation output as measured by patents and citations.

We contribute to this literature by studying the effect of analyst coverage on firms' innovation strategy,namely their choice of **internal** and **external** innovation,and the effects of these channels on the final innovation **outcome**.

- Bushee(1998) finds that managers are more inclined to cut R&D expenses in response to a decrease in earnings and that this is more likely to happen when a large portion of institutional owners are nondedicated (i.e., short-term) investors.
- A related paper by Yu (2008) finds, in contrast, that firms with more analysts manage their accrual based earnings less, and recent work by Irani and Oesch(2016) suggests that managers decrease real earnings management but increase accrual manipulation when they are followed by more analysts.

Add to the literature that studies the effect of financial markets on **managerial myopia.**

- The recent paper by Chen et al. (2015) shows a positive monitoring role of analysts: following a decrease in coverage, shareholders value internal cash holdings less, their CEOs receive higher excess compensation, and they are more likely to engage in value-destroying acquisitions.
- A related paper by Derrien and Kecskés (2013) shows that a decrease in analyst coverage increases the cost of capital, which results in a decrease in firm investments such as acquisition expenses.

Add to the literature that studies the **governance role** of financial analysts.

- Bena and Li (2014), who study whether acquisition decisions are based on the innovative output of acquirers and targets.
- Dushnitsky and Lenox (2005) that analyzes firms’ decisions to pursue equity investments in new ventures to adopt innovative ideas, instead of investing in internal R&D.

We advance on this topic by studying the effect of financial market analysts on the internal versus external decision to innovate.

3. Sample selection, variables, and summary statistics

3.1. Sample selection

The sample used in this paper includes information on US public firms for the period 1990–2012.(exclude financial and utilities firms)
Retrieve financial statements information from **Compustat.**

- Obtain financial analyst information from the **Institutional Brokers Estimate Systems (I/B/E/S) database**
- Collect information on firms' acquisitions from the **Securities Data Company (SDC) Mergers and Acquisitions database.**
- Obtain the fund names and the names of the parent companies that have a CVC fund from the **Thomson ONE private equity database**
- Manually merge the CVC funds information to our sample of Compustat firms

- Institutional ownership data comes from **Thomson's CDA/Spectrum database**
- Board characteristics come from **BoardEx**
- Obtain patent and citation information from **the National Bureau of Economic Research (NBER) Patent Citation database address these two problems by supplementing the NBER database withthe Harvard Business School (HBS) patent database**

Variable definitions

Variables	Definitions
Innovation	
R&D change	Ratio of R&D expenses (Compustat data item ♯46) to total assets (♯6) at t minus ratio of R&D expenses to total assets at $t-1$
R&D cut	Indicator variable equal to one if R&D (♯46)—scaled by total assets (♯6)—at t is lower than that at $t-1$, and zero otherwise
Acquisition	Indicator variable equal to one when a firm acquires one or more other companies, and zero otherwise
LnAcquisitions	Natural logarithm of (one plus) the number of target companies acquired
CVC setup	Indicator variable equal to one the year in which CVC fund makes its first investment, and zero for the years preceding the first investment
CVC investments	Indicator variable equal to one for each year in which CVC fund invests in a start-up, and zero otherwise
LnTargPatent	Natural logarithm of (one plus) the accumulated number of patents on average of all target firms acquired
LnTargCite	Natural logarithm of (one plus) the accumulated number of citations on average of all target firms acquired
LnPatents	Natural logarithm of (one plus) the number of granted patents per year of a firm
LnCitations	Natural logarithm of (one plus) the number of citations per year of a firm
LnBackCitations	Natural logarithm of (one plus) total number of citations that firms' patents make to prior patents
LnTop1Citations	Natural logarithm of (one plus) number of patents of a firm with citations in the top 1% in the distribution of citations.
LnNewTechnology	Natural logarithm of (one plus) number of patents filed in technology classes previously unknown to the firm
Analyst coverage	
LnCoverage	Natural logarithm of (one plus) the arithmetic mean of the 12 monthly numbers of earnings forecasts obtained from financial analysts
EPSP	Difference between the firm's end of fiscal year realized EPS and the EPS consensus forecast made by analysts the second month in the last quarter

