

A Taxonomy of Regulatory Forms

There is a lot of interest in understanding what effects regulations have on economic growth and other macroeconomic measures, but measuring those impacts is challenging, in part because regulatory metrics themselves are rather blunt. Pages or even words in regulatory code may not tell the whole story. Intuitively, the *form* a regulation takes is relevant for predicting its impacts.

To address this information gap, as part of a cooperative agreement with the U.S. Department of Agriculture (USDA), the George Washington University Regulatory Studies Center is developing a taxonomy of regulatory forms. This framework allows regulations to be classified by the *form* (e.g. price or quantity caps, performance standards, information disclosure, etc.) they employ to achieve the stated regulatory outcomes. Although our initial goal is to use the taxonomy to estimate the impacts of regulation on agricultural industries in the U.S., we expect that the taxonomy can be used by researchers and analysts in a wide range of fields as a framework for informing research on the relative effectiveness of different regulatory forms to address market and social problems.

The Logic of a Regulatory Taxonomy

The peer-reviewed literature in regulation, economics, and individual policy fields all provides certain theoretical and empirical evidence for the intuition that some regulatory forms are likely to be more effective than others in achieving outcomes while minimizing disruption of market signals. In particular, research suggests that market-based alternatives to traditional “command-and-control” regulations, such as carbon taxes and emissions trading systems, have prominent theoretical advantages over stringent mandates for climate change.¹ Others have shown that management-based regulations can be an effective strategy when regulated entities are heterogeneous and regulatory outputs are difficult to monitor.²

¹ Stavins, Robert N. 1997. “Policy Instruments for Climate Change: How Can National Governments Address a Global Problem.” *University of Chicago Legal Forum* 1997: Article 10.

² Coglianese, Cary, and David Lazer. 2003. “Management-Based Regulation: Prescribing Private Management to Achieve Public Goals.” *Law and Society Review* 37: 691-730.

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Still, existing studies on different regulatory forms are limited in the sense that they mostly focus on a narrow scope that only provides understanding of a limited set of instruments (e.g. market-based vs. command-and-control regulations) in a limited policy field (e.g. environmental policy). One of the factors limiting the scope of this scholarship is the lack of a well-defined, widely-applicable catalog of different forms of regulation. Although there have been several attempts of building a taxonomy for this purpose, they either focus on an aggregated level of categorization or do not cover a complete list of forms.³ We believe that our taxonomy presented below is the first comprehensive taxonomy that can be used to classify regulations in any field into specific forms they take.

The Structure of the Taxonomy

Our classification system identifies regulations by form in three tiers. The first tier has four broad categories: economic regulation, social regulation, transfers, and administrative regulation. The second tier breaks down each broad category. For example, social regulation includes command-and-control, market-based, and information-based regulation. The third-tier classification is more specific, including a total of 36 categories such as performance standards, means-based regulation, pre-market approval, and permitting (which are all under command-and-control regulation). Intuitively, the economic and social regulation categories contain most of the specific regulatory forms.

The embedded tiers provide flexibility for researchers in applying the taxonomy to fit the context of their research designs. For example, researchers interested in a specific comparison of performance and means-based standards, or performance standards and marketable permits can focus on the third tier, while others interested in a higher-level comparison of command-and-control and market-based regulations might find the second tier useful.

Applications of the Taxonomy

As mentioned above, the taxonomy could be widely applicable. As an example, we recently used it to classify over 700 parts of the *Code of Federal Regulations* that are highly relevant to agricultural industries since 1970. Our coding process involved four coders coding independently, with at least two coders coding each part. The initial coding results show a high inter-coder reliability score, which validates the legitimacy of the taxonomy. The resulting dataset has allowed us to examine the prevalence of different forms of regulation related to agricultural industries in a given year as well as regulatory changes over time. Eventually, we

³ See, e.g. Blind, Knut. 2012. “The Influence of Regulations on Innovation: A Quantitative Assessment for OECD Countries.” *Policy Research* 41: 391-400; Drahos, Peter (editor). 2017. *Regulation Theory: Foundations and Applications*. Acton ACT: The Australian National University; Weersink, Alfons, John Livernois, Jason F. Shogren, and James S. Shortle. 1998. “Economic Instruments and Environmental Policy in Agriculture.” *Canadian Public Policy/Analyse de Politiques* 24(3): 309-327.

plan to combine the dataset with various measures of regulation to empirically examine the impacts of different regulatory forms on agricultural productivity at the industry level.

A similar approach can certainly be applied to other industries, other types of regulations, and other outcome variables. The taxonomy essentially enhances existing measures of regulation by distinguishing the forms that regulatory requirements take. We plan to continue updating and improving this framework to provide an additional tool for those studying regulation, and welcome comments and suggestions.

