

Methodological Lock-in and the Evaluation of R&D Policies: A Critique to Quasi-Experimental Assessments

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Abstract

Technological innovation policies represent a strategic area in the field of public policy, and they are bound to face a continuous process of evaluation in order to analyze their effective contribution, as well as to allow their adaptation to changing economic and social contexts. However, a well-known weakness that many policy and scientific evaluations face in terms of R&D initiatives is that of being purely led by technique or method. In this article I build a criticism towards the widespread use of quasi-experimental assessments in the evaluation of RTD policies, as well as the predominance of regressive statistics in economic analysis. In order to illustrate my arguments I develop a simple empirical approach to the case of the Eureka Program

Key Words: RTD policy; Evaluation; Quasi-experimental approaches; Eureka Program

Technological innovation policies represent a strategic area in the field of public policy regardless of governments' political inclination or geographical relevance (national, regional, local or even supranational). This is a result of the role that innovation and technological change play in fostering economic growth and its characteristics of public goods that are likely to create market failures, thus requiring intervention from external institutions (mainly governmental related organizations).

Since such policies can be considered as fundamental for long-term development and are subject to an ever-changing environment, there is a strong need to continuously evaluate their effectiveness. Thus, the process of analyzing and evaluating RTD policies represents means to improve the policymaking process in terms of policies' suitability to a specific context, as well as to provide support for the achievement of managerial progresses in the existing programs. Moreover, there has been an enlarging trend in terms of policy instruments, thus implying a need of a more diverse and complete group of analytical tools.

However, a well-known weakness that many policy and scientific evaluations face in terms of R&D initiatives is that of being purely led by technique or method, thus characterizing this situation as a style-driven “obsession”. The outcome is usually an adaptation of reality to a preexistent mindset, and not the other way around. In fact, there is a broad diversity of methods that can be applied in RTD policy evaluation, suggesting that there are many dimensions of analysis existing in this context, but many of them are neglected in terms of adequacy for a “proper” economic analysis. An assessment of the most influential journals that are focused on the subject of innovation economics can be instructive in showing a strong bias towards regressive statistics, where many other approaches have their contribution diminished in these publications.

For the specific case of RTD policy evaluation, there is a great concern in analyzing if it can be defined as successful or not, and the widespread approach in the economic realm is that of quasi-experimental methodologies. The goal in such sort of research is to emulate a control group using companies under “treatment” (that have participated in a policy initiative) and other companies that have similar profiles and which did not receive any support (did not participate in such initiatives). Results are likely to identify the effects of “treatment” being administered to these “patients”, since differences between similar companies should be attributed to the event being analyzed, i.e., the policy intervention. Therefore, this approach is regarded as an effective way of dealing with self-selection bias.

To illustrate our perspective and criticisms to this approach, we shall build upon the example of the Eureka Program’s evaluation (for an example of quasi-experimental approaches in the case of the Eureka Program, see Bayona-Sáez and García-Marco, 2010). As an introductory aspect to this particular initiative, it is worth highlighting that the Eureka Program emerged as part of a concerted effort to bridge the widening technological gap observed since the 1960s between Europe and its global competitors: notably the USA and Japan. It was created in 1985 by a French initiative as a complementary structure for the Framework Programs aiming at enhancing collaboration between companies in a market oriented, non-bureaucratic, bottom-up approach promoting cooperative projects for national funding.

Eureka became a Europe-wide network that aims at increasing its participants’ competitiveness through the promotion of cross-border “market-driven” R&D projects in which firms may seek entry for any projects that meet the broad criterion of developing advanced technology with a market orientation. Here, emphasis should be put on the relevance of the bottom-up approach of this initiative. Unlike programs that have clearly defined areas of interest for R&D projects, the nature and scope of proposals is defined by proponents.

The deal is that an inherent issue with quasi-experimental assessments regards the impacts of innovation policy on firms’ results. These approaches usually apply corporate performance data (such as ROA) as dependent variables in econometric models, checking for impacts of a specific initiative on firms’ global outcomes. However, even an optimistic policymaker would not expect such a direct relationship that omits market oriented dimensions from the investigation (e.g., demand growth in particular sectors, firms’ rate of investment, industrial structure). What this means is that R&D is a part of companies’ structures, but does not represent the whole picture. Likewise, participation in RTD initiatives can have impacts on these firms’ performance, but to state that such influence is strictly direct and that it happens in a relatively short time span is, to say the least, doubtful.

This is even more pronounced for Eureka individual projects, given its aforementioned decentralized structured (bottom-up approach). Assessing projects’ results as homogeneous (even to a small extent) might lead to spurious results. Here, we understand homogeneity as the perspective that participation in Eureka is beneficial, regardless of actual achievements, as demonstrated in the work of Bayona-Sáez and García-Marco (2010).