Control Variables

Firm size	Natural logarithm of book value of total assets (#6) at the end of the fiscal year
R&D	R&D expenses (#46) divided by book value of total assets (#6)
Firm age	Natural logarithm of the number of years listed on Compustat
Leverage	Book value of debt (#9 + #34) divided by book value of total assets (#6)
Cash	Cash (#1) at the end of fiscal year divided by book value of total assets (#6)
Profitability	Operating income before depreciation (#13) divided by book value of total stockholders' equity (#216)
PPE	Property, plant, and equipment (#8) divided by book value of total assets (#6)
Capex	Capital expenditure (#128) divided by book value of total assets (#6)
InstOwn	Average institutional ownership percent for a firm
Tobin's Q	Market value of equity (#199 × #25) plus book value of assets (#6) minus book value of equity (#60) minus balance sheet deferred taxes (#74), divided by book value of assets (#6)
KZ index	Kaplan and Zingales index calculated as −1.002× cash flow [(#18 + #14)/#8] plus 0.283 × Tobin's Q plus 3.139 × leverage minus 39.368 × dividends [(#21 + #19)/#8] minus 1.315 × cash holdings (#1/#8), where #8 is lagged
CGIndex	Average of three standardized variables: the percentage of independent directors on a board, G-index, and CEO duality
HHI	Herfindahl–Hirschman Index calculated as sum of sales revenue scaled by sales of four-digit standard industrial classification (SIC) code
HHI^2	Squared Herfindahl–Hirschman Index

Summary statistics

Variable	25th percentile	Median	Mean	75th percentile	Std. dev.	No. of obs.
R&D	0.008	0.038	0.083	0.109	0.127	34,307
R&D change	−0.006	0.000	0.002	0.008	0.066	26,734
R&D cut	0.000	0.000	0.483	1.000	0.500	26,734
Acquisition	0.000	0.000	0.154	0.000	0.361	34,307
NumofAcquisitions	0.000	0.000	0.205	0.000	0.570	34,307
CVC setup	0.000	0.000	0.003	0.000	0.056	31,454
CVC investments	0.000	0.000	0.014	0.000	0.118	34,307
TargPatent	0.000	0.000	4.299	0.000	77.621	4204
TargCite	0.000	0.000	70.165	0.000	1143.696	4204
Patents	0.000	1.000	24.545	6.000	146.720	18,191
Citations	0.000	4.000	280.027	58.000	1944.356	18,191
BackCitations	26.000	95.000	811.982	405.500	3273.194	7968
Top1Citations	0.000	0.000	1.135	0.000	4.850	7970
NewTechnology	0.000	1.000	1.666	2.000	2.792	7970
Coverage	1.600	4.333	6.644	9.250	7.058	34,307
EPSP	−0.020	0.010	0.006	0.037	0.066	20,147
Positive EPSP (indicator)	0.000	1.000	0.559	1.000	0.496	20,147
Negative EPSP (indicator)	0.000	0.000	0.354	1.000	0.478	20,147
Zero EPSP (indicator)	0.000	0.000	0.087	0.000	0.281	20,147
Firm size	4.543	5.745	5.919	7.102	1.870	34,307
Firm age	8.000	14.000	19.273	27.000	14.877	34,307
Leverage	0.007	0.131	0.184	0.287	0.213	34,307
Cash	0.041	0.145	0.236	0.366	0.242	34,307
Profitability	0.050	0.223	0.171	0.363	0.548	34,307
PPE	0.085	0.175	0.224	0.308	0.180	34,307
Capex	0.020	0.037	0.051	0.066	0.052	34,307
InstOwn	0.093	0.432	0.436	0.709	1.495	34,307
Tobin's Q	1.190	1.807	2.981	3.241	3.443	34,307
KZ index	−6.696	−1.543	−7.477	0.606	20.455	34,307
CGIndex	−0.232	0.263	0.232	0.795	0.704	34,307
HHI	0.134	0.216	0.287	0.381	0.206	34,307
HHI^2	0.018	0.047	0.125	0.145	0.189	34,307

$$InnovStrategy_{(i,t+k)} = \alpha + \beta LnCoverage_{(i,t)} + \gamma X_{(i,t)} + \lambda_i + \delta_t + \varepsilon_{(i,t)}, \quad (1)$$

$$ExpCoverage_{(i,t,j)} = (Brokersize_{(t,j)}/Brokersize_{(0,j)}) * Coverage_{(i,0,j)} \quad (2)$$

$$ExpCoverage_{(i,t)} = \sum_{j=1}^{n} ExpCoverage_{(i,t,j)}, \quad (3)$$

The effect of financial analysts on firms'R&D expenses.

