

Social returns to “direct” private innovation support: the patent system

Bhaven N. Sampat (Columbia University and NBER)

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Some Proposals for Improving the Patent System

BY DR. VANNEVAR BUSH

FOREWORD

The following research study was prepared by Dr. Vannevar Bush at the request of the Subcommittee on Patents, Trademarks, and Copyrights as part of the study of the United States patent system it is conducting pursuant to Senate Resolutions 92 and 167 of the 84th Congress. Dr. Bush's study is one of a number of special studies undertaken for the subcommittee under its mandate "to conduct a * * * complete examination and review of the statutes relating to patents * * * ." The authors of these studies have been selected on the basis of their understanding, experience, and vision in dealing with the patent system.

Senate Judiciary Study #1 (December 20, 1956)

competition. But the rights granted under patents have remained substantially unchanged. It is the patent monopoly with which we are here primarily concerned. Our forebears made the latter a temporary monopoly and imposed upon it practically no further governmental control.

It worked well. This country has prospered beyond all others in the wide application of new techniques and in advanced industrial processes. Undoubtedly much of this was due to the width of the land in which great homogeneous markets were developed, and to the pioneering spirit of the people which could be applied as well to industrial as to geographic frontiers. Yet the patent system was largely responsible for the vigor of our small enterprises and for the effectiveness with which new things were promptly brought into use.⁶ **Life was made more comfortable, healthy, and worth living for large numbers of our citizens.**

Senate Judiciary Study #15 (June 30, 1958)

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AN ECONOMIC REVIEW OF THE PATENT SYSTEM

guesses about the extent to which reality corresponds to these assumptions.

If one does not know whether a system "as a whole" (in contrast to certain features of it) is good or bad, the safest "policy conclusion" is to "muddle through"—either with it, if one has long lived with it, or without it, if one has lived without it. If we did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of our present knowledge, to recommend abolishing it. This last statement refers to a country such as the United States of America—not to a small country and not a predominantly nonindustrial country, where a different weight of argument might well suggest another conclusion.

While the student of the economics of the patent system must, provisionally, disqualify himself on the question of the effects of the system *as a whole* on a large industrial economy, he need not disqualify himself as a judge of proposed *changes* in the existing system. While economic analysis does not yet provide a basis for choosing between "all or nothing," it does provide a sufficiently firm basis for decisions about "a little more or a little less" of various ingredients of the patent system. Factual data of various kinds may be needed even before some of these decisions can be made with confidence. But a team of well-trained economic researchers and analysts should be able to obtain enough information to reach competent conclusions on questions of patent reform. The kind of analysis that could form the framework for such research has been indicated in the present study.

The classic tradeoff

- ▶ Competitive markets underinvest in R&D since social returns exceed private returns
- ▶ Patents provide a limited term right to exclude: this “monopoly” reward provides an incentive to innovate (and disclose their technology)
- ▶ Though good for innovation, patents restrict competition and keep prices high
- ▶ Finding the right balance (dynamic and static efficiency) is the heart of patent policy

Do patents induce innovation? Survey evidence

- ▶ Taylor and Silberston (1973) - Reduction in R&D expenditure without patents: 8 percent overall (64 percent in pharma)
- ▶ Mansfield, Schwartz, and Wagner (1981): Share of innovations that would not have been introduced without patents - 20 percent overall (90 percent in pharma)
- ▶ “Yale survey” (1987) and “Carnegie Mellon” survey (1994): Patents not the main way in which firms appropriate returns from R&D in most industries; Exception: Pharmaceuticals and chemicals
 - ▶ Interesting: No changes over time in importance, but rapid growth of patents in “complex product” industries such as electronics, computers, machinery

Do patents induce innovation? Historical evidence and natural experiments

- ▶ Branstetter and Sakakibira (2001): Increasing patent scope in Japan (in 1988) did not lead to increases in R&D
- ▶ Moser (2005): Data on innovation from World Fair exhibits from 1800s - National patent laws don't matter much for innovation; do matter for patenting
- ▶ Qian (2007): Introduction of domestic pharmaceutical patent laws by country, 1978-2002 - Little effect on research incentives or drug innovation
- ▶ Budish et al (2015): Less investment for R&D for cancers with longer development times, which could be because effective patent term for these is shorter

Note: Most strengthening of patent laws do seem to lead to more *patenting* (Moser 2005; Lerner 2002; Hall and Ziedonis 2001)

We know less about

- ▶ Do patents facilitate disclosure, the economic impact of disclosure of technical information in patents?
- ▶ The static costs of patent protection (but see Branstetter et al 2015)

Both the patent system and economic research on patents have changed in past decades

Effects on	Positive	Negative
Innovation	Induce research investment	Raise transaction costs
Competition	Markets for technology	Create monopolies

Adapted from Bronwyn Hall's "The Patent System as Viewed By a Two-Handed Economist"

Patents and cumulative innovation

- ▶ Galasso and Schankerman (2015): Examine citations to a patent before and after invalidation. Patents seem to block downstream innovation in computers, electronics, medical instruments; but not in drugs or chemicals
- ▶ Sampat and Williams (2016): Look at follow on innovation for genes that do and don't get patents. Gene patents have no effect on measures of follow on innovation (scientific citations, clinical trials, development of diagnostic tests)
- ▶ Each of these studies exploit randomness in the patent grant (or invalidation process) to attempt to measure causal effect of patents

Much recent economic research focused on evaluating changes to patent law and practice

- ▶ Broadening of patent protection (Bayh-Dole, TRIPS, Patenting Life Forms, Software, Business Methods)
- ▶ Strategic use of patents beyond appropriating R&D; Patents as bargaining chips; Patent trolls
- ▶ Patent quality debates

Concluding thoughts

- ▶ Strengthening of patent law does seem to increase patenting and enforcement of patents
- ▶ Patents more important for innovation in some fields (pharmaceuticals) than others (electronics, IT)
- ▶ Not one size fits all statements about social costs and benefits of the patent system; most credible analyses and answers are context specific
- ▶ The need for comparative institutional analysis: patents vs. prizes, vs. direct funding vs. other incentives