



The effect of the financial crisis on patterns of innovation investment in Europe: an analysis of Innobarometer

Daniele Archibugi, Andrea Filippetti, Marion Frenz

Birkbeck Centre for Innovation Management

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Introduction

- The 2008 financial crisis reduced firms' investment in innovation
- Exploration of firm level determinants of innovation investment at three points in time:
 - Before the crisis
 - During the crisis
 - Following on from the crisis

Innobarometer Survey 2009

- Data collected in EU27 plus Norway and Switzerland via telephone interviews between 1st and 9th of April 2009
- Responses from 5,238 enterprises with 20 or more employees with their main activities in innovation intensive industry sectors
- Stratified random sample: 5 size bands, 2-digit industry codes and country
- The 2009 version has unique questions related to investment in innovation during the crisis in 2008

Dependent variables

(a) before the crises: *“compared to 2006 has the total amount spent by your firm on all innovation activities in 2008 increased, decreased or stayed approximately the same?”*

(b) during the crisis: *“in the last six months has your company taken one of the following actions as a direct result of the economic downturn; increased total amount of innovation expenditures, decreased [...] or maintained [...]?”*

(c) following on from the beginning of the crisis: *“compared to 2008, do you expect your company to increase, decrease or maintain the total amount of its innovation expenditure in 2009?”*

Investment in innovation related activities before, during and following on from the crisis

<i>Dependent variable: change in innovation related investment</i>	Before the crisis		During the crisis		Following on from the beginning of the crisis	
	(T1)		(T2)		(T3)	
	<i>Frequency</i>	<i>Percent</i>	<i>Frequency</i>	<i>Percent</i>	<i>Frequency</i>	<i>Percent</i>
Increase	1,985	38	453	9	659	13
Decrease	472	9	1,231	24	1,560	30
Maintain	2,207	42	2,961	57	2,452	47
Innovation active firms	4,664	89	4,645	90	4,671	90
No innovation activities	328	6	457	9	343	7
Missing observations	242	5	132	3	220	4
Number of observations	5,234	100	5,234	100	5,234	100

Are the enterprises investing before, during and following on from the crisis the same enterprises or different enterprises?

			During the crisis (T2)			Total
			Increase	Decrease	Maintain	
Before the crisis (T1)	Increase	<i>Frequencies</i>	332	445	1,124	1,901
		<i>Column percentages</i>	76	38	40	43
	Decrease	<i>Frequencies</i>	18	255	167	440
		<i>Column percentages</i>	4	22	6	10
	Maintain	<i>Frequencies</i>	88	469	1,538	2,095
		<i>Column percentages</i>	20	40	54	47
	Total	<i>Frequencies</i>	438	1,169	2,829	4,436
		<i>Column percentages</i>	100	100	100	100

Chi²(4)=463; p<0.01

Independent variables

- Newly established
- Small enterprise
- Medium enterprise
- Large enterprises
- Low innovation intensity
- High innovation intensity
- In-house R&D
- Bought-in R&D
- Link with other firms
- Link with the knowledge base
- International collaboration
- Investment in companies abroad
- Enterprise competes on innovations
- Enterprise competes on improvements
- Enterprise competes on new business models
- Enterprise competes on cost
- IPRs
- Technological opportunities
- Market opportunities
- International market

Methodology

- Limited dependent variable takes values of 1=decrease, 2=maintain, 3=increase
- Logistic regressions predicting increase compared with maintain and decrease
- Multinomial regressions with three outcomes
- Controls, robust standard errors

<i>Dependent variable: increase in innovation related investment</i>	Before the crisis	During the crisis	Following on from the crisis
Estimation method: logistic	(T1)	(T2)	(T3)
Newly established	-0.19	-0.12	0.27*
Medium enterprise	0.13	-0.13	0.10
Large enterprise	0.12	-0.64***	-0.15
High innovation intensity	0.97***	0.20*	0.01
In-house R&D	0.33***	0.21	0.20*
Bought-in R&D	0.26***	-0.08	-0.07
Link with other firms	0.36***	0.33**	0.23*
Links with the knowledge base	0.07	0.15	0.15
International collaboration	0.30***	0.38***	0.35***
Investment in companies abroad	-0.02	-0.05	-0.33**
Enterprise competes on innovations	0.29***	0.36**	0.58***
Enterprise competes on improvements	0.24**	0.22	0.61***
Enterprise competes on business models	0.14	0.15	0.52***
IPRs	0.27**	0.32**	0.16
Technological opportunities	0.20***	0.04	0.07
Market opportunities	0.16**	0.40***	0.17
International market	-0.16*	-0.02	0.00
<i>Industry dummies</i>	Included	Included	Included
<i>Country dummies</i>	Included	Included	Included
Number of observations	3,959	3,886	3,890
Wald Chi ² (64)	524***	150***	179***
Pseudo R ²	0.11	0.07	0.06

Discussion

Before the economic downturn, firms expanding their innovation are: i) well-established; ii) engaged in formal R&D; iii) exploit IPRs; and iv) involved in collaboration with other businesses.

During the economic downturn the few firms that are “swimming against the stream” are: i) smaller; ii) collaborating with other businesses; iii) using IPRs; and iv) less likely to compete on costs.

Younger firms are more likely to increase innovation investment after the crisis.

While before the crisis technological opportunities have a positive impact on investment, during and after the crisis firms are more likely to explore innovative solutions by looking at opportunities in new markets.

Conclusions

- Crisis is not likely to further concentrate activities in the most innovative firms
- Policy instruments directed at small, start-up firms have potential to increase investment during the recession; fostering innovation through increased transparency about new market openings; relevance of IPR regime
- While the Innobarometer data offers unique possibilities, it also constraints the analysis, e.g. omission of US and regions outside EU, relatively short time periods, no full panel