Panel A: OLS				
Dependent variable	*R&D change*		*R&D cut*	
	(1) $t+1$	(2) $t+2$	(3) $t+1$	(4) $t+2$
LnCoverage	−0.009***	−0.004***	0.035***	0.028***
	(0.001)	(0.001)	(0.009)	(0.009)
Control variables	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
No. of observations	26,734	24,391	26,734	24,156
R^2	0.153	0.134	0.157	0.127

Panel B: IV 2SLS

Dependent variable	First-stage	Second-stage			
	LnCoverage	*R&D change*		*R&D cut*	
	(1) *t*	(2) *t + 1*	(3) *t + 2*	(4) *t + 1*	(5) *t + 1*
ExpCoverage	0.373***				
	(0.023)				
LnCoverage (Instrumented)		−0.007**	−0.006*	0.063**	0.066**
		(0.003)	(0.003)	(0.030)	(0.030)
Firm size	0.425***	0.018***	0.013***	−0.095***	−0.081***
	(0.015)	(0.002)	(0.002)	(0.016)	(0.016)
R&D	0.583***			1.327***	0.632***
	(0.067)			(0.073)	(0.069)
Firm age	0.093***	−0.010***	−0.001	0.045***	0.007
	(0.028)	(0.002)	(0.002)	(0.016)	(0.016)
Leverage	−0.160***	−0.021***	−0.005	−0.038	−0.073***
	(0.044)	(0.006)	(0.006)	(0.027)	(0.026)
Cash	0.219***	0.035***	−0.007	−0.200***	−0.100***
	(0.042)	(0.006)	(0.005)	(0.032)	(0.032)
Profitability	−0.004	0.008***	0.006***	0.025***	0.021**
	(0.009)	(0.002)	(0.002)	(0.008)	(0.008)
PPE	0.223**	−0.028***	−0.021**	0.251***	0.127**
	(0.094)	(0.010)	(0.010)	(0.065)	(0.064)
Capex	0.833***	−0.009	−0.068***	0.025	0.386***
	(0.128)	(0.020)	(0.019)	(0.111)	(0.115)
InstOwn	0.444***	−0.003	−0.000	−0.027	−0.030
	(0.047)	(0.003)	(0.003)	(0.026)	(0.026)
Tobin's Q	0.006***	−0.001***	0.000*	0.001	−0.007***
	(0.002)	(0.000)	(0.000)	(0.001)	(0.001)
KZ index	0.001***	−0.000***	−0.000***	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CGIndex	0.043***	−0.003***	−0.002	0.014*	0.003
	(0.013)	(0.001)	(0.001)	(0.009)	(0.009)
HHI	−0.404**	0.017	0.001	0.102	−0.047
	(0.189)	(0.014)	(0.014)	(0.117)	(0.116)
HHI^2	0.289*	−0.012	0.004	−0.117	−0.009
	(0.171)	(0.012)	(0.012)	(0.111)	(0.113)
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes
No. of observations	26,734	26,734	24,391	26,734	24,156
F-statistic	302.7				
R^2	0.862	0.153	0.134	0.156	0.127

The effect of financial analysts on firms' acquisition strategy

Panel A: OLS				
Dependent variable	*Acquisition*		*LnAcquisitions*	
	(1) $t+1$	(2) $t+2$	(3) $t+1$	(4) $t+2$
LnCoverage	0.023***	0.016***	0.019***	0.015***
	(0.005)	(0.006)	(0.005)	(0.005)
Control variables	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
No. of observations	34,307	32,966	34,307	32,966
R^2	0.243	0.238	0.273	0.266

