

## Research Proposal

### NBER Productivity, Innovation and Entrepreneurship (PIE) Program – Innovation Policy

Title: *Patents as Quality Signals to Consumers*

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Description and Goals of Project:

The primary goal of the patent system is to incentivize the creation of new and useful innovations. A patent allows an inventor to exclude others from making, using, or selling his invention. An inventor knows, therefore, that a competitor cannot merely reverse engineer or copy his invention once it is made public. Knowing this *ex ante*, the inventor is encouraged to produce the invention in the first place.

While the right to exclude is the primary benefit of patent protection, there are other benefits that are less apparent but perhaps still important to patentees. I plan to study one such ancillary benefit: an improved perception of patented products by consumers. In addition to serving as a deterrent to competitors, patents might serve as signals of high product quality to potential customers. A product marked as “patented” might make it more desirable to a consumer, perhaps because the consumer believes such a product is new or improved, or because the consumer views the patent as a stamp of approval by an outside authority.

Previous scholars have examined how patents might allow start-up ventures to signal quality to investors (*e.g.*, Czarnitzki *et al.* NBER Working Paper No. 19947 (Feb. 2014); Hsu and Ziedonis (2001)), and others have posited that patents can convey information about an invention to the public at low cost (*e.g.*, Long (2002); Arora *et al.* (2001)). But there does not appear to be rigorous empirical research on whether patents actually serve as signals of quality to consumers. The lack of research in this area might be due to an inherent endogeneity problem: patented products might actually be higher quality products, so consumers might perceive these products as having higher quality independent of whether they know the product is patented.

My goal is to measure whether consumers in fact view patented products as being higher quality merely because they know the products are patented. I plan to tackle the underlying endogeneity problem in two separate ways: through an online survey and with a natural experiment.

First, I plan to conduct a randomized survey in which I will present images and descriptions of various patented products to participants. Treatment group participants will be informed that the products are patented. Control group participants will not receive this information. Participants will then be asked to assess their perception of the products. For example, they might be asked to rate the products’ quality on a 1-5 scale, or asked how much (if anything) they would pay for the product. They might also be asked general questions that test their knowledge and understanding of what patents actually signify.

I intend to conduct this survey using a number of different product types, to see if consumer perception of patent status matters more for some categories of products as compared to others. For example, patents might be a more important signal of quality in the context of household products that consumers regularly use, or for high-technology gadgets. The survey will be an important first step in assessing whether potential consumers perceive patented products as having higher quality, and relatedly, whether they are willing to pay more for that perceived quality.

Of course, surveys have their limitations and it would be better to measure the effect of patents on consumer perception using actual consumer purchasing behavior. So I also plan to conduct a natural experiment, which exploits a change in law in 2009. In particular, I plan to take advantage of a surprise decision by the U.S. Court of Appeals for the Federal Circuit that made it much easier for individuals to sue companies for falsely marking their products as patented.<sup>1</sup> Prior to

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<sup>1</sup> *The Forest Group, Inc. v. Bon Tools Company*, 590 F.3d 1295 (Fed. Cir. 2009).

this decision, “false patent marking” was ubiquitous — for example, a product that bears a marking for a patent that has expired would be considered falsely marked. Hundreds of companies had products that were (likely inadvertently) falsely marked, and they were sued for this practice. As a result, many companies removed or corrected patent markings on their products.

I intend to use a difference-in-differences approach to exploit variation in false patent marking across similar products. For example, product A and product B might be similar in all observable dimensions, except product A was falsely marked as patented. After a false patent marking suit, this marking would be removed from the product. I intend to look at changes in sales data for both products before and after the filing of a false marking suit to measure the value of the patent marking.

I intend to conduct this analysis using retail scanner data provided by the Kilts Center for Marketing at the University of Chicago Booth School of Business. This data (which is available for 2006-2011) includes weekly pricing, volume, and store environment information based on scanner data at more than 90 participating retail chains across the United States. I intend to pair the products in this data set with data that I have already collected regarding false patent marking suits and their associated products.

This empirical approach still has challenges — for example, it is possible that products that were falsely marked were different in some relevant unobservable dimension from products that were not falsely marked, though I believe this is not likely for many products. But if the results from the observational study match those from the survey, it would suggest that whatever effect has been found is in fact real.

#### Research Setting:

I plan to conduct my research this spring at Princeton University, where I am currently a doctoral student in Economics. I will continue my research at some another institution when I begin teaching as a full-time professor this fall, but I should retain the support of Princeton (and in particular, its Industrial Relations Center) for research started while I was a graduate student.

I intend to use the Princeton Survey Research Center, as well as feedback from my colleagues at Princeton and elsewhere, to ensure that my survey design is sound.<sup>2</sup> Princeton graduate students also have access to the Kilts Center data set, which provides the relevant price and volume information necessary for my observational study.

#### Project Impact:

My project will hopefully provide a definitive answer to an unanswered research question: do patents signal product quality to consumers? If so, in which industries is such signaling especially salient? I believe my research could inform ongoing policy discussions regarding the scope of the patent system, as well as various patent reform bills currently being debated in Washington. I also believe my research would be of interest to businesses, who can see what impact (if any) that patent markings have on their consumers. I anticipate publishing my results in a journal that regularly publishes interdisciplinary law and economics research, such as the Journal of Law and Economics; the Journal of Economic Behavior and Organization; or the RAND Journal of Economics.

#### Use of Research Funds:

Most funds will likely be used to find survey participants and to conduct the survey. The survey costs will depend on the number and type of participants that are recruited, as well as the number of experimental treatments that are run, but I presently anticipate costs to be about \$5,000-\$10,000. Some funds (likely \$3,000-5,000) will also be used to disseminate research results at conferences.

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<sup>2</sup> My understanding is that the survey should receive IRB approval. There is no false information being provided: all products involved will be patented. My treatment merely controls the amount of information that is revealed about the products to the survey participants.