

Referee report for “Diversity of Science Linkages and Innovation Performance: Some Empirical Evidence from Flemish Firms” by Bruno Cassiman, Reinhilde Veugelers and Pluvia Zuniga.

This paper examines some empirical evidence on diversity of industry-science linkages in a cross-section sample of Flemish firms and how they are related to r&d performance. In addition to providing some basic facts about the extent and types of industry-science linkages for Flemish firms, there are two main findings. First, firms with science linkages have a better innovation performance than firms without science linkages. Second, patents from firms with science linkages are more highly cited than patents from firms without science linkages.

I have two important concerns with this paper. First, I am a bit sceptical regarding some of the types of linkages examined by the authors. In particular, the authors examine four different types of linkages: (i) whether a firm has a cooperative r&d agreement with a university or public research center, (ii) whether a firm considers public information as a very important source of innovation, (iii) whether a firm has been engaged in publication activity and (iv) whether a firm has patents that contain references to scientific papers. I am happy with (i), but sceptical about the rest, especially (ii) and (iii). In what sense do these things constitute industry-science linkages? Isn't this stretching the notion of industry-science linkages a bit too far? In this light, it may not be surprising that patents by firms that do not consider public information as a very important source of innovation are more highly cited – this just goes to show how problematic this measure is in the first place.

Second, the authors present correlations between their measures of industry-science linkages and measures of innovation performance or patent citations. I am not sure these are very informative, however, if one is interested in causal relationships. Therefore the usefulness of the paper's results for firm strategy or economic policy is not clear. Surely the firms with science linkages are different in many ways from the firms without such linkages. They are probably in different industries, they may have different size on average, different quality of research personnel, different r&d intensity and so on. In the absence of controls for these and other characteristics, it is very difficult to interpret the correlations reported in this paper. Furthermore, not only is there an “omitted variable” problem, there is an “endogeneity” problem as well. For instance, the participation of a firm in a cooperative r&d agreement with a university or public research center may be driven in part by the firm's innovation performance in the recent past (and present performance is likely to be strongly correlated with past performance). These difficult issues are not discussed, let alone examined, in this paper.

In sum, the paper provides some potentially interesting descriptive empirical evidence on industry-science linkages in Flemish industry. Further work would be needed to assess the causal relationship (if any) between industry-science linkages and innovation performance and to draw important conclusions for firm strategy and economic policy.