Panel B: IV 2SLS

Dependent variable	Second-stage			
	Acquisition		*LnAcquisitions*	
	(1) $t+1$	(2) $t+2$	(3) $t+1$	(4) $t+2$
LnCoverage	0.059***	0.038**	0.060***	0.032**
(Instrumented)	(0.020)	(0.019)	(0.017)	(0.016)
Firm size	−0.018*	−0.034***	−0.018*	−0.028***
	(0.011)	(0.011)	(0.010)	(0.009)
R&D	−0.135***	−0.097***	−0.120***	−0.080***
	(0.028)	(0.028)	(0.024)	(0.023)
Firm age	−0.019*	−0.011	−0.024**	−0.009
	(0.011)	(0.012)	(0.010)	(0.010)
Leverage	−0.079***	−0.068***	−0.065***	−0.055***
	(0.015)	(0.016)	(0.013)	(0.013)
Cash	0.170***	0.104***	0.128***	0.084***
	(0.022)	(0.020)	(0.019)	(0.017)
Profitability	0.005	0.007**	0.003	0.006**
	(0.004)	(0.004)	(0.003)	(0.003)
PPE	0.032	0.024	0.021	0.030
	(0.035)	(0.034)	(0.030)	(0.029)
Capex	−0.107*	−0.030	−0.121**	−0.061
	(0.062)	(0.061)	(0.053)	(0.050)
InstOwn	0.004***	−0.000	0.003***	−0.000
	(0.001)	(0.000)	(0.001)	(0.000)
Tobin's Q	0.003***	0.001	0.003***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
KZ index	−0.000**	−0.000	−0.000**	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)
CGIndex	0.015**	0.013**	0.012**	0.012**
	(0.006)	(0.006)	(0.005)	(0.005)
HHI	0.090	0.031	0.106	0.041
	(0.078)	(0.077)	(0.068)	(0.067)
HHI^2	−0.045	−0.014	−0.055	−0.014
	(0.073)	(0.073)	(0.062)	(0.063)
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
No. of observations	34,307	32,966	34,307	32,966
R^2	0.242	0.237	0.270	0.266

Number of analysts and acquisition innovativeness

Dependent variable	*LnTargPatent*		*LnTargCite*	
	(1)	(2)	(3)	(4)
	$t+1$	$t+2$	$t+1$	$t+2$
LnCoverage	0.339**	0.319**	0.344**	0.277*
(Instrumented)	(0.154)	(0.133)	(0.174)	(0.152)
Control variables	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
No. of observations	4204	3977	4204	3977
R^2	0.220	0.223	0.217	0.221

the effect of analysts on firms' CVC investments

Panel A: OLS				
Dependent variable	*CVC setup*		*CVC investments*	
	(1) $t+1$	(2) $t+2$	(3) $t+1$	(4) $t+2$
LnCoverage	0.001	0.001**	0.007***	0.007***
	(0.001)	(0.000)	(0.002)	(0.003)
Control variables	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
No. of observations	31,454	30,141	34,307	32,966
R^2	0.389	0.385	0.309	0.303

Panel B: IV 2SLS

Dependent variable	Second-stage			
	CVC setup		*CVC investments*	
	(1) $t+1$	(2) $t+2$	(3) $t+1$	(4) $t+2$
LnCoverage	0.008***	0.007***	0.032***	0.027***
(Instrumented)	(0.002)	(0.002)	(0.010)	(0.011)
Firm size	−0.002	−0.002	−0.005	−0.005
	(0.001)	(0.001)	(0.005)	(0.006)
R&D	−0.007**	0.003	−0.018*	−0.011
	(0.003)	(0.003)	(0.010)	(0.011)
Firm age	0.004***	0.003***	0.019***	0.019***
	(0.001)	(0.001)	(0.006)	(0.006)
Leverage	−0.001	−0.000	−0.013**	−0.010*
	(0.002)	(0.002)	(0.006)	(0.006)
Cash	−0.001	−0.002	−0.022***	−0.017**
	(0.002)	(0.002)	(0.008)	(0.008)
Profitability	−0.000*	0.000	−0.001	−0.001
	(0.000)	(0.000)	(0.001)	(0.001)
PPE	−0.001	−0.002	0.017	0.034**
	(0.003)	(0.003)	(0.015)	(0.015)
Capex	−0.007	−0.009	−0.039*	−0.040*
	(0.007)	(0.006)	(0.020)	(0.021)
InstOwn	−0.000	−0.000	−0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Tobin's Q	−0.000	−0.000**	0.003***	0.004***
	(0.000)	(0.000)	(0.001)	(0.001)
KZ index	0.000	0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)
CGIndex	−0.002**	−0.000	−0.002	0.001
	(0.001)	(0.001)	(0.002)	(0.002)
HHI	0.008	0.011	0.089**	0.099**
	(0.009)	(0.007)	(0.044)	(0.046)
HHI²	−0.002	−0.005	−0.053	−0.066
	(0.007)	(0.007)	(0.042)	(0.045)
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
No. of observations	31,454	30,141	34,307	32,966
R^2	0.387	0.383	0.303	0.299

