

Hayden Fuller  
Professor Klein  
Economics of Growth and Innovation  
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A Brief Analysis of 'Private patent protection in the theory of Schumpeterian growth.'

(Davis 2012) examines how firms engaging in Rent Protection Activities (RPAs), such as litigation and lobbying, to protect their intellectual property, affects social welfare and economic growth through innovation. The study creates a theoretical model where each industry has a patent holder with monopoly power who faces two threats, imitation that steals market share and the emergence of new innovators that replace them. The patent holding firm is protected from imitation by Intellectual Property Rights (IPRs), but these are imperfect, so they must hire lawyers to engage in RPAs to protect their patent from imitators. However, they also engage in RPAs to get in the way of other innovating firms that threaten to replace them.

The study uses two constraints, relative profitability of RPAs vs Research & Development (R&D) to make sure the firm is optimally allocating resources between RPAs and R&D, and the resource constraint, where there is a limited population that must be divided into workers, lawyers, and researchers. All these groups grow at the same rate as the population, maintaining a constant ratio, and resulting in an equilibrium that's immune to scale effects.

The equilibrium equation is complicated, and detailed explanations of each are beyond the scope of this report, but we can discuss the results from changing policy variables and see what may be socially optimal. Firstly, the presence of imitation decreases innovation and increases the need for R&D subsidies. This effect is stronger with higher ease of imitation, but can be solved for with IPR that better distinguishes between imitation and innovation.

Second, if the subsidy for RPAs is increased, there are two competing factors, and the net result depends on ease of imitation. When imitation is easy, RPAs are mostly used against them, so it results in a net positive, but when it's difficult, RPAs aren't needed and are instead used against innovators, resulting in a net negative. RPA subsidies guarantee a decrease in imitation, but will only increase innovation if imitation is easy, so either a tax or a subsidy may be optimal. Last, R&D subsidies also have two competing effects. It increases the incentive to innovate by making it cheaper to do so, but this applies to everyone, increasing the chance that the monopoly

firm be replaced and lose profits, decentivizing innovation. It increases incentive to innovate by making it cheaper, but this makes it cheaper for others too, increasing the risk of being replaced, decentivizing innovation. Unlike RPA subsidies, incentive from R&D subsidies always prevails and leads to increased innovation. Because firms can actually innovate more than is socially optimal, this still means the optimal policy may be either an R&D tax or subsidy.

This model was very closely related to what we've developed in class. All the basics of households, innovation, patents and monopoly power, etc. are the same Quality Ladder model, it was just expanded upon by the introduction of imitation and imperfect IPR, leading to RPA spending and competitive markets, which as mentioned in the paper, is a significant consideration in the decision to innovate. Our in class model touched on some of the same ideas, including R&D subsidies and imperfect IPR as solutions to move us closer to socially optimal levels of growth, but these were individual additions with much simpler implementations, while this model combines the two and goes in much more depth to look at how firms counteract this imitation with RPAs, how these same RPAs are used against other innovators, and the relationship between R&D and RPA spending. This model certainly offers a lot more detail compared to what we looked at in class, but of course, that comes with a lot of added complexity as well. They also propose multiple ways that this model could be further expanded upon, such as fully incorporated behavior of imitators in a north-south model, or a model where litigation is a more complicated two-way interaction. All of these possible models have their trade-offs of new information at the cost of more complexity, so what's optimal to look at will simply depend on what situation you're looking at and what information you're looking for.

I found this paper quite interesting. One of the main goals of this paper was to break away from the common idea in literature that litigation and lobbying do nothing but hurt the economy, and instead, model them in more detail to look at all their possible pros and cons. This paper finds that the optimal RPA tax is non-infinite, and can in fact be a subsidy in certain conditions, and though this model does have an optimal ease of imitation of zero, it points out that this is specific to this model, and that another paper from 2003 looked at the same two competing factors due to imitation, a decrease the rate of growth of consumption and an increase instantaneous consumption, and instead identified a positive optimal ease of imitation.

This paper has clear applications to policy issues, as it could allow economists to recommend more optimal R&D, RPA, and IPR policy solutions, perhaps more specifically in nations with weaker IPR that may need a subsidy on RPA, or nations that are strengthening their IPR and need to start taxing RPA, but I'd also like to talk about what this paper did in a more broad sense. The idea of this paper was to look at factors that are often overshadowed by opposing factors. Especially in economic models, but generally throughout life as well, simplicity has value, which leads to us ignoring these factors completely. I believe these ignored factors often deserve a lot more consideration than they're given, as when you don't, you often end up at extremes like an infinite tax on RPA, and it's rarely ever the case that these extremes are actually optimal.

Davis, L. S. and F. Sener (2012). Private patent protection in the theory of Schumpeterian growth. *European Economic Review* 56 (7), 1446–1460.