

An experimental approach to industrial policy evaluation: the case of Creative Credits

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Setting the scene

- ‘Experimental methods’ of policy evaluation are well-established in education and social policy and development economics.
- In an early study Greenberg and Schroder (1991) identified more than 90 experimental field trials in health insurance, prisoner rehabilitation, labour supply, worker training and housing subsidies
- Banerjee and Duflo (2008) describe the ‘recent surge in experimental work’ in development economics
- Typically such evaluations involve individual human subjects facing some common socio-economic problem, and the random allocation of subjects to a treatment and control group. Differences in outcomes between the treatment and control groups are then attributed to the effect of the policy intervention



Setting the scene

- In terms of industrial policy, however, experimental policy evaluation approaches remain marginal, with non-experimental, ex post policy evaluations remaining the norm.
- Potter and Storey (2007), for example, provide an extensive review of OECD best practice without any mention of either the application or potential for experimental methods.
- Similarly, experimental approaches are largely ignored in UK government guidance (BIS, 2009) and evaluating innovation policy (Laredo, 1997)
- Why is there this contrast between industrial and social policy applications of experimental evaluation methods? Ethical issues may actually be less pressing for industrial policy evaluation

So what do we do here?

- We propose and test an experimental approach to the evaluation of new industrial policy interventions. We call the approach RCT+ as it is based on:
 - Randomised allocation
 - Longitudinal approach
 - Mixed-methods data collection
- Contributions
 - Provide an assessment of value of experimental approaches to industrial policy evaluation
 - Extend standard experimental approaches – which are typically summative – to provide causal insights
 - Illustrate how a longitudinal approach so can reflect time profile of scheme outcomes
- Empirical focus of the paper is the Creative Credits scheme – a UK-based B2B innovation voucher programme designed to create new innovation partnerships between SMEs and creative services firms (e.g. designers)



Why bother?

- A key issue with policy evaluation is that treated and non-treated outcomes for any individual/firm are not observed. So how to model? Or more accurately how to construct treatment and control groups which differ only in terms of the treatment (and avoid issues of selection)
- Three situations (Imbens and Wooldridge, 2009)
 - Random allocation – as in experiments
 - Un-confounded allocation – allocation related to characteristics
 - Confounded allocation – allocation related to outcomes
- Latter two arise from non-experimental designs – such as peer evaluation of applications - and require econometric or other means of ‘controlling’ ex post for selection biases. Such methods widely used, e.g. two-stage Heckman models
- But such methods often require strong structural assumptions and identifying restrictions and results can vary between estimation methods

On experiments ...

- Experimental methods – based on randomised allocation – offer a way of avoiding issues of selection rather than correcting ex post (with its attendant difficulties)
- But experiments themselves are subject to series of potential implementation issues which can reduce their ‘validity’ (or ability to provide true representation of a treatment effect)
- Threats to internal validity – i.e. treatment v control
 - Small sample issues (Bruhn and McKenzie, 2009)
 - Substitution bias (Heckman and Smith, 1995)
 - Signalling bias (e.g. Meuleman and Maeseneire, 2012)



On experiments ...