Robustness: a quasi-natural experiment

$$InnovStrategy_{(i,m,t)} = \beta_0 + \beta_1 Treated_{(i,m)} + \beta_2 Post_{(m,t)} + \beta_3 (Treated_{(i,m)} * Post_{(m,t)}) + \alpha_i + \phi_m + \delta_t + \gamma X_{(i,t)} + u_{(i,t)}, \quad (4)$$

Panel A: Number of analysts

Dependent variable	*Coverage (t+1)*	*Coverage (t+2)*
	(1)	(2)
DID effect	−1.2***	−1.5***
	(0.24)	(0.25)
Firm fixed effect	Yes	Yes
No. of observations	21,029	31,196
R^2	0.90	0.89

Panel B: Basic matching

Dependent variable	*R&D cut*		*Acquisition*		*LnAcquisitions*		*CVC setup*		*CVC investments*	
	(1) $t+1$	(2) $t+2$	(3) $t+1$	(4) $t+2$	(5) $t+1$	(6) $t+2$	(7) $t+1$	(8) $t+2$	(9) $t+1$	(10) $t+2$
DID effect	−0.09**	−0.08***	−0.05*	−0.05*	−0.10***	−0.08***	−0.02	−0.03**	0.02	0.004
	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Year & merger fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	21,029	31,196	21,029	31,196	21,029	31,196	19,199	28,274	21,029	31,196
R^2	0.26	0.22	0.43	0.39	0.38	0.34	0.03	0.03	0.58	0.57

Panel C: Matched sample

Dependent variable	*R&D cut*		*Acquisition*		*LnAcquisitions*		*CVC setup*		*CVC investments*	
	(1) $t+1$	(2) $t+2$	(3) $t+1$	(4) $t+2$	(5) $t+1$	(6) $t+2$	(7) $t+1$	(8) $t+2$	(9) $t+1$	(10) $t+2$
DID effect	−0.08*	−0.08*	−0.07*	−0.07**	−0.08**	−0.08**	−0.03*	−0.03**	0.001	−0.01
	(0.05)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.017)	(0.01)	(0.02)	(0.02)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Year & merger fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2120	3180	2120	3180	2120	3180	1707	2526	2120	3180
R^2	0.38	0.28	0.52	0.42	0.56	0.48	0.03	0.03	0.66	0.59

Split sample analysis

Panel A: Corporate governance								
Dependent	*R&D change*	*R&D cut*	*Acquisition*	*LnAcquisitions*	*LnTargPatent*	*LnTargCite*	*CVC setup*	*CVC investments*
variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Good governance:								
LnCoverage	−0.007	0.047	0.146***	0.132***	0.561	0.493	0.010**	0.022
	(0.005)	(0.058)	(0.042)	(0.036)	(0.441)	(0.505)	(0.004)	(0.018)
No. of obs	13,614	13,614	17,239	17,239	2104	2104	15,507	17,239
R^2	0.190	0.187	0.258	0.292	0.213	0.228	0.452	0.347
Low governance:								
LnCoverage	−0.011**	0.104**	0.019	0.021	0.396***	0.419**	0.007**	0.046***
	(0.004)	(0.043)	(0.021)	(0.018)	(0.147)	(0.165)	(0.003)	(0.014)
No. of obs	13,120	13,120	17,068	17,068	2100	2100	15,947	17,068
R^2	0.231	0.226	0.319	0.342	0.288	0.273	0.454	0.372

Panel B: Financial constraints

Dependent	*R&D change*	*R&D cut*	*Acquisition*	*LnAcquisitions*	*LnTargPatent*	*LnTargCite*	*CVC setup*	*CVC investments*
variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High financial constraints:								
LnCoverage	−0.006	0.091**	0.037	0.043**	0.064	0.089	0.011***	0.033***
	(0.003)	(0.045)	(0.025)	(0.021)	(0.196)	(0.218)	(0.003)	(0.011)
No. of obs	11,936	11,936	17,154	17,154	2102	2102	16,044	17,154
R^2	0.405	0.194	0.272	0.304	0.268	0.267	0.392	0.398
Low financial constraints:								
LnCoverage	−0.006	0.027	0.092**	0.085**	0.611*	0.547	0.007**	0.029
	(0.005)	(0.053)	(0.040)	(0.034)	(0.328)	(0.370)	(0.003)	(0.021)
No. of obs	14,798	14,798	17,153	17,153	2102	2102	15,410	17,153
R^2	0.235	0.219	0.302	0.330	0.237	0.248	0.479	0.352

