INNOVATION BEYOND THE IMAGINATION OF THE MARKET:

HOW THE STATE DROVE AN ECONOMICALLY BENEFICIAL AND SOCIALLY RESPONSIBLE INNOVATION: THE ADOPTION OF ELECTRONIC HEALTH RECORDS IN THE US AND EU

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ABSTRACT: (WORDS: 868)
This project focuses on disruptive technological innovations (DTIs), innovations which arise from technological change and disrupt the regulatory regime. Building on Cortez's (2014, 183) concept of regulatory disruption from administrative law, these DTIs disrupt the regulatory regime and elicit a response because they are clearly within an agency's jurisdiction but cannot be addressed by the current regulatory regime. DTIs can disrupt the *operation* of the regulatory regime by changing what is possible within a regulatory domain, often by altering the speed, scale, or complexity of the regulated activity.[1] DTIs can also disrupt the regulatory *paradigm* by

[1] There are surely more mechanisms of disruption. Empirical examples suggest that speed (i.e. high frequency trading, (Lewis 2014; Ford 2017)), complexity (i.e. Deep Water Horizon oil rig disaster, (Mills and Koliba 2015)), and scale (i.e. cross-national production networks) are three ways technological change disrupts the existing structure of regulatory regimes by changing the practicalities of the regulated activity.

challenging regulators' fundamental understanding of their responsibility toward the regulated domain.[2]

The tech industry's entrepreneurial rhetoric has tarred regulation as a specter of the past holding back the future. Yet, in the case of electronic health records (EHR), concerted state action was required to drive market participants to adopt a technology which decreases costs, improves patient care, and has the potential to revolutionize public health and policy research. EHR therefore demonstrates that through proper statutory design and administrative implementation, regulators can not only reduce their dead-weight loss to industry, not only beneficially constrain market actors to coordinate on better equilibria, but also move past the zero to drive the adoption of innovations which the market has failed to spread.

This paper illuminates the mechanism by which regulation drives innovation adoption using Bayesian process traced[3] evidence from the United States and European Union. In the US, the HITECH act of 2009 pushed the laggard medical community to adopt EHR with first a carrot (subsidy) and then a stick (withholding of Medicare reimbursements). In the EU, Directive 2011/24EU interpreted the Common Market to include cross-border healthcare and required EU member-states to adopt interoperable EHR although implementation details were left to member-state governments. Through statutory design and administrative implementation that matched the needs of their societies, both HITECH and Directive 2011/24EU successfully drove the adoption of EHR; from 17%[4] to 90%[5] in the US and 39% to 82% in the EU.[6]

[2] Genetically Modified Organisms (GMOs) in food are an excellent example of such a challenge as they raise the question of whether the products from GM plants are substantially different from those of their non-GM brethren.

[3] (Fairfield and Charman 2017) define a logical Bayesian approach to process tracing which serves to discipline analysis and clarify results.

[4] (Blumenthal 2009, 1477)

The mechanism behind the regulation driven adoption of innovative EHR is particularly interesting because actors espoused preferences counter to their purported interests. Among US and EU states, there were both early adopter and laggard medical practices that led governments to push for system-wide adoption in order to realize gains from scale and universality. Early adopters also recognized that EHR was in their individual economic interest: once the transition from paper charts was complete, EHR lowered costs and improved patient care.

Yet despite these clear practice level benefits, the vast majority of medical practices espoused strong preferences against adopting EHR even though these preferences were against their "thick" economic interest.[7] This resistance centered on *perceptions* of who had to bear the costs of transition (doctors) and who received the benefits (administrators, insurers, researchers). That patients and public health would eventually experience the majority of the benefits was deeply downplayed; patients were employed in effigy to support both pro and anti EHR camps but did not actively enter the debate.

Failure is loud, success quiet. Regulatory failures like the Deepwater Horizon oil spill and 2008 Global Financial Crisis are loudly publicized. Quieter are responses other than failure like American recombinant DNA regulation following the 1975 Asilomar Conference. This

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[5] (Washington et al. 2017)

[6] EU numbers are based on author's population correction to raw percentages for 15 EU countries in 2012 (before) and 2016 (after) reported in (OECD and European Union 2018, 193).

[7] (Vogel 1999, 187–88, 202–3, entire, especially endnote 1 and 3) explores this distinction between interests and preferences; for our purposes interests are what analysts deductively say groups or actors are supposed to want based on a specified utility (growth, profit, gain) while preferences are what groups or actors say they want. Some analysts further muddy this distinction by referring to espoused preferences as "thin" interest and analytically deduced interests as "thick" interest.

mismatch reinforces a folk model[8] of regulators as merely deadweight destined to fail. Worse yet, loudly prognosticating regulators' inevitable failure often fosters failure where alternative rhetoric could encourage success.

Regulatory scholars who study actually existing regulation know the folk economic model as "capture" within "command and control" regulation. They have repeatedly demonstrated the deceptive inadequacy of catch-all models of regulation.[9] Nevertheless, scholars who *do not* study regulation still use this folk economic capture baseline to judge all work on regulation which hinders scholarly understanding of relationships between regulation and innovation. With these scholarly limitations, lay entrepreneurs' misperceptions are no surprise.

In other work, I systematically challenge the limited folk economic model of DTI by developing a deductive typology of regulatory responses using variables generalized from underlying concepts in regulatory scholarship. The folk economic model arose from Christensen's simplification in "Innovator's Dilemma"(1997) of Stigler's "The Theory of Economic Regulation" (1971) proclaiming that innovation only happens when entrepreneurs evade regulators. My typology reconceptualized that fixed interpretation into variables due to Streeck's counterdemonstration in "Beneficial Constraints"(1997) that some constraints lead to economic benefits. The EHR case demonstrates a further step beyond both the folk economic model and beneficial constraints because it shows that well designed statutes and proper implementation can drive innovation adoption beyond the imagination of the market.

Mandated EHR adoption in the US and EU demonstrates the power of perception in public policy: policies live and die on whether people *think* they will work. Perceptions create

[8] (D'Andrade 1987, 113) "a statement of the common-sense understandings that people use in ordinary life [rather than] various "specialized" and "scientific" models."
[9] (Slayton and Clark-Ginsberg 2018) is a good recent review of the inadequacy of the capture model.

preferences long before outcomes can breed interests.[10] Innovators and entrepreneurs distrust regulation not because they've *had* bad experiences but because they *think* they have or think they will. EHR is a case where public policy overcame poor perception to create good outcomes beyond the imagination of the market in Europe and the United States. Understanding how helps us build on that success to allow innovators to work with regulators rather than against them to design and implement statutes which further the public good.

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[10] My distinction between perceptions and outcomes v. preferences and interests is both counter-to and consistent-with Pierson's (2014, 284–86) discussion of "stakeholder creation" because it is counter to the initial process of policies "confer[ing] substantial resources on specific types of groups" while it is consistent with the complementary process of "countermobilization or backlash [because] [n]ew policies create new threats." Pierson emphasizes that this complementary process is often the more significant one and I argue that this backlash is built on perception of the effect of a policy rather than waiting for that effect to play out.

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