Impacts of R&D investments on European Agriculture: paving the way for a preliminary evaluation

Poster Abstract

The growth of agricultural production worldwide has been boosted by the adoption of innovations generated by the results of research. The economic literature, since Griliches (1958), have tried to explain the contribution of Research and Development (R&D) on the productivity evolution of the agricultural sector in order to evaluate the inner profitability of such investments. Several studies report very high rates of return (ROR) on agricultural R&D investments (see Alston at al., 2000; Hurley et al. 2014), but, even so, a generalized decrease in agricultural R&D expenditure has been observed in the last decades (Pardey et al., 2006; Piesse et al. 2010).

At the same time, for developed countries, a decline in the rate of growth of the agricultural productivity is widely reported (Alston et al., 2009; James et al., 2009; Ball et al., 2013) and such decline is mainly attributed to a gradual reduction in R&D expenditures over time (Thirtle et al. 2004; Alston et al., 2009, Fuglie et al., 2012).

However, as regard the agricultural productivity performance of European countries, the literature is not unanimous. Ball et al. (2010) estimated a reduction of competitiveness of European agriculture due to a slowdown in agricultural productivity, while Wang et al. (2012) reported a downturn in European agricultural production, despite an increase in productivity favored by the exit of labor resources from the agricultural sector. Furthermore, doubts about the role of R&D expenditure on agricultural productivity in European countries still persist. In effect, information coming from few European countries report that, in the last decades, part of the expenditure in agricultural R&D shifted from production-oriented investments to other dimensions of the agricultural activities, such as environmental protection and food-safety (e.g. organic and GMO-free crops), maintenance of current productivity (e.g. control of new pests) and diversification toward non-agricultural activities (Piesse et al., 2010; Wang et al., 2012). The range of use of R&D funds in agriculture might be also interpreted as reactions, over time, to changes in weather, institutions, policy and economic conjunctures of individual countries (Alston et al., 2010). Such consideration is particularly valid for European countries that have experienced the effects of the evolution of the common agricultural policy (CAP), characterized by the gradual switch from productivity enhancement, to reduction of over-production, to sustainable (in terms of finance and environment) competitiveness of the agricultural sector.

Nevertheless, a screening of official databases (Eurostat, OECD) reveals the data on actual expenditure in agricultural R&D are not quite available and, for many countries, the time series on R&D investments in agriculture are incomplete and not disaggregated per research activity. Sufficiently long time series are available solely as GBAORD, which account for budgeted investments. It follows that a clear picture at European level of the variation in productivity attributed to R&D investments is not available.

Therefore, there still is space for an European cross-country assessment of the ROR of R&D investments in agriculture over time. In such a context, this poster aims at paving the way for investigating the evolution of both country level R&D expenditure and agricultural productivity, to be more widely developed in subsequent studies.

Based on GBAORD series provided by the OECD and data on total factor productivity (TFP) produced by Fuglie (2012), the main finding of such screening exercise is that the available data might have a sufficient informative power to allow for a specification of an attribution/causal relationship between the rate of growth of R&D expenditure and the rate of growth of productivity, assuming a time-lag of about 20 years between research and its effects on productivity (in line with Alene et al. (2009) and Alene (2010)) and, desirably, controlling for CAP evolution.

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