Panel C: High-tech versus low-tech industries

Dependent	*R&D change*	*R&D cut*	*Acquisition*	*LnAcquisitions*	*LnTargPatent*	*LnTargCite*	*CVC setup*	*CVC investments*
variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High-tech industries:								
LnCoverage	–0.008**	0.074**	0.064**	0.069***	0.469**	0.505**	0.010***	0.050***
	(0.004)	(0.033)	(0.027)	(0.023)	(0.191)	(0.216)	(0.003)	(0.014)
No. of obs	21,649	21,649	23,162	23,162	3102	3102	20,852	23,162
R^2	0.156	0.162	0.251	0.286	0.183	0.177	0.414	0.307
Low-tech industries:								
LnCoverage	–0.004*	0.007	0.055**	0.046**	–0.105	–0.179	0.007**	0.004
	(0.002)	(0.071)	(0.026)	(0.022)	(0.225)	(0.259)	(0.003)	(0.011)
No. of obs	5085	5085	11,145	11,145	1102	1102	10,602	11,145
R^2	0.197	0.141	0.212	0.222	0.314	0.310	0.269	0.255

Direct versus indirect effect of the number of analysts

$$ExternalInnov_{(i,t+k)} = \alpha + \beta_1 LnCoverage_{(i,t)} + \beta_2 R\&DCut_{(i,t+1)} + \beta_3 (LnCoverage_{(i,t)} * R\&DCut_{(i,t+1)}) + \gamma X_{(i,t)} + \lambda_i + \delta_t + \varepsilon_{(i,t)}, \quad (5)$$

Panel A: Acquisitions

Dependent variable	*Acquisition*		*LnAcquisitions*	
	(1) $t+1$	(2) $t+2$	(3) $t+1$	(4) $t+2$
LnCoverage	0.072***	0.047**	0.076***	0.040**
(Instrumented)	(0.024)	(0.023)	(0.021)	(0.019)
R&D cut	0.034**	0.031**	0.030**	0.031**
	(0.016)	(0.015)	(0.013)	(0.013)
InteractR&D	−0.008	−0.015	−0.007	−0.014*
(Instrumented)	(0.010)	(0.009)	(0.008)	(0.008)
Control variables	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
No. of observations	26,734	25,732	26,734	25,732
R^2	0.254	0.248	0.287	0.280

Panel B: Innovative acquisitions

Dependent variable	*LnTargPatent*		*LnTargPatent*	
	(1) $t+1$	(2) $t+2$	(3) $t+1$	(4) $t+2$
LnCoverage	0.455***	0.312**	0.495**	0.269
(Instrumented)	(0.173)	(0.150)	(0.195)	(0.172)
R&D cut	0.204	−0.181	0.224	−0.203
	(0.153)	(0.144)	(0.168)	(0.151)
InteractR&D	−0.075	0.133*	−0.087	0.144*
(Instrumented)	(0.082)	(0.079)	(0.089)	(0.081)
Control variables	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
No. of observations	3533	3415	3533	3415
R^2	0.209	0.212	0.201	0.209

Panel C: CVC investments

Dependent variable	*CVC setup*		*CVC investments*	
	(1) $t+1$	(2) $t+2$	(3) $t+1$	(4) $t+2$
LnCoverage	0.009***	0.006*	0.035***	0.028**
(Instrumented)	(0.003)	(0.003)	(0.012)	(0.012)
R&D cut	0.004	0.002	0.005	0.010
	(0.004)	(0.003)	(0.009)	(0.008)
InteractR&D	−0.003	−0.001	−0.004	−0.007
(Instrumented)	(0.003)	(0.002)	(0.006)	(0.005)
Control variables	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
No. of observations	24,140	23,157	26,734	25,732
R^2	0.398	0.382	0.314	0.315

The possible consequences of the change in firms' innovation strategy due to analyst coverage on the final innovation outcome

$$InnovOutcome_{(i,t+3)} = \alpha + \beta_1 LnCoverage_{(i,t)} + \beta_2 InnovStrategy_{(i,t+1)} + \beta_3 (LnCoverage_{(i,t)} * InnovStrategy_{(i,t+1)}) + \gamma X_{(i,t)} + \lambda_i + \delta_t + \varepsilon_{(i,t)}, \quad (6)$$

