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## Tort Reform and Innovation

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Economists have long recognized the crucial role of innovation in economic growth. A key feature of research and development (R&D) investments is their public-good nature, which generates underinvestment in innovation relative to the socially optimal level. How to avoid such underinvestment and how to provide greater innovation incentives are central questions in the literatures of macroeconomic and public policy.

To increase R&D incentives, governments typically implement a variety of policies—such as patents and subsidies—directly targeted at innovation investments. To assess and quantify the effects of these policies is a key focus of the innovation literature. Only recently, economists have recognized that policies not directly targeted at innovation investments may also have large impacts on R&D incentives and on the direction of technological progress. Documenting and quantifying these indirect and dynamic effects is crucial not only to understanding the determinants of innovation activities, but also to evaluating the costs and benefits of policy reforms. Our work examines the innovation investment response to a prominently debated public policy: tort reform.

Torts are actions that injure someone and are recognized by law as grounds for a lawsuit. The role of the tort system is to deter people from injuring others. An important class of torts related to professional negligence is medical malpractice. A danger prominently voiced in public debates

is that large settlements arising from medical malpractice litigation lead doctors to practice “defensive medicine”—that is, to perform excessive tests and procedures because of concerns about malpractice liability. Policy debates on this subject typically contrast the high costs of defensive medicine procedures with their low expected benefits to patients. A number of studies have investigated the relationship between the tort system and treatment intensity or medical expenditures, and they provide evidence of the practice of defensive medicine.

In addition to their effects on procedure use and malpractice claims, tort reforms may also affect R&D investments and technological change. In particular, a number of legal scholars have warned about a possible “chilling effect” of the current tort system on innovation; that is, high damage awards and the court’s reliance on custom may reduce physicians’ willingness to adopt new but riskier technologies, even if they are potentially superior to customary treatments. This idea that liability retards innovation has become a key argument for tort reform advocates and has gained substantial ground over the years in courts and in Congress. A typical counterargument is that high liabilities may also encourage innovation because they induce physicians to defensively adopt innovative technologies that are themselves safer or that help physicians manage risks. Despite these claims, the empirical literature on the relationship between liability risk and innovation is scarce. We address this gap by studying the impact of

tort reform on innovation in the medical device sector, a field of technology closely linked to malpractice litigation.

To illustrate the channels through which tort reforms may affect innovation incentives, we first analyze a simple theoretical model. In our framework, physicians who adopt medical technologies consider both their expected benefits to patients and their riskiness—that is, the likelihood that adoption will lead to malpractice liability. A tort reform, such as the introduction of caps on malpractice damages, will affect physicians' decisions on what medical technologies to adopt. Consistent with the idea that having high liabilities chills innovation, our model predicts that a reduction in the cost associated with malpractice litigation will *increase* physicians' propensity to use riskier technologies that have high patient benefits. However, our analysis also shows an additional effect of tort reforms: they *reduce* the propensity of physicians to defensively adopt low-risk technologies that have limited benefits to patients in order to avoid lawsuits. These shifts in technology adoption affect upstream R&D investments, and the overall impact on the development of new devices depends on the relative strengths of the two effects.

While our theoretical framework shows that the overall effect of tort reforms on innovation is ambiguous, it provides a testable prediction. Tort reforms are more likely to reduce innovation incentives in technology fields characterized by the high risk of malpractice claims. Intuitively, in these fields it is likely that physicians adopt new technologies mainly for defensive reasons. Thus, if the expected liability cost is reduced, the incentives to use these technologies decrease, resulting in an overall decline in innovation incentives.

To test these predictions, we combine standard measures of innovation, based on U.S. patent data, with data on state tort reforms from the American Tort Reform Association for the period 1985–2005. We use the inventor address information provided by the U.S. Patent and Trademark Office and the application year of a patent to link patents with U.S. states and years. The class of tort reform central to our empirical analysis is the introduction of caps on noneconomic damages—that is, damages other than monetary losses, such as pain and suffering. These damages typically comprise a substantial fraction of total awards and represent the main focus of tort reform advocates.

Our main result shows that patenting in medical instruments is reduced by roughly 14 percent in the presence of caps on noneconomic damages. This negative effect suggests that, on average, the demand for new technologies that high

liabilities generate through defensive adoption exceeds their negative chilling effect on medical device innovation. Results are similar if we exclude from the sample states for which caps on noneconomic damages affect only medical malpractice rather than general torts. Moreover, we show that our findings are not driven by the largest states or by the largest medical device producers. Finally, we run a placebo test that indicates no effect of tort reforms on a sample of nonmedical measuring and testing instruments.

Because innovation activities may respond to demand changes beyond the local level, we also examine whether medical device patenting in a state is affected by policy changes in other states. We construct measures of economic linkages across states, exploiting proxies for the relative demand and supply of medical device innovation, and find that the effect is predominantly driven by local reforms. We show that the local nature of the policy impact is related to a key feature of the medical device industry: the involvement of practicing physicians. Indeed, a sizable fraction of the negative impact of tort reforms appears to be driven by the patenting activity of physician innovators located in the state.

We extend these baseline results in several directions. First, to confirm the prediction of our theoretical model, we show that the effect of tort reforms is much more pronounced for patenting related to specialties with a high frequency of malpractice claims (such as surgery and orthopedics). Conversely, caps on noneconomic damages have a small and statistically insignificant effect on patenting in medical fields with few malpractice claims (such as dental and optics). Second, exploiting patent citations as a proxy for technological value, we document a relationship between the effect of tort reforms and innovation quality.

Taken together, our findings indicate that tort reforms can have an impact on the level and direction of innovation and that an effective assessment of these policies should consider both their static impact on patients and their dynamic effects on medical technologies. While, on average, caps on noneconomic damages appear to reduce the propensity to innovate, our analysis shows that this effect is heterogeneous and depends on the characteristics of both the devices and the medical fields.

## NOTE:

This research brief is based on Alberto Galasso and Hong Luo, "Tort Reform and Innovation," *Journal of Law and Economics*, forthcoming.