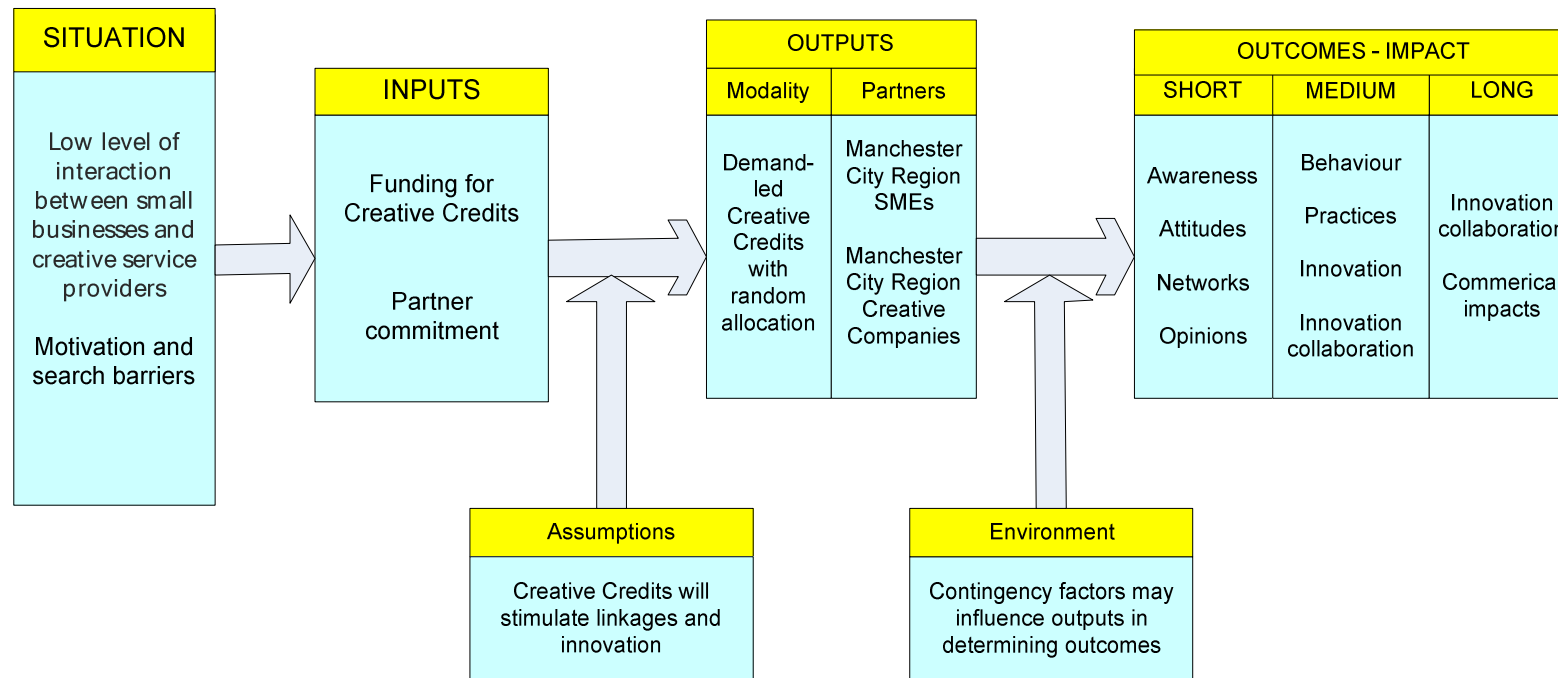
- Threats to external validity – i.e. in-scheme v not in-scheme
 - Macro biases (information flows, social interaction, norm formation) (Garfinkel et al., 1990)
 - Participation bias (differing characteristics) (Burtless, 1995)
 - Randomisation bias (Heckman and Smith, 1995).
- But these threats – based largely on statistical arguments - may be offset by economic arguments in favour of randomised allocation (Reiner, 2011)
 - May avoid adverse selection
 - May be more cost effective
- So far based discussion largely on debate on validity in quantitative evaluation literature but in qualitative literature parallel debate about ‘trustworthy’ evaluation (Guba and Lincoln, 1989)

The policy experiment

- Creative Credits:
 - Manchester City Region – Sept 2009 to October 2010
 - 150 Creative Credits worth £4,000 with £1,000 firm contribution to stimulate collaborative project
 - 672 applications, 22 per cent funded
 - Allocation of Creative Credits by simple lottery
- And the logic model