Panel A: Patents				
Dependent variable	*LnPatents(t+3)*			
	(1)	(2)	(3)	(4)
LnCoverage	0.071	0.051	0.063	0.066
(Instrumented)	(0.073)	(0.072)	(0.072)	(0.073)
R&D cut	0.013	−0.053*	0.013	0.013
	(0.010)	(0.031)	(0.010)	(0.010)
Acquisition	0.032**	0.033**	−0.063	0.032**
	(0.015)	(0.015)	(0.060)	(0.015)
CVC investments	0.387***	0.388***	0.381***	−0.331
	(0.062)	(0.062)	(0.062)	(0.317)
InteractR&D		0.042**		
(Instrumented)		(0.021)		
InteractAcquisition			0.052	
(Instrumented)			(0.035)	
InteractCVC				0.269**
(Instrumented)				(0.121)
Control variables	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
No. of observations	18,191	18,191	18,191	18,191
R^2	0.787	0.787	0.787	0.787

Panel B: Citations

Dependent variable	*LnCitations(t+3)*			
	(1)	(2)	(3)	(4)
LnCoverage	0.047	0.023	0.041	0.042
(Instrumented)	(0.075)	(0.075)	(0.075)	(0.075)
R&D cut	0.010	−0.070**	0.010	0.010
	(0.011)	(0.033)	(0.011)	(0.011)
Acquisition	0.031*	0.032*	−0.053	0.030*
	(0.017)	(0.017)	(0.065)	(0.017)
CVC investments	0.414***	0.416***	0.409***	−0.253
	(0.067)	(0.067)	(0.067)	(0.333)
InteractR&D		0.051**		
(Instrumented)		(0.032)		
InteractAcquisition			0.045	
(Instrumented)			(0.038)	
InteractCVC				0.250**
(Instrumented)				(0.127)
Control variables	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
No. of observations	18,191	18,191	18,191	18,191
R^2	0.762	0.762	0.762	0.762