A simple exercise proves the validity of such concern. Using data from Eureka's Final Reports we regressed a sample of 77 Spanish companies' achievements (Technological Achievements - TECHACHIEV, Commercial Achievements - COMMACHIEV, and Expected Impacts - EXP_IMPACT) on firms' Return on Total Assets at the time of project completion (ranging from 2000 to 2005 for each firm) and on years +1, +2, and +3 to check for relationships (table 1).

Independent Variable	Dependent variable: Return on Total Assets			
	Standardized Coefficients - Sig. in parentheses			
	Year of Completion	Completion +1	Completion +2	Completion +3
TECHACHIEV	.208 (.093)	-.007 (.959)	-.132 (.305)	.097 (.455)
COMMACHIEV	.099 (.805)	.056 (.684)	.046 (.730)	.020 (.884)
EXP_IMPACT	-	.076 (.560)	.060 (.642)	.031 (.811)
Rsq.	.066	.012	.022	.012
Model Sig.	.095	.853	.674	.849
Durbin Watson	2.057	2.138	1.952	1.788

Table 1. Regressions of Spanish firms' outcomes from Eureka projects (2000-2005) on their overall corporate performance (Return on Total Assets for year of project completion, year +1, +2, +3)

One would expect a positive relationship between independent and dependent variables if Eureka projects were to impact on firms' overall corporate performance, i.e., better results in the project would be related to better overall corporate results. However, as it can be noticed, this is not the case for any period. Even though this approach is somewhat simplistic, it serves the purpose of highlighting the inconsistency of the hypothesis that a) firms' results arising from the participation in RTD policies are homogenous; and b) that even firms that achieve outstanding results in terms of technical and commercial dimensions in a given program cannot necessarily translate these gains into *global* gains for the organization.

This assessment suggests that companies differ in aspects other than those included in conventional models. Furthermore, it gives a strong hint in the direction of understanding that those companies that already outperform their "similar peers" are more prone to engage in such activities as those supported by Eureka. Perhaps the matching-samples do not match the "treated" sample as well as intended.

Are quasi-experimental methodologies a useful approach for RTD policy or any other kind of policy evaluation? Yes. Are they *optimal*? Not at all. Professor Giovanni Dosi in the opening speech of DIME's Final Conference held in Maastricht, 2010, criticized the economic perspective that firms are equal (a common assumption in economic models). Firms are different, he stated. It seems obvious, but for the sake of "good econometrics" this is often forgotten. Quasi-experimental forms of analyzing firm behavior are bound to fail in capturing such differences, for one of its premises is to rely on the aforementioned "control group".

Moreover, quasi-experimental approaches create an aggregated figure of the situation, identifying if the initiative was or was not successful in terms of the relevant indicators under examination. This means that such approach does not provide consistent answers on the heterogeneity of firms participating in a given program, or information on the influential characteristics of such program on companies' results (this view is also supported by Lepori, 2006). In a nutshell, social organizations do not respond to "treatments" the same way that cells or organs do (which is quite an obvious conclusion).

Ultimately, it is not a program that succeeds or not, but the agents that are involved in it. Programs might provide *incentives* for these agents, but their capabilities combined with market and other contextual contingencies are the factor that will determine *economic* (and also technological) performance. It is important to consider that in order to translate new scientific knowledge into commercial innovation is a process that involves obstacles and bottlenecks (Balconi, Brusoni & Orsenigo, 2010). Verifying factors other than just "better or worse than without the initiative" is fundamental for moving forward in RTD evaluation – thus avoiding a methodological lock-in.

To make it clear, my case is in favor of *more diversity* in the use of quantitative techniques in the evaluation of RTD policies, thus taking advantage of the myriad of tools available. For this to happen, it is fundamental that the economics' scientific community start to further acknowledging their contribution. Ultimately, this can contribute to stronger frameworks of analysis for innovation programs, leading to improved initiatives. Innovation Systems, as well as the agents and institutions which they comprise, could benefit from this.

If we resort to the foundations of economic thought, organizations are similar in pursuing individual benefits (*through innovation* for a good contextualization in the terms of this article), but their strategies and tactics to achieve firm-specific goals are highly *idiosyncratic*. This might represent a whole deal of subjectivity in the terms of what represents success or failure, but it also copes better with reality than to build investigations upon models that face such phenomena as irrelevant. This leads us to a scenario in which the logical determinants of outcomes (technological and economic) are *context-specific*.

The inherent problem of evaluating firms' performance through objective indicators lies in this rationale. Firms are not equal, they do not behave equally, and they measure achievements *differently*. Using inherently subjective analysis (e.g. using perception-oriented questionnaires) might not be optimal in terms of adequate consistence for what it is *expected* for firms. However, as they are *private* entities, who is to define what their desirable results ought to be? To rely on subjective observations is to believe that individual perception is related to also individual benefits or characteristics.

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