

LAW IN REGRESSION? IMPACTS OF QUANTITATIVE RESEARCH ON LAW AND REGULATION

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Quantitative research (“QR”) has undeniably improved the quality of law- and rulemaking, but it can also present risks for these activities. On the one hand, replacing anecdotal assertions regarding behavior or the effects of rules in an area to be regulated with objective, statistical evidence has advanced the quality of regulatory discourse. On the other hand, because the construction of such evidence often depends on bringing the complex realities of both human behavior and rules designed to govern it into simple, quantified variables, QR findings can at times camouflage complexity, masking real problems. Deceptively objective findings can in this way prevent the kind of deep, difficult, granular investigation a problem needs.

This Article examines the methodology of QR, highlighting points where objectivity and verifiability can be threatened. It discusses a number of case studies where common patterns emerge in the interaction between QR and policymaking. These include the displacement of qualitative problems with inaccurate quantification, the release of powerful, statistical

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or otherwise quantitative “sound bites” that immediately move policy but are later found to be incorrect, deflating like a “bubble,” and the abdication of governance duties by regulators in favor of quantitative indicia like the performance benchmarks of an “efficient market.” These case studies reveal a particularly troubling tension between the strength of QR in reaching generalized findings and the uniquely context-specific nature and operation of most laws and regulations.

This Article recommends a number of measures to improve the use of QR in policymaking, including increasing the transparency of data generation and analysis within the academic community, putting more emphasis on interdisciplinary creation and validation of findings, using certain cautionary disclosure when making “public offerings” of quantitative findings, and holding policymakers more strictly to their statutory mandates, even if not complementary with quantitative analysis.

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I. INTRODUCTION: SIMPLE ASSERTIONS WITH COMPLEX DERIVATIONS

While the aim of law is depicted allegorically by scales weighing in an unbiased (blind) manner, it is rare that either justice or law can be quantified in anything more than an approximation of this scaled end. Nevertheless, the ideal end of justice presented in the allegory of the balance leans toward an image of exact quantification.¹ Objective sciences and mathematics, which can realistically aspire to providing results that are verifiable across individual scientists, time, and cultures, have throughout modern history captivated the minds of lawmakers. This has occurred on a system-wide level throughout the modern era, so that frameworks like the U.S. Constitution attempted to reflect the perfect mechanics of a Newtonian universe² and over 200 years later the

¹ This goal had been set as early as Aristotle, who argued: “So the just is a sort of proportion. Being proportionate is not a property particular to abstract number, but belongs to number in general, since proportion is an equality of ratios.” ARISTOTLE, *NICOMACHEAN ETHICS* 86 (Roger Crisp ed. & trans., Cambridge Univ. Press 2000) (c. 384 B.C.E.).

² PETER GAY, *THE ENLIGHTENMENT: THE SCIENCE OF FREEDOM* 164, 563–67 (1969); *see also* THE FEDERALIST NO. 9 (James Madison) (“The science of politics, however, like most other sciences, has received great improvement. The efficacy of various principles is now well understood,

financial regulatory model of the 2000s attempted to dovetail with the naturally perfect mechanics of the efficient capital market.³ It has also occurred at the level of decision-making that shapes law, so that mathematical patterns culled from statistical analysis are used to provide quantifiable anchors for the fashioning of rights, rules and remedies.⁴

The dependence of law- and rulemaking on studies undertaken in the social sciences has never been as strong as it is today, particularly between economics and finance studies on the one side, and the laws and regulations they work to shape on the other. In the context of this close interaction, scholars of economics and finance have added new tools to quantitative research (QR) at an impressive rate, perhaps most notably the incorporation of concepts from political science in the form of new institutional economics⁵ and the incorporation of insights from psychology in the form of behavioral economics/finance.⁶ New tools also

which were either not known at all, or imperfectly known to the ancients. The regular distribution of power into distinct departments; the introduction of legislative balances and checks.”)

³ In 1997, Federal Reserve Chairman Alan Greenspan observed: “As we move into a new century, the market-stabilizing private regulatory forces should gradually displace many cumbersome, increasingly ineffective government structures. This is a likely outcome since governments, by their nature, cannot adjust sufficiently quickly to a changing environment, which too often veers in unforeseen directions.” Alan Greenspan, *The Evolution of Banking in a Market Economy*, Remarks Delivered at the Annual Conference of the Association of Private Enterprise Education, Arlington, Virginia (Apr. 12, 1997), available at <http://www.federalreserve.gov/boarddocs/speeches/1997/19970412.htm>, archived at <http://perma.cc/L7V8-BPRB>.

⁴ At the latest, use of statistical evidence and cost-benefit analyses in lawmaking can be understood to begin with Theodore Roosevelt’s appointment of a Committee on Scientific Methods. THEODORE M. PORTER, TRUST IN NUMBERS 151 (1995). Part III discusses in some detail high impact quantitative studies of La Porta *et al* and of Reinhart and Rogoff.

⁵ See, e.g., Elinor Ostrom, *Challenges and Growth: The Development of the Interdisciplinary Field of Institutional Analysis*, 3 J. INSTITUTIONAL ECON. 239, 239–40 (2007).