Creative Credits logic model

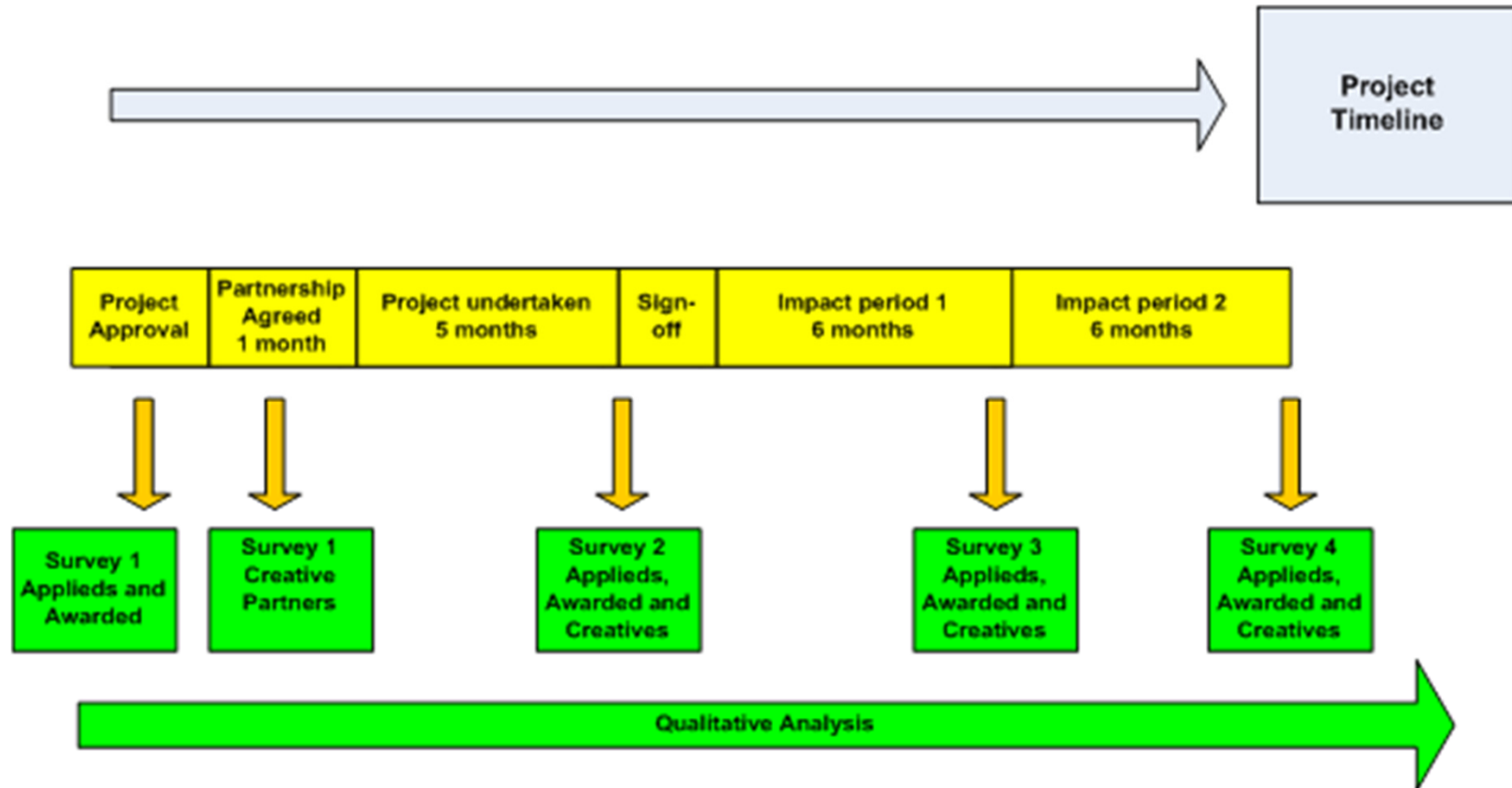


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 - Allocation of Creative Credits by simple lottery
- ***Outcome measures (measured after 6 and 12 months):***
 - Short-term – project additionality – more projects?
 - Longer term
 - output additionality (sales, innovation),
 - behavioural additionality (innovation intention),
 - network additionality (partnering intention)

