Probabilistic Patent Races

Neoclassical economic models of patents typically assume that the rights granted are determinate and "ironclad" in the sense that there is no uncertainty in issuance, application, or enforcement. Of course, such models do not adhere to the uncertain reality of patent prosecution and litigation. When uncertainty has been considered by scholars -- aside from pointing out that incomplete rights may save on administrative costs at the agency and judicial levels -- these scholars have traditionally perceived uncertainty as imposing welfare-decreasing costs on the innovation process. Thus, the overriding assumption is that if one could costlessly assess the validity and scope of a given patent -- so that it exhibited bright-line, and typically valid, boundaries like real property -- innovative activity would be maximized relative to a patent system with uncertain rights.

In an important new result, Ian Ayres and Paul Klemperer extend the neoclassical model to show that probabilistic patent rights not only can decrease administrative costs, but also can reduce consumer deadweight losses without substantially diminishing incentives to innovate. Although Ayres and Klemperer's model is novel, commentators have criticized it because the resulting benefits of these "probabilistic patents" may be fully replicated by straightforward adjustments to the scope and duration of traditional, non-probabilistic patents. For example, decreasing the term of a patent can have the same effect on deadweight losses as making enforcement probabilistic. Moreover, Ayres and Klemperer’s model is limited to one innovator -- abstracting away from the problems of patent races, namely, the rent-seeking behavior of multiple innovators duplicating each other’s research in racing to acquire a patent over a new technology.

This paper addresses the concerns of Ayres and Klemperer's work by modeling a probabilistic IP game with two or more potential innovators, such as a patent race. In so doing, it shows that probabilistic patents may not only reduce deadweight losses, but also duplicated development costs -- specifically, by coordinating the actions of the players in ways that determinate and ironclad patents cannot. Additionally, the paper shows that the gains from probabilistic patents in multi-innovator games cannot be simply replicated by alterations to traditional patents. As such, the paper improves the descriptive economic models of patent issuance, enforcement, and adjudication and substantially strengthens the normative case for the benefits of probabilistic rights in IP law.