A Taxonomy of Regulatory Forms (Updated 5/23/2018)

First Tier	Second Tier	Third Tier	Definition	Example
Economic	Price	Benchmarking (or yardstick regulation)	A limit placed on prices by reference to benchmarks, such as prevailing wage or prices within an area or product segment.	The Davis-Bacon Act prevailing wage provisions; Centers for Medicare and Medicaid Services' pharmaceuticals and medical services.
		Price ceiling/floor	A price control on the highest/lowest price that can be charged for a product.	Rent control.
		Rate of return	A form of price setting regulation where governments determine the fair rate of return allowed to be charged by a monopoly.	The Federal Communication Commission's (FCC) rate of return for local exchange carrier to determine common line rates.
		Revenue cap	A limit on the amount of total revenue received by a company operating within an industry; this generally applies to utility companies who are monopolists.	The Federal Energy Regulatory Commission's regulations related to energy offer caps.
	Quantity	Obligation to serve	A regulation requiring companies to make their services/products available to the general public at rates determined to be "reasonable."	Regulations under the Communications Act of 1934, telephone companies; rail and bus services.
		Portfolio standards	A regulation that requires the increased production of energy from renewable energy sources.	Renewable portfolio standards; renewable fuel standards.
		Rationing and quotas	A regulation that limits the number, or monetary value, of goods: it generally applies to limits in international imports or exports during a particular time period and occasionally to limits in interstate commerce; and it also includes catch limits in fishing and hunting.	U.S. tariff rate quotas for imports.
	Entry & Exit	Antitrust	A regulation that promotes fair competition (restrict collusion/cartels).	Regulations under the Hart-Scott-Rodino Antitrust Improvements Act (16 CFR 801, 802).
		Certificate of need	A requirement before proposed acquisitions, expansions, or creation of facilities to affirm that the plan fulfills the needs of a community as decided by a government entity.	State-level requirements for approval before providing medical services.
		Certification	A requirement that products be routinely approved before introduction to the market.	Inspection of eggs; USDA certification and inspection of meat products (7 CFR 57).
		Licensing	A license granted by the government is required to legally practice a profession or operate a business.	The U.S. Department of Health and Human Services' requirements regarding the services that different medical professionals can provide; occupational licensing (often at the state level).
		Rivalrous/exclusive permits	Permission is required to enter the market, and allocation to one party precludes other party.	Broadcast spectrum license; airline landing slots.

First Tier	Second Tier	Third Tier	Definition	Example
	Service Quality	Product identity or grades	Products categorized into official grades/classes recognized by the government based on measurable attributes.	USDA Agricultural Marketing Service's Grades & Standards for fruits or beef.
		Quality levels	Level/Standard of service is defined by regulators in case of price cap regulation.	FCC regulation of local exchange companies.
Social	Command-and-Control	Means-based standards	A requirement that specifies technologies that must be used, or prescribes specific procedures, methods, and practices that must be performed. It is also known as prescriptive standards, specification standards, design standards, or technology-based standards. ⁱ	Requirement of Vehicle-to-vehicle communications in highly automated vehicles; U.S. Consumer Product Safety Commission's animal testing policy (16 CFR 1500).
		Monitoring, reporting, and verification requirement	Requirements that specifically require reporting data to the government and often involves substantial recordkeeping by businesses.	Electronic reporting of National Pollutant Discharge Elimination System (NPDES) (40 CFR 127).
		Performance standards	"A performance standard specifies the outcome required but leaves the concrete measures to achieve that outcome up to the discretion of the regulated entity." ⁱⁱ This includes technology-based performance standards.	The U.S. Environmental Protection Agency's (EPA) performance standards.
		Permitting	"An administrative agency's statutorily authorized, discretionary, judicially reviewable, granting of permission to do that which would otherwise be statutorily prohibited." ⁱⁱⁱ This is usually for environmental protection and can include conditions for operation.	NPDES; regulations under the National Environmental Policy Act (e.g. oil pipelines; other construction).
		Pre-market notice	A requirement to notify a regulator prior to manufacture but not to receive approval prior to introduction into the market.	Regulations under the Toxic Substances Control Act.
		Pre-market/pre-manufacture approval	A requirement to receive regulatory approval prior to initiating the manufacture or marketing of a product.	The U.S. Food and Drug Administration's approval of medical devices or drugs required prior to sale.
		Prohibitions	The official or legal prohibition of a product or an act, without exceptions (i.e. no permits accepted).	EPA's ban of the pesticide DDT; acts prohibited on a National Wildlife Refuge.
	Market-based	Bonds	A requirement for regulated entities to post a bond prior to engaging in any activity that might cause negative impacts. ^{iv}	Bonding requirements for natural gas production.
		Marketable permits	Tradable allowances or permits. Mostly used in an environmental context.	Marketable permits applied to fisheries; SO ₂ ; lead (carbon).
		Subsidies	Benefits given to an individual, business or institution to incentivize certain behavior (changes resource allocation vs. transfer which is intended to change resource distribution).	Subsidies to ethanol production under renewable fuel standards ^v ; USDA's conservation programs.
		Taxes and fees	Fees on polluters that penalize them in proportion to the amount they discharge.	Carbon taxes.

