

## Patent Races and Patent Twins

### **Grant application by Neil Thompson (for research with Jeff Kuhn)**

This project aims to use “Patent Twins” – cases where two discoverers file patent applications at the USPTO for the same invention at the same time – to see how firms react to getting (not-getting) patent protection for their ideas.

In genetics research, it is common to use twins to disentangle the impact of different nurturing environments, since they have similar (or identical) genes. Scholars such as Michael Bikard have imported this concept into innovation research with “Paper Twins” – areas where a single discovery is made by multiple research teams and published simultaneously in the scientific literature (Bikard, 2014).

Our research takes this concept a step further and considers “Patent Twins” – instances where the same invention is filed with the patent office within a narrow window of time. Perhaps the most famous example of this is the patent filings by Alexander Graham Bell and Elisha Gray on the telephone within a few hours of each other.

Unlike Paper Twins, where both articles are often published, patents are granted such that only the first one (the ‘senior’ application) gets protection. The latter one (the ‘junior’ application) fails to get that protection, rejected based on lack of novelty (USC 102), *even if they didn’t know the other discovery existed*. We take advantage of this fact to look for instances where two patent applications are filed on the same discovery within the window where the filings are ‘secret’ (i.e. before they are published). Thus, at the time of filing, the two firms filing the patent applications are unsure of the content (and timing) of the other’s filing; the patent race for that discovery is still undecided.

Given the uncertainty in the filing timing and content, the outcome of this patent race provides an excellent quasi-random shock to getting patent protection, with the senior application getting it and the junior application not. Moreover, since both the senior and junior firms invested in R&D and went to the trouble to file a patent application, they are substantially alike in many ways – making for a cleaner comparison than is often the case between patenters and non-patenters.

There are many outcome measures from this shock to patent protection that would be of interest. Since the economic justification of patents relies on their incentive to innovate, a natural outcome of interest would be the effect on R&D expenditure. For example, one could imagine a junior firm cutting R&D expenditure since they don’t have patent protection or,

alternatively, investing in R&D to invent around the newly-discovered patent. Similarly the senior firm might increase investment now that they have surety of protection, or decrease it since they no longer have to compete.

In theory, this project could have been done long ago, as the importance of patent protection has long been studied (e.g. Gans, Hsu, and Stern 2008). In practice, however, this would have been difficult since the junior patent application is rarely *completely* disallowed. Indeed, in general, the patent office lacks the ability to *reject* a patent application. Instead they reject individual claims, and the filer may at some point decide to *abandon* the whole application if it becomes sufficiently unattractive. Discussions with patent prosecutors suggest that applications are rarely abandoned for this reason, and that far more common is that the patent eventually issues with the scope of the claims narrowed (perhaps substantially).

Since the junior application frequently still issues as a patent, it isn't usually possible to observe patent twins via abandonments. Instead, patent twins must be found by looking for claim-level rejections by patent examiners where the reason for the rejection is the description of the claim *in the senior patent*. Thanks to the recent release of examiner-filer correspondence, including these rejections in USPTO-issued "office actions", this analysis is now possible. It is nevertheless an enormous project, involving optical character recognition (OCR) on 3.2 million PDF documents, comprising 50 million pages of correspondence. Both the OCR and subsequent analysis of this data involves the use of large-scale cloud computing resources to efficiently process.

This grant asks for \$20k from the Innovation Policy funding at the NBER to pursue this project. Funding will be used for travel for the two authors (Neil Thompson and Jeff Kuhn), for computing costs (hardware / software / cloud computing time) and for other miscellaneous costs (e.g. using Mechanical Turk to classify / categorize text from the application text extraction).

## References

Joshua S. Gans & David H. Hsu & Scott Stern, 2008. "*The Impact of Uncertain Intellectual Property Rights on the Market for Ideas: Evidence from Patent Grant Delays*," Management Science, INFORMS, vol. 54(5), pages 982-997, May.

Bikard, Michaël, *Hurdles to Invention Based on Academic Science: Evidence from 'Knowledge Twins'* (May 20, 2014). Available at SSRN: <http://ssrn.com/abstract=2333413> or <http://dx.doi.org/10.2139/ssrn.2333413>.