Gauging the economic impact of CERN technological procurement

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What is the value to a firm of being involved in the construction of CERN accelerators? Economists of the University of Milan, the University of Rome 3, and the CSIL Centre for Industrial Studies have joined the FCC study to answer the question. The FCC Week hosts a special session on this topic (May 31, 2017) opened by Frederic Bordry (CERN Director for Accelerators and Technology), Lucio Rossi (HL-LHC Coordinator), Anders Unnervik (Head of Procurement and Industrial Services) and concluded by comments of experts of the Fraunhofer Institute and the Helmholz Association. Three presentations by the economists disclose entirely novel empirical results (*).

CERN granted the researchers of the University of Milan access to LHC procurement database, including suppliers of LHC from 35 countries for orders beyond 10,000 SFR. Moreover, the researchers have been able to collect financial data for more than 350 of the main LHC suppliers. Changes in operating revenues and profits of each of these companies were analyzed for a time span of 24 years (1991-2014), before and after the year of the first LHC-related order. After controlling for time fixed-effects, firm-level and country-level possible confounding factors, the study observes a statistically significant effect of entering in CERN procurement on the long-run operating revenues and profitability of LHC suppliers. This effect is mostly driven by high-tech orders, and for the first time worldwide it is measured using the company financial accounts for many years.

In a second paper the way how CERN supports learning and innovation in the economy through its procurement activity is investigated. Information from more than 600 companies which received at least one order between 1995 and 2015 has been collected through an on-line survey. Firms have provided information on the type of services delivered to CERN, the relationship established with CERN, the technological intensity of the order, and the variety of effects produced by procurement on suppliers' performance as perceived by firms themselves. Responses have been processed by means of Bayesian Network Analysis, which allows to identify the causal mechanisms through which CERN procurement generates learning and economic benefits on suppliers, and, specifically, the role that different interaction modes between CERN and supplier firms play in producing knowledge spillovers. The main finding is a network of statistical effects that goes from intensity of the relation with CERN staff during procurement to firms' innovations and ultimately performance in other markets.

Finally, a quasi-experiment was performed comparing the economic performance of actual and potential CERN suppliers, once the factors affecting the probability of being a supplier have been accounted for. Potential suppliers represent a counterfactual sample, i.e. a control group in a quasi-experiment: a set of firms that have registered with CERN procurement, never delivered any order, but according to their self-assessment are potentially able to deliver orders by specific CERN activity codes. The study finds again that CERN positively impact firms' economic performance relative to the control group of potential suppliers, and that the probability of becoming a supplier increases with the degree of technological sophistication of the products and is also positively influenced by CERN's procurement practices.

The bottom line of the three studies is converging evidence (with three different quantitative methods) of the positive long-term impact on firms' economic performance of entering in a techological procurement relation with CERN. While it was common knowledge that such effect should exist, this is the first time it is measured quantitatively, and its determinants analyzed.

(*) The authors of the papers include Andrea Bastianin (UNIMI) , Paolo Castelnovo (UNIMI), Massimo Florio (UNIMI), Stefano Forte (UNIMI and INFN Milano), Francesco Giffoni (UNIROMA3 and Rossi-Doria Centre), Anna Giunta (UNIROMA3 and Rossi-Doria Centre), Lucio Rossi (CERN), Emanuela Sirtori (CSIL).