⁶ See, e.g., Robert J. Shiller, *Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends?*, 71 AM. ECON. REV. 421, 434 (1981). For how this theory has been carried into law, see Donald C.

include refined statistical techniques that allow ever more rigorous testing of the causal impacts of a given policy,⁷ and perhaps more importantly, increasingly powerful computers, which are easily accessible and capable of processing the abundance of available data. The sum of such innovations has led to both a broadening and a deepening of what can be achieved with QR.

While the substance of law has evolved with equal speed to address society's rapidly changing needs, the conceptual tools endogenously available within the discipline of law have not noticeably evolved to increase the ability of judges, lawmakers or regulators to make choices on what is just and what is the best regulation. If anything, both judges and legal academics have tended to discard many of the inherited guiding principles they previously used, as underlying philosophical and moral premises were held to contain ideology impacting unfairly on a portion of the population or were shown to be otherwise inadequate.⁸ Thus, today, policymakers engaged in law- and rulemaking look more than ever to QR as their compass for quality,⁹ and in many instances justifiably so.

The risks connected with policymakers' use of QR to support law and rulemaking are often evidenced by a pattern of rapid adoption of a succinct QR result followed by a slow

Langevoort, *Taming the Animal Spirits of the Stock Markets: A Behavioral Approach to Securities Regulation*, 97 NW. U. L. REV. 135, 137 (2002).

⁷ An excellent overview is given by Guido W. Imbens & Jeffrey M. Wooldridge, *Recent Developments in the Econometrics of Program Evaluation*, 47 J. ECON. LITERATURE 5 (2009).

⁸ A famous example of this is Justice Holmes' statement that, "The 14th Amendment does not enact Mr. Herbert Spencer's Social Statics." *Lochner v. New York*, 198 U.S. 45, 75 (1905). A more recent example is the rejection of restrictions (with foundations in traditional Western morality) on same-sex marriage. *See United States v. Windsor*, 133 S. Ct. 2675, 2693 (2013).

⁹ Ironically, I can offer no quantitative support for this statement. The reader, tellingly enough, would likely prefer I could write something like, "the use quantitative studies to support new legislation has increased from 27% in 1991 to nearly 48% in 2013." Anecdotal evidence is discussed in my treatment of cost benefit analysis. *See infra* Part III.B.

deflation of the position by studies revealing substantive or methodological flaws, and then a reversal from the position so rapidly taken. In an even worse scenario, no reversal takes place, and rules implementing a discredited policy remain in force. The public might be offered a punchy statistic or quantitative “sound bite” commanding that reasonable people support a proposed law or policy, only to have this ostensible objectivity unwind—and the proposed norm with it—at a later date when the data or methods behind the asserted finding are vetted. The prick of such a “policy bubble” can come from an unpacking of errors that may lurk behind data, assumptions, choice of proxy, or mistaking correlation for causation. As in the case of financial bubbles, a good way to lower this risk is careful investigation of fundamental strengths before embracing what appears to be a simple solution overlooked in the past.

An example of such a policy bubble was the “legal origin debate” of the early 2000s, in which the source of good financial market development was asserted to lie in the superiority of common law (as demonstrated quantitatively). Leading policymakers quickly adopted these findings, which were later refuted by a number of law scholars, and then quietly dropped.¹⁰ The sound bite was simple, quick and clear: an objective index based on data from 49 countries showed that common law was far superior to civil law for capital market development. Because vetting these results depended on evaluating the contents of various databases, understanding the structure and operation of a large set of laws, and ascertaining that the statistical methods used to test causation were correct in design and application, the sound bite’s rapid impact was matched only by the laborious process of its eventual revision. More importantly for the persuasive power of this QR was that the simplicity of its answer stood in stark contrast to the complexity of an informed explanation of the relationships within a multi-levelled legal framework set within a complex context of historical events and economic development.

¹⁰ See *infra* Part III.C.

This unhappy juxtaposition presents itself again and again in the evaluation of laws and rules regulating capital markets. However, once the sound bite is released into public debate at a high enough level of prestige, reinforced by institutional signaling of quality, and quoted by persons for whom its impact is desirable, reversing the momentum is no easy task. If the data, the methods applied to such data, the proxy chosen for a dependent variable, or the methodology used to determine causality is incorrect, or if the proposed solution provokes unforeseen consequences, history itself will eventually unwind the decision. The boom and bust of policy bubbles can be a wasteful process.

In distinguishable but related circumstances, heavy reliance on quantitative assessment criteria, as opposed to research findings, can also dangerously mislead law- and rule-makers. This can occur when vague, qualitative aims are rejected in lieu of sharply quantified proxies to measure the quality of law and regulation. In recent decades, a proxy which has been embraced to guide law- and rulemaking is the (short-term) economic impact of rules. Two assumptions behind assessing law- and rulemaking by market performance are the ideas that social interaction is most accurately expressed in market terms and that a regulator guided by clumsy and vague principles like “fairness” and “orderliness” cannot connect with the inherent logic of the market as well as can a market participant driven by an urge for profit unencumbered by market-exogenous motivations. The market, seen in this way, is a highly intelligent ecosystem that generates its own