First Tier	Second Tier	Third Tier	Definition	Example
	Information-based	Contingency planning	A requirement for regulated entities to engage in planning and data gathering to realize regulatory goals, which typically includes identifying the hazards in operations and actions to take to mitigate the risks while it does not require any specific outcomes or actions. ^{vi}	Safety and Environmental Management System rules (e.g. oil and gas development).
		Hazard warnings	A requirement to disclose information concerning the hazards and identities of a subject. Often involves the requirement to use recognizable symbols (e.g. skull and crossbones).	The Occupational Safety and Health Administration's Hazard Communication Final Rule, requiring information disclosure on hazardous chemicals to employees.
		Labeling	A requirement for labels that bear certain information on products sold.	Nutrition Labeling and Education Act, nutrition labelling for foods; Country of Origin Labeling; appliance and vehicle efficiency stickers; pesticide labels.
		Other disclosure	Information disclosure requirements other than labeling or hazard warnings. Distinguished from other information disclosures because the intended recipient is not directly affected either as a consumer or worker.	Toxic Release Inventory; Community Right-to-Know.
Transfer	Transfer	Knowledge transfer	A regulation that requires agencies to share certain information (e.g. manuals, data, survey results) with the public for free, usually upon request.	Regulations on soil surveys (7 CFR 611); snow surveys and water supply forecasts (7 CFR 612).
		Monetary transfer	Includes income support/payments to farmers/businesses. Distinguished from "subsidies" because it targets a need versus motivating a behavior.	Dairy Disaster Assistance Payment Program; Food Stamps (7 CFR 786).
		Technology transfer	Technologies transferred from the government to a private sector partner, generally through patenting and licensing (including exclusive and non-exclusive licensing).	USDA Agricultural Research Service's technology transfer programs.
		User fees	A payment is required in exchange for certain services.	Peanut Board fees in exchange for marketing/research.
Administrative	Administrative	Definitions	A <i>Code of Federal Regulations</i> (CFR) part that only contains definitions of terms.	Regulations on the definitions regarding the inspection of Siluriformes fish and fish products (9 CFR 530).
		Government action	A regulation that requires government agencies to take certain actions or comply with certain standards without any requirements for the public.	Regulations requiring Natural Resources Conservation Service to collect, provide and interpret data on water supply forecasts (7 CFR 612).
		Organizational	A CFR part that only describes the organization and functions of an institution.	Regulations on the administrative structure and functions of Farm Service Agency state and county committees (7 CFR 7).

References for the Taxonomy:

- ⁱ Coglianese, Cary. 2017. “The Limits of Performance-Based Regulation.” *University of Michigan Journal of Law Reform* 50(3): 525-563.
- ⁱⁱ Coglianese, Cary, Jennifer Nash, and Todd Olmstead. 2003. “Performance-Based Regulation: Prospects and Limitations in Health, Safety, and Environmental Protection.” *Administrative Law Review* 55(4): 705-729.
- ⁱⁱⁱ Biber, Eric, and J.B. Ruhl. 2015. “Designing Regulatory Permits: Reports and Case Studies.” Available at: <https://www.acus.gov/sites/default/files/documents/Licensing%20and%20Permitting%20Draft%20Report.pdf>
- ^{iv} Carrigan, Christopher, and Elise Harrington. 2015. “Choices in Regulatory Program Design and Enforcement.” Research Paper Prepared for the Penn Program on Regulation’s Best-in-Class Regulator Initiative, Penn Program on Regulation. Available at: <https://www.law.upenn.edu/live/files/4706-carriganharrington-ppr-researchpaper062015pdf>.
- ^v Mannix, Brian. 2012. “Regulatory Subsidies: A Primer.” The George Washington University Regulatory Studies Center, Working Paper March 2012. Available at: <https://regulatorystudies.columbian.gwu.edu/regulatory-subsidies-primer>.
- ^{vi} Mannix 2012, *supra* note v