Risk management systems for occupational safety and health and the "Support incentives for enterprises" programme – Background, rules and some comments on an evaluation

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Abstract

The ISI calls are a policy offering incentives to firms to invest in occupational safety and health. One measure of this policy is devoted to the adoption of systems to manage occupational risk (risk management systems, RMS now on). These are adaptive sets of actions undertaken by a firm to improve its preparedness to manage the emergencies and to reduce risks. In this paper we will show the results of new estimates on the impact of ISI incentives on the firms' accident profile.

In previous papers based on this research (Sella, Ragazzi, Radin 2023; Sella, Ragazzi, Dettmann 2023), some impact of the incentives was detected, but the results were very volatile and not reliable. There are many possible explanations for this lack of robustness:

- Choice of the unit of observation (local unit vs whole firm)
- Sample size (even though our sample is not very small, accidents are very rare events, so large samples are required to detect the impact)
- The problem of non-compliance to assigned treatment (attrition and firms investing even without the incentive), which affects the credibility of the natural experiment evaluation setting
- The role of non-observables as factors conditioning the impact in OSH.
- The role of heterogeneity among yearly calls (in pooled estimations)

In this more advanced version of our research we tackle those problems.

Keywords

Occupational safety and health, risk management systems, quasi experimental design, sample attrition, matching, DID, counterfactual anaysis

1 Promotion of Occupational Safety and Health

Despite the consensus on the need of policy interventions aimed at promoting and improving occupational safety and health (OSH), there is no convergence on the most appropriate way to achieve the goal. Partly, this lack of knowledge is due to the almost complete absence of evaluation studies on this class of policies. So the European Agency for Health and Safety at Work (2013) states that, although the implementation of OSH interventions is of high importance, the effects of the different systems are not evaluated by means of rigorous and scientific evidence-based research.

In 1989, the European Union enforced the EU framework directive (Directive 89/391/EEC) on the introduction of measures to encourage improvements in the safety and health of workers at work. This was the first step towards a common European OSH strategy. It defines the key principles for the

successful management of OSH, setting the employers' responsibility for risk assessment and introducing the use of preventive services and social dialogue with employees (Van Stolk et al., 2012).

There are many options to improve workers' OSH conditions with the aim of reducing occupational accidents and work-related diseases. Most countries rely on regulation enforced through supervision and sanctions, complemented with information, training, assistance and advice. The use of economic incentives for investments in prevention is very scarce. Against this background, the Italian case is particularly interesting.

In 2008, the Italian Parliament introduced the Italian Legislative Decree 81/08, which sets out an obligation for employers to assess all risks to workers' safety and health. In addition, it decided to provide grants addressed to small, medium and micro enterprises (SMEs) that realize investment projects in the field of health and safety at work. The most important program, both in terms of the number of beneficiaries and the provided amounts, has been realized by the National Institute for Insurance against Accidents at Work (INAIL), the Italian public insurance for compulsory OSH insurance. The "Support Incentives for Enterprises program" (in short ISI), provides incentives to invest in safety and health further than what is required by regulation. Since 2010, INAIL has financed OSH projects of about 3 billion euros.

2 The Support Incentives for Enterprises program

The INAIL funding programme is focused on small and micro firms as well as self-employed, mainly in high-risk sectors, e.g. agriculture, fishery, transport. It aims at the reduction of work-related accidents and occupational diseases, improvements of safety and health at work in general, and at increasing the awareness to occupational safety and health.

The firms can apply for non-repayable grants for investment projects like new machines or renovation measures that improve worker's safety, but also for organizational interventions, for instance RMS. The firms receive 40 to 65 percent of the investment costs, depending on the type of investment.

The application process is organized in yearly calls with special regional funding budgets, the so-called "ISI click-day". That means, fFirms apply for funding in an a-priori time frame and are selected on a first-come first-served basis. A standardized online form is used to give information on the firm and a short project description. From the information, the eligibility for funding is assessed. Eligibility depends on a automatically computed score that consists of different sub-scores, depending on the characteristics of the firm (size, sector) and of the project (type of investment, involvement of workers' representatives, adoption of one of the listed good practices, etc). Only if the score exceeds a pre-defined threshold, the firm is eligible to participate in the further process. All eligible projects are collected in chronological order, and if the regional budget is exhausted, the firms do not get any funding in this call.

After the click day, the selected firms provide additional information and documents on the investment, and INAIL verifies the technical suitability of the project and the compliance with the funding rules in a first assessment. If INAIL admits the project, the firm can implement it. After a second verification of the implemented projected, the firm gets the funding.

This process may take 18 to 24 months, and during this time, some firms drop out of the funding process (for different reasons).

… full description of the programme, maybe including a sketch of the process and the numbers (slide 5 of your AISRe presentation)

3 Thoughts on the programme evaluation

Since the available funds are exhausted in a few minutes (or even seconds), the mechanism can be regarded as a natural experiment, where the applicants that arrived too late to be funded represent

our control group. So, this case study represents an unique evaluation setting, seen that the vast majority of interventions in OSH are in the form of overall regulation and lack then of a counterfactual.

