What hampers innovation?
Revealed versus deterring barriers to innovation

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Crisis and Innovation Workshop
Birkbeck College
13 March 2012
Why obstacles to innovation?

- Relevance for public policy:
  - Removing obstacles to innovation is a **necessary condition** to innovate
  - (Traditional) incentives to innovation are not a **sufficient condition** to innovate
  - Guidelines for policy makers on detailed areas of intervention rather than indiscriminate incentives

- Relevance for business strategy
  - Identifying firms’ and contextual characteristics that are more likely to encounter barriers
Why obstacles in the current crisis context?

- Exacerbation of systemic failures, barriers and mis-trust
- Backlash of financial resources' shrink on other barriers
- Over-emphasis on financial difficulties undermines other equally important obstacles (knowledge, market, institutional)
- At the same time, the crisis has been sparked by a substantial increase of innovation in the financial sector: opening or shutting down the tap?
- How to ‘redirect‘ efforts toward ‘real innovation‘?
What contribution for Innovation Studies?

- Over-emphasis on factors of success and innovative firms
- Under-exploration of determinants of failure and characteristics of non-innovative firms
- Few innovation survey-based studies dealing with barriers
- Methodological implications for CIS data collection
- Relevant econometric issues raising from the assessment of obstacles and reverse causality
Introduction

Motivation

Outline

- Background on barriers to innovation
- Our own conjectures of deterring versus revealed barriers
  - Deterring barriers hamper firms to enter the innovation context
  - Revealed barriers are experiences ‘in the making’ of innovation – i.e. ‘disclosing’ outcome based on learning experience
- Taxonomy of innovators, potential innovators and not innovation–oriented
- Empirical analysis of engagement in innovation and perception of obstacles
- Discussion of results
- Further avenues of research
Types of barriers - Community Innovation Survey

- Financial
  - Excessive perceived economic risk
  - Direct innovation costs too high
  - Cost of finance
  - Availability of finance

- Knowledge
  - Lack of qualified personnel
  - Lack of information in technology
  - Lack of information on markets

- Market
  - Market dominated by established firms
  - Uncertain demand for innovative products

- Regulation
  - Need to meet UK government regulation
  - Need to meet EU regulation
Overview of literature

- Factors affecting the perception of the importance of barriers (Mohnen and Rosa, 2000; Baldwin and Lin, 2002; Galia and Legros, 2004; Iammarino et al., 2009)

- Impact of (mainly financial) obstacles on the propensity/intensity of innovation (Arundel, 1997; Tourigny and Le, 2004; Mohnen and Roller, 2001, 2005; Savignac, 2006 and 2008; Tiwari et al., 2007; Mancusi and Vezzulli, 2010)
Perception of obstacles

▶ General (counter–intuitive!) finding: a positive relation between engagement in /intensity of innovation and assessment of barriers as highly important

▶ Interpretation as a signal of ‘the ability of the firm to overcome the barrier‘ (Baldwin and Lin, 2002; Tourigny and Le, 2004)

▶ Management literature confirms that setbacks and failures characterise innovation processes (Ferriani et al., 2008)
Impact of (financial) obstacles on innovation

- Firms innovative effort is significantly reduced by the presence (or perception) of financial obstacles (Savignac, 2006 and 2008)
- No evidence on the other obstacles: it is impossible to find suitable instruments to correct for endogeneity with obstacles other than the financial ones
- Potential sources of bias for the positive relation:
  - Heterogeneous unobserved factors
  - Simultaneity of decision to innovate and to finance it
  - Selection bias against ‘not innovation-oriented’ rather than ‘constrained non-innovators’
Deterring barriers

- Management literature drawing on in-depth case studies
- Large established firms suffer from lock-in and resistance to adjust (Ferriani et al., 2008)
- Resistance to engage in radical innovation to avoid cannibalising existing products or destabilising core competences (Henderson, 1993)
- Small new firms suffer from lack of knowledge or financial resources (Katila and Shane, 2005) or market structure (Nelson and Winter, 1982; Malerba and Orsenigo, 1993, 1995)
Conjectures

- There are two types of barriers, revealed and deterring
- **Revealed barriers** – a learning process associated to innovation ‘in the making’
- Firms differ in their propensity to innovate - so that ‘not innovation–oriented‘ should be distinguished from ‘potential innovators‘ (who might suffer barriers)
- Knowledge, Marketing and Regulation barriers to innovation are equally – if not more – important than financial ones
Translating conjectures into empirical estimation

- Testing how the degree of firms innovation engagement affects the perception of barriers as being important
- Accounting for all type of barriers (Finance, Knowledge, Market and Regulation)
- Controlling for firms and context fixed effects (size, group, age, region, sectors, internationalisation)
- Multivariate Probit Model estimating simultaneously the factors affecting the joint perception of different set of barriers (for technicalities see DEste et al., 2008, 2012)
Sample