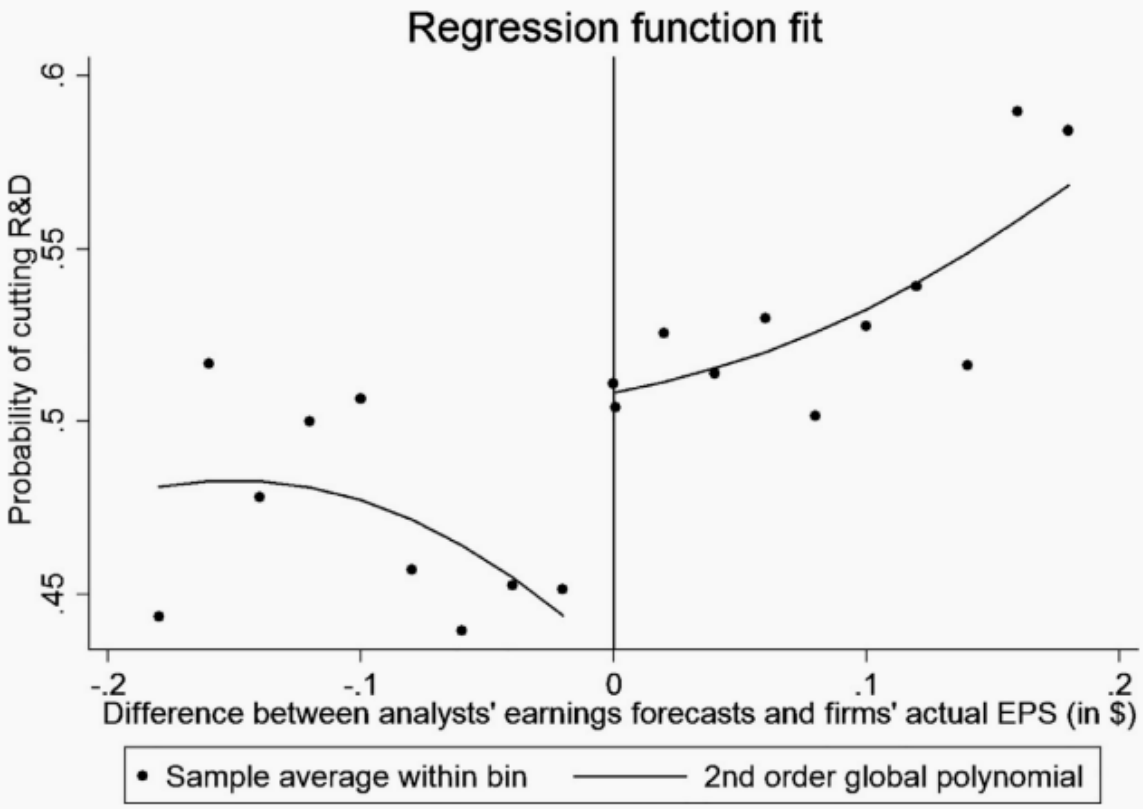

Fig. 1. Probability of cutting R&D. This figure plots the probability that firms cut R&D spending by the end of the fiscal year as a function of EPSP measured by the distance between analysts' consensus forecasts and the actual firms' EPS. For every EPSP bin, the dots represent the probability of a cut in R&D—the proportion of firm years that cut R&D from all the firm years included in that bin (bins are of two cents). The lines are second-order polynomials fitted through the estimated probabilities on each side of the zero EPSP threshold.

We formally analyze this discontinuity estimating the following regression:

$$R\&D_{(i,t)} = \alpha + \beta_1 I_{MeetBeat(i,t)} + \beta_2 EPSP_{(i,t)} + \beta_3 EPSP^2_{(i,t)} + \beta_4 EPSP_{(i,t)} * I_{MeetBeat(i,t)} + \beta_5 EPSP^2_{(i,t)} * I_{MeetBeat(i,t)} + \beta_6 X_{(i,t)} + \lambda_i + \delta_t + \varepsilon_{(i,t)}, \quad (7)$$

The effect of cutting R&D expenses in the short-term due to EPSP on firms' innovation outcomes:

$$InnovOutcome_{(i,t+k)} = \alpha + \gamma_1 R\&Dcut_{(i,t)} + \gamma_2 EPSP_{(i,t)} + \gamma_3 EPSP_{(i,t)} * I_{MeetBeat(i,t)} + \gamma_4 X_{(i,t)} + \delta_t + \varepsilon_{(i,t)}, \quad (8)$$

Panel A: EPSP and R&D activities

Dependent variable	*R&D cut*			*R&D change*		
	(1) t	(2) t	(3) $t+1$	(4) t	(5) t	(6) $t+1$
$I_{MeetBeat(i,t)}$	0.034*	0.032**	−0.009	−0.000	−0.001	−0.000
	(0.011)	(0.015)	(0.016)	(0.001)	(0.002)	(0.002)
EPSP	−0.186	0.113	−0.118	−0.021	−0.058	0.024
	(0.128)	(0.426)	(0.450)	(0.017)	(0.056)	(0.053)
EPSP polynomial	1-order	2-order	2-order	1-order	2-order	2-order
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	20,147	20,147	18,560	20,147	20,147	18,560
R^2	0.174	0.174	0.181	0.224	0.224	0.208

Panel B: EPSP, R&D cut, and patents

Dependent variable	*LnPatents*		*LnCitations*	
	(1) $t+3$	(2) $t+4$	(3) $t+3$	(4) $t+4$
R&D cut	0.081	−0.904	−0.222	−1.248
(Instrumented)	(1.074)	(1.183)	(1.191)	(1.369)
EPSP polynomial	1-order	1-order	1-order	1-order
Control variables	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
No. of observations	10,963	10,963	10,963	10,963
R^2	0.492	0.339	0.456	0.222

Conclusions

- We find evidence that firms followed by more financial analysts are more likely to cut their internal R&D programs, which provides evidence of their pressure effect.
- Firms followed by more financial analysts are also more likely to start or increase CVC investments and to acquire other innovative firms, which provides evidence of their information effect.
- We find that firms that cut R&D expenses after being followed by financial analysts produce more patents and citations.
- Both the pressure and information effects of financial analysts induce firms to make more efficient decisions regarding their innovation activity.

- Financial analysts affect the type of innovation produced. In particular,firms that are followed by more financial analysts tend to produce less radical innovation, as do firms that cut R&D.In contrast, we find that acquisitions and CVC investments enable firms to produce more breakthrough innovations.

THANKS !