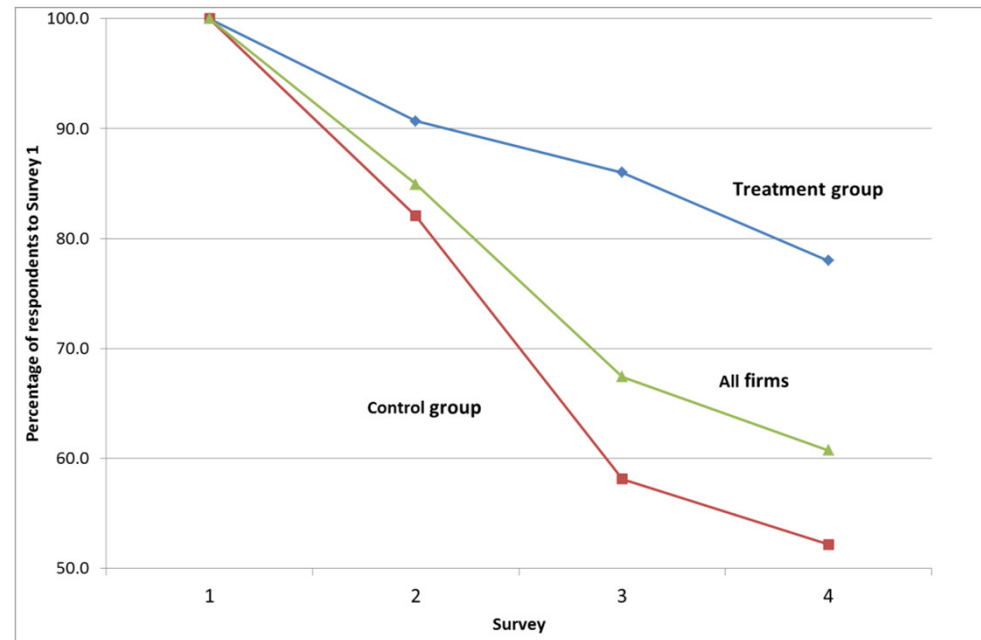


Collecting evaluation data – quant and qual strands



Collecting evaluation data – in practice

- Four surveys over two years so attrition was a problem – used some small financial incentives
- By survey 4. Treatment -78 per cent response (n=117), control group 52.2 per cent (n= 157)
- Clearly bias between groups but comparison of baseline characteristics suggests NO systematic bias within groups
- Longitudinal sample therefore considered ‘representative’ and preserved internal validity



Project additionality – a strong positive effect

Table 1: Project Additionality - The likelihood of firms undertaking their innovation project

Dependent variable: Whether or not firms undertook their project

Number of observations 451

Adjusted R-squared 0.653

| Variable | Coefficient | Std. Err. | t-statistic | Signif |
|-----------------|-------------|-----------|-------------|----------|
| Creative Credit | 0.840 | 0.028 | 29.11 | 0.000*** |
| Constant term | 0.119 | 0.017 | 7.18 | 0.000*** |

Notes: Analysis is based on respondents to the initial baseline survey undertaken immediately after the allocation of Creative Credits. *** denotes significance at the 1 per cent level.

- ...award of a Creative Credit increases the probability of project going ahead by 84 per cent

Project additionality – a strong positive effect



- With RCT+, our qualitative data identified two main factors that underpinned the robust quantitative estimates of project additionality:
 - First, SMEs described how their project fed operational plans and how they anticipated it would enable them to market their company offering more widely
 - Second, a number of companies indicated how the Creative Credit had helped them to ‘accelerate things’ (W1S8): ‘I’d have waited until we’d accumulated more money. And then probably programmed it in for sort of the back end of this year’ (W1S10).



Output additionality – a transitory effect

Table 2: Output additionality in terms of the probability of innovation: 6 months and 12 months after the completion of the Creative Credits projects

| | N | Control % firms | Treatment % firms | t-statistic | Signif. |
|--------------------------------|---------|--------------------|----------------------|-------------|----------|
| A. After 6 months | | | | | |
| Product or service innovation | 145/105 | 55.9 | 72.4 | 2.740 | 0.007*** |
| New to the market innovation | 126/92 | 23.0 | 35.9 | 2.089 | 0.038** |
| Process innovation | 142/105 | 47.2 | 63.8 | 2.618 | 0.009*** |
| B. After 12 months | | | | | |
| Product or service innovation | 154/113 | 63.0 | 70.8 | 1.345 | 0.180 |
| New to the market innovation | 135/97 | 32.6 | 40.2 | 1.192 | 0.235 |
| Process innovation | 153/111 | 51.0 | 47.7 | 0.517 | 0.606 |
| | N | Control % | Treatment % | $\chi^2(6)$ | Signif. |
| C. Average Sales Growth | | | | | |
| After 6 months | 146/107 | 6.4 | 7.5 | 11.5 | 0.075* |
| After 12 months | 155/114 | 4.7 | 7.8 | 7.7 | 0.261 |

- ...positive and significant effects after 6 months but no measurable effect after 12 months – a transitory impact on the probability of innovation and sales



Output additionality – a transitory effect

- In the short-term, our qualitative analysis suggested a largely picture of the Creative Credits scheme and its results.
- However longer-term, the qualitative data supported the absence of any boost to sales growth.
- Many SMEs, like their wider markets, experienced a drop in sales over the recession period undermining the value of the project.
- As one SME reported: ‘it was like sticking a Band Aid on a much bigger problem’ (W1S3). For a few SMEs the impact was low because they were dissatisfied with their innovation outcome: ‘If I was to pay that out of my own account I would just not be happy at all’.



