

An analysis of the source of EPO citations: applicant vs patent examiner citations.**Paola CRISCUOLO, Aldo GEUNA, Bart VERSPAGEN**Contact : criscuolo@sussex.ac.uk

Patent documents contain citations to other patents and references to articles in order to comply with the legal requirement to supply a complete description of the state of the art. Citations limit the scope of the inventor's claim for novelty and in principle they represent a link to previous innovations or pre-existing knowledge upon which the inventor builds. When an inventor cites another patent or a scientific article, this indicates that the knowledge contained in the cited document has been useful in the development of the citing patent and therefore they might be a proxy for knowledge flows between two inventors.

A large body of empirical studies has used patent citations to assess the local nature of technological spillovers (e.g., Jaffe *et al.* 1993, Jaffe and Trajtenberg 1996, 1998, Jaffe *et al.* 1998, Maurseth and Verspagen 2002), i.e. whether or not knowledge spillovers between firms, or from (semi-) public knowledge institutes to firms, depend on geographical distance. These studies find that both in the U.S. and Europe, such a relationship indeed exists. Thus, knowledge spillovers tend to be more intense between parties that are located close to each other in space. One of the criticisms of this methodology is that citations are a very noisy indicator of knowledge spillovers (Jaffe *et al.* 1998), mainly because most citation studies are not able to identify precisely those citations chosen by the inventor. Citations are proposed by the inventor, but the final decision on which documents to cite in an application lies ultimately with the patent examiners. The patent document reports the citations as chosen by the examiner. The examiner might decide to accept the ones proposed by the applicant and/or add new references, which leads to a potential source of bias due to the fact that patent citations might not reflect an actual source of knowledge used in the development of the citing patent.

In this study we are able to discriminate between the citations listed by the examiner, on the one hand, and the ones proposed by the applicant and accepted by the patent examiner, on the other, using the search report compiled by patent examiners at the European patent office. At the origin of each citation there is a search report which the patent examiner has to complete during his screening of technically relevant literature. The European patent search report contains various characters next to each citation, the so-called categories of citation, which grade the cited document according to its relevance. In addition, when the citation added by the examiner is also proposed by the applicant, the examiner adds the letter "D" as a second letter in the category of citation.

The main objective of this paper is to test whether the references added by the patent examiner are systematically and significantly different from the ones listed by the inventor in order to assess the validity of citations analysis carried out without distinguishing the source of the citation. In particular this study tries to investigate whether applicant citations and examiner citations present the same geographical distribution. As shown by Narin *et al.* (1997), there is a home country bias in citations to non-patent documents, i.e. inventors tend to cite their own country's papers much more than what it one would expect from their publication share in the science citation index. If patent citations added by the inventor and the ones added by the examiner are no statistically different we should observe the same degree of home country bias in the two samples. To this end we use a sample of EPO patents applied for by 171 high-tech multinational firms appearing in the Fortune 500 list.