- **Non–innovation oriented** are excluded: 3,126 firms who declare to be non–innovation active either due to prior innovation or to market condition and did not experience any barrier

- **Potential innovators**: 12,024 firms who engaged in innovation activities or did not do so due to one or more obstacles of which:
  - **Actual innovators**: 5,820 firms introducing product/process innovation
  - **Innovative–active**: 3,078 firms devoting financial resources to innovation activities though not introducing any innovation
## Engagement in innovation and perception of obstacles

<table>
<thead>
<tr>
<th>Type of Barriers</th>
<th>Zero</th>
<th>1–2</th>
<th>3–4</th>
<th>5–7</th>
<th>Chi-square (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>30.7</td>
<td>29</td>
<td>36.6</td>
<td>42.8</td>
<td>136.69*</td>
</tr>
<tr>
<td>Knowledge</td>
<td>12.1</td>
<td>10.8</td>
<td>13.1</td>
<td>15.2</td>
<td>25.26*</td>
</tr>
<tr>
<td>Market</td>
<td>19</td>
<td>15.3</td>
<td>17.4</td>
<td>19.7</td>
<td>23.95*</td>
</tr>
<tr>
<td>Regulation</td>
<td>16.8</td>
<td>14.5</td>
<td>15.4</td>
<td>18.5</td>
<td>18.03*</td>
</tr>
</tbody>
</table>
Engagement in innovation and perception of obstacles

MPM results: Dep. Var. At least 1-barrier item assessed as highly important

<table>
<thead>
<tr>
<th>Expl. Vars.</th>
<th>Cost</th>
<th>Knowledge</th>
<th>Market</th>
<th>Regulation</th>
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</thead>
<tbody>
<tr>
<td>No innov</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>1–2 Innov</td>
<td>-0.077 **</td>
<td>-0.07</td>
<td>-0.188 ***</td>
<td>-0.06</td>
</tr>
<tr>
<td>3–4 Innov</td>
<td>0.140 ***</td>
<td>0.089 **</td>
<td>-0.101 **</td>
<td>0.04</td>
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<tr>
<td>5–7 Innov</td>
<td>0.299 ***</td>
<td>0.219 ***</td>
<td>-0.03</td>
<td>0.241 ***</td>
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<tr>
<td>Ln Empl</td>
<td>-0.049 ***</td>
<td>-0.070 ***</td>
<td>-0.037 ***</td>
<td>-0.074 ***</td>
</tr>
<tr>
<td>Group</td>
<td>0.03</td>
<td>-0.04</td>
<td>0.01</td>
<td>-0.079 **</td>
</tr>
<tr>
<td>Start up</td>
<td>0.111 ***</td>
<td>0.05</td>
<td>0.072 **</td>
<td>-0.076 **</td>
</tr>
<tr>
<td>Intl mkt</td>
<td>0</td>
<td>-0.035 **</td>
<td>0.041 ***</td>
<td>-0.096 ***</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.311 ***</td>
<td>-0.831 ***</td>
<td>-0.722 ***</td>
<td>-0.776 ***</td>
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<tr>
<td>Regions</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
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<tr>
<td>Sector</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
</tbody>
</table>

Rho1 1
Rho2 0.431 ***
Rho3 0.372 ***
Rho4 0.359 ***
No. obs 11747
Log Likelihood -21049.7
Wald 2(96) 723.0 ***
## Results

### Deterring versus revealed

- Making sense of the seemingly counter-intuitive evidence
- U–shape relationship between engagement in innovation and perception of obstacles: **deterring** effect for cost and market barriers
- **Revealed** effect is stronger for knowledge and regulation barriers
- Market concentration and lack of demand are actual **deterrent** and there is not much ‘learning‘ effects

### Control vars

- Large firms are less likely to perceive obs as relevant
- Mature firms are less likely to assess market and cost obs as relevant
- Internationalisation helps releasing the pressure of knowledge and regulation (but not of cost and market related barriers)
Wrapping up

- Deterring and revealed effects require distinct policy interventions.
- Cost and market barriers seem to be most deterrent when starting engaging in innovation.
- While knowledge and regulation are mostly perceived ‘in the making’ of innovation.
- Revealed and deterring effects might co-occur depending on the phase of the innovation trajectory.
- Overall, financial constraints are over–emphasised by the literature.
- Market structure (i.e. dominated by established incumbents) and lack of demand are major obstacles (in the Schmooklerian vein).
Future avenues of research

- Reprising the role of Schmooklerian demand in fostering innovation and releasing a major deterrent for firms
- Disentangling the role of geographical location of firms in affecting the perception of barriers (extending results in Iammarino et al., 2009)
- Looking more in depth at the sectoral differences in the perception of obstacles
- Assessing the impact of policy on attenuating deterring barriers
- Availability of longitudinal data would allow to look at the perception of barriers and their effects in relation to the economic cycle