Behavioural additionality – future innovation intentions – little positive effect

| | N] | Control | | | Treatment | | | $\chi^2(2)$ | Signif. |
|---------------------------|-----|--------------|----------------|---------------|--------------|----------------|---------------|-------------|---------|
| | | Not Likely % | Quite Likely % | Very Likely % | Not Likely % | Quite Likely % | Very Likely % | | |
| A. After 6 months | | | | | | | | | |
| Goods or services | 248 | 4.3 | 35.5 | 60.3 | 5.6 | 27.1 | 67.3 | 2.036 | 0.361 |
| Processes | 245 | 7.9 | 34.5 | 57.6 | 8.5 | 33.0 | 58.5 | .074 | 0.964 |
| Strategy | 235 | 15.7 | 41.8 | 42.5 | 12.9 | 38.6 | 48.5 | .912 | 0.634 |
| New technologies | 204 | 38.5 | 36.8 | 24.8 | 41.4 | 42.5 | 16.1 | 2.321 | 0.313 |
| Organisation | 216 | 39.5 | 28.7 | 31.8 | 44.8 | 32.2 | 23.0 | 1.984 | 0.371 |
| Marketing | 231 | 10.4 | 40.7 | 48.9 | 11.5 | 45.8 | 42.7 | .864 | 0.649 |
| B. After 12 months | | | | | | | | | |
| Goods or services | 257 | 6.7 | 40.9 | 52.3 | 7.4 | 35.2 | 57.4 | .876 | 0.645 |
| Processes | 260 | 9.3 | 42.4 | 48.3 | 11.9 | 36.7 | 51.4 | 1.059 | 0.589 |
| Strategy | 249 | 14.6 | 45.8 | 39.6 | 18.1 | 38.1 | 43.8 | 1.583 | 0.453 |
| New technologies | 206 | 47.6 | 29.8 | 22.6 | 45.1 | 32.9 | 22.0 | .224 | 0.894 |
| Organisation | 221 | 49.3 | 36.6 | 14.2 | 47.1 | 32.2 | 20.7 | 1.676 | 0.433 |
| Marketing | 235 | 18.4 | 38.2 | 43.4 | 15.2 | 48.5 | 36.4 | 2.464 | 0.292 |

- ... no measureable behavioural effect after either 6 or 12 months - a negative result – and likewise with network additionality ...

Behavioural additionality – future innovation intentions – little positive effect

- In interviews, findings on behavioural/network additionality highlighted:
- First, for some SMEs their Creative Credits project had been based on a ‘transactional’ relationship with their creative service providers: ‘a one-off hit where they got something for free’ (W1C7).
- A second reason for the lack of sustained network additionality was dissatisfaction with their creative partner (W2S2, W1S7, W1S8, W1S11, W1S3). Sometimes ‘it did feel that they were in a sense had bigger fish to fry than our project’ (W2S4).
- Third reason was the lack of brokerage or assistance with identifying/managing the creative partner. SMEs advised that additional networking could help by ‘actually go[ing] and meet[ing] a few of these other companies ... I would get heaps more out of the project’.



Experimental methods - discussion

- Comparing treatment and controls did see some small sample biases but generally randomisation worked well – so internal validity good
- Impact periods really matter – here 6 months v 12 months made a big difference -> value of longitudinal element of RCT+
- Why did this happen though? Here qualitative research was beneficial in highlighting potential causes:
 - Transactional nature of SME-creative relationships
 - Communication and co-ordination issues
 - Poor partner choice (perhaps most important)
- External validity more of an issue due to:
 - Characteristics of firms selecting in to the scheme
 - Potentially macro-biases – although hard to assess
 - Recession effects which may influence outcomes

Conclusions

- Key aim here was to test feasibility of RCT+ methodology and each element added some value
 - Randomisation - > internal validity
 - Longitudinal -> captured varying output effects
 - Qualitative work -> generated causal insights
- But issues did arise with external validity and recession effects both limit generalizability of results
- Important however to realise that neither of these caveats is specific to experimental studies – would apply equally strongly to non-experimental approaches such as a regional pilot scheme

