

Referee Report on

“Choice of Foreign R&D Entry Mode and Impact on Firm Performance - A Firm-level Analysis for Switzerland and Austria”

Paper submitted to Economics (E-Journal)

The paper provides a microeconomic analysis of international R&D activities of firms and the impacts of these activities on the firms' performance at their home locations. A main contribution of the paper is to distinguish two modes of foreign R&D activities —equity based (= own R&D department at a location abroad) and non-equity based (= R&D cooperation with partners abroad)— showing that equity based modes of governance tend to have larger impacts. The paper uses firm data from two countries (Austria and Switzerland) demonstrating significant country differences which the authors associated with the higher degree of R&D internationalisation of Swiss firms.

I do like the paper, and I think its results are highly relevant for a better understanding of firms' decision to engage in foreign R&D and how this decision affects performance. While I think that the design of the empirical study as well as the econometric analysis is sound, I do have some comments that may further improve the paper:

- 1) It is difficult to follow the exact definition of the key variables, RDFOR (foreign R&D activity) and MODE (equity or non-equity based foreign R&D). When consulting the Swiss questionnaire, one finds that information on foreign R&D activities is collected in two ways. One question is on cooperation in general and first asks whether firms have cooperation abroad either contract based or equity based (without any reference to R&D), followed questions on whether they have cooperation in the field of production and in the field of R&D (not distinguishing by the mode of cooperation). Another question asks whether firms conduct activities abroad, distinguishing a large range of activities, including “own R&D department”, “joint R&D department (incl. minority interest)” and “contractual R&D cooperation”. It would be good to know which information was used to measure RDFOR and MODE and how the two variables have been defined precisely.
- 2) The authors argue that an equity based mode of foreign R&D activity may be superior to a non-equity based in terms of performance impacts due to a better integration of equity based activities into the parent company's activities, easing for example the acquisition of knowledge available at foreign locations. I do not share this view. Equity based R&D activities imply the presence of a separate organisational unit at a foreign location and hence some way of organisational separation between the parent company and its foreign location. A non-equity based foreign R&D activity —as defined in this paper— actually refers to a cooperation mode of getting access to foreign knowledge. In my understanding, such cooperation would involve the direct participation of researchers from the parent company. This should ease knowledge flows compared to an equity based mode.
- 3) Models B on innovation output and labour productivity do not include information on firms' foreign activities other than R&D. I understand that the sample is restricted to firms with domestic in-house R&D, which may also include firms with no foreign activities at all. (Please correct me if I am wrong, and forget about that what follows.) In this case, I suppose that most firms do not only have foreign R&D activities but also other foreign activities (production, marketing). The positive effect of the foreign R&D dummy may hence be the

positive effect of other foreign activities. It would be good to see a dummy for other foreign activities in the models (or perhaps three dummies: only R&D, only other, and R&D combined with other activities).

4) In model B1 on innovation output, the LRDL variable (R&D expenditures per employee of the parent firm) does not appear. Standard innovation output models almost always control for innovation input. This should also be done in this paper.

Minor comments:

- 1) The provided link to the Austrian questionnaire leads to a report published in 2007 and not to the questionnaire used in 2010. Please provide the correct link.
- 2) The discussion on the low response rate of the Austrian survey on p. 10 is a bit strange. If the response rate is very low (and 7% is indeed very low), the authors should provide a comparison of size and industry distribution in the net sample and the gross sample, as well as comparisons for key variables (R&D expenditure, innovative sales, labour productivity) for the net sample and the total population of R&D active firms in Austria (which could be taken from the results of the Austrian Community Innovation Survey). This comparison could show whether the sample is biased towards more or less innovative/productive firms.
- 3) It would be helpful if the authors could report marginal effects for the models A. Given the extremely high Pseudo R^2 (0.41 in the Swiss models, 0.56 in one of the Austrian models), it would be good to know that there are no multicollinearity problems with the models.