There is a second element of interest in a good evaluation of the impact of incentives. In the policy mix among sticks (represented by rules, inspections and fines) and carrots (represented by incentives), the balance is generally leaning towards the former. In other words, most policy makers prefer to use public money to fund a greater enforcement system than to give incentives that leverage corporate responsibility. Impact evaluation of incentives can provide some evidence for this difficult choice.

Nevertheless, even in a favorable evaluation setting such as the one of the ISI calls, many evaluation challenges are present. The following considerations are not an exhaustive list, encompassing just the most relevant ones:

1. The identification of the proper outcomes

As with any policy, even for the ISI calls it is possible to identify a direct outcome (e.g., the decibel reduction obtained by replacing a noisy machinery with a quieter one) and one or more outcomes, which are indirect and mediated by other factors (in our example, the reduction of hearing-related professional diseases). The impact assessment lies in appreciating the change in the outcome that is generated by the incentive system. However, this assessment is not immediate. In fact, in the case of investments aimed at preventing accidents in the workplace, it is possible to identify indicators of the frequency of accidents based on the administrative data. But it is much more difficult to observe the change generated by the investment, when this affects the exposure to risk factors that generate occupational diseases occurring only in the long run; moreover, it is often difficult to determine the actual level of risk exposure of an individual worker over the course of his career. Furthermore, the analysis of the ISI monitoring data do not always allow to identify *a priori* the objective of the investment, unless analyzing the single investment projects, which makes very complex the attribution of each grant application to the right class, which in turn corresponds to a specific evaluation design (see the following point).

2. The identification of the causal relation

An evaluation design provides credible results if the causal relation between the tool (i.e., the incentive) and the objective (improving OSH) is strong and clearly distinguishable from the remaining dynamics that affect workers' safety. This implies different evaluation designs for different types of investments and the risk which it intends to reduce. It is not possible to set up a general "evaluation of the ISI calls", but multiple partial evaluations based on the various risk categories met by the grant (e.g., prevention of falling from above rather that vibration reduction). Moreover, it is unrealistic to think that the investment financed by the ISI call is producing a measurable change in variables describing general aspects of the firm attitude towards OSH, such as the safety culture or the maturity of its management system.

3. The problem of self-candidacy to the treatment and the external validity

The assignment-to-treatment mechanism based on the click day represents a quasi natural experiment, allowing to compare the firms that applied but did not obtain the grant to those that applied and receive the grant. With this design, it is possible to exclude the risk of self-selection into the treatment, but it cannot be assumed that the applicants are effectively representative of the universe of the target companies (external validity). In such a framework, it is necessary to assess whether the impact results can be extended to the whole population of small and micro firms.

4. The problem of non-compliance to assignment in the ISI calls

In the case of the ISI calls, we face the risk of non-compliance since firms might realise the intended investment even without receiving the funding. This might cause an underestimation of the treatment effect.

Moreover, some units selected at the click day may drop out of the group of treated firms before funding for different reasons. From an evaluation point of view, sample attrition is problematic if the units that have left are different from the rest of the treated units. The problem becomes even more serious when these variables are non-observable.

In the case of the ISI calls attrition arises at different stages of the implementation process, essentially connected to the first verification phase (assessment of the investment projects) and the second one (assessment of the implemented projects). Attrition represents a serious problem for this policy. The share of firms not receiving the final funding over the number of selected firms ranges between 51% (2011) and 29% (2015).[1]

4 Risk management systems for occupational safety and health

4.1 Definition

Risk Management Systems (RMS now on) are adaptive sets of actions undertaken by a firm to improve its preparedness to manage the emergencies and to reduce risks.

The definition above draws on many contributions by authors and institutions (see Ragazzi et al. 2023 rms), since in most cases the concept has been defined in a very broad and vague way. For example, the International Labour Organization (ILO) defined an OSHMS as *'a set of interrelated or interacting elements to establish OSH policy and objectives and to achieve those objectives'* (International Labour Office (ILO), 2001).

Even though there is no consensus on what a RMS is, some elements have been identified as a common requirement. RMS must include actions that are proactive, oriented towards continual improvement and necessitate to be integrated and incorporated into the management strategy of enterprises (Robson et al., 2005).

4.2 Origins

In the history of actions to enhance workers' safety and health, RMS appeared as one of the latest evolutions (Ragazzi et al., 2023). Initially, OSH problems were perceived as mainly technical problems that called for technical solutions. In the Eighties some disasters (Seveso, Italy 1976, Chernobyl, 1986) called for a more risk-based focus for OSH policies and a more systematic approach to risk management; in this context organizational, human factors, behavioral and culture issues emerged and were recognized as being just as important as the technical ones (Wadsworth & Walters, 2019).

The growing complexity of the world of work, increasingly globalized and characterized by articulated work processes has led to more sophisticated methods of risk assessment and management. These RMS were required to be more comprehensive, in the sense that they needed to be able to take into account the safety and health principles at all operational levels and for all activities and workers (European Agency for Safety and Health at Work, 2002).

4.3 Mandatory versus voluntary RMS

It is useful to distinguish two main groups of RMS: mandatory RMS and voluntary systems (Frick et al., 2000b; Gallagher et al., 2001; Robson et al., 2005, 2007).

Mandatory RMSs are imposed by legislation or regulation. Since they are intended for all workplaces, including small ones and regardless to sectoral specificities, they usually include a limited set of core principles for the management of OSH to be implemented by employers. They are enforced through inspections, fines and other corrective measures (European Agency for Safety and Health at Work, 2002; Robson et al., 2005). We can conclude that mandatory RMS are simple and not very demanding,

[1] This reduction in the attrition rate was obtained thanks to the attempts of Inail to avoid it, done through simplification of procedures, clear communication, and assistance services for applying companies.

so representing a common ground of minimum requirements. The EU framework directive (Directive 89/391/EEC) is an example of mandatory RMS.

Voluntary RMSs are developed by international institutions, commercial organizations and associations. They are generally in the form of standards or guidelines. Some provide requirements for certification. Voluntary RMS tend to be more complex and demanding than regulatory systems, and also more specific (Van Stolk et al., 2012). These are adopted on a voluntary basis, but it may happen that firms participating in calls for public procurement are requested to adopt one as a requirement or receive some additional score if they do.

4.4 RMS in the ISI calls

The ISI calls, among many types of investments, give incentives to cover the external costs (consultancy and certification costs) for the adoption of a RMS (Ragazzi, Colagiacomo et al. 2023). The company can apply for a wide list of models and certifications, ranging from a simple Social Accountability certification (SA 8000), up to UNI ISO 45001:2018, which is a specific certification for OSH.

In a longitudinal perspective, the calls have followed the history of RMS and their recognition in regulation, so the names of fundable options change in the different years (for example UNI ISO 45001 took the place of BS OHSAS 18001:07 which was in use previously). Notwithstanding the frequent changes in regulation, the ISI calls acknowledge the presence of different categories of standards more or less demanding and complex. Over time we may recognize in the calls the presence of three broad categories of fundable standards, whom INAIL assigns a growing value:

1. Social accountability certification;
2. RMS not certified or certified by an entity not accredited by national agency for certification (Accredia);
3. RMS certified by an entity accredited by the national agency for certification.

Companies applying for funding for the third group of RMS are not granted an higher amount of money as if they applied for a group 1 or 2 RMS; but they receive an higher score in the application procedure and the eligibility decision. So, if the RMS adopted is in group 3, the firm has higher probability to be funded, all the other things equal.

4.5 Why assessing RMS?

Granting a small amount of money to a small share of applying firms to adopt a RMS might appear as a very limited policy intervention. So, why it is worth to evaluate them? Indeed, our ex-ante expectations are:

- a firm adopting a RMS shows either no reduction or a very small impact on accidents;
- the impact may be on all types of accidents rather than on a specific subset (and also on professional diseases, although this cannot be observed due to latency times).

RMS (in their more complete formulations) provide:

- Risk assessment: fundamental starting point to design specific and effective countermeasures, includes understanding of interactions
- Awareness: both at the managerial level and for workers
- Skills: what to do to avoid an event and what to do in case it happens
- Strategy: mitigation of the probability of an adverse event
- Organization: reaction in case the event occurs, to minimize time to recover and consequences

The literature, both academic and professional, on safety and security policies underlines that a structured strategy/organization and a focus on the human factor (skills and awareness) are the

starting point of any protection action. So, the impact might be relevant, above all in very immature contests. Moreover, a RMS could represent an enabling condition, enhancing the effectiveness of other countermeasures or investments. So, even though the impact of RMSs seems to be negligible or questionable, they are a pre-requirement and a multiplier for the impact of other investments and countermeasures.

Since the general tendency of firms, and of policy makers as well, is to focus on the hard elements of safety and security, we deem it very important to evaluate if RMS provide an effect in terms of increased safety. Our research strategy foresees two stages:

1. Evaluate if incentives for the adoption of RMS have an impact on the frequency and severity of accidents, and for which firms;
2. Understand whether the impact of incentives for other types of investment are higher for firms adopting a RMS.

It must be underlined that this is an evaluation of the effectiveness of ISI incentives and not of the adoption of a RMS per se.

5 Recent Evaluations of RMS

In previous papers on the above mentioned issue (Sella, Ragazzi, Radin 2023), some impact of the incentives was detected, but results were very volatile and not reliable. There are many possible explanations for this lack of robustness:

- Choice of the unit of observation (local unit vs whole firm)
- Sample size (even though our sample is not very small, accidents are very rare events, so big samples are required to detect an impact)
- The problem of non-compliance to assigned treatment (attrition and firms investing even without incentive, see above), which affects the credibility of the natural experiment evaluation setting
- The role of non-observables influencing the impact in OSH
- The role of heterogeneity among yearly calls (in pooled estimations)

An evaluation study on the effect of funding RMS should consider all the above mentioned issues in an appropriate way.

6 Preliminary results

During the conference, some preliminary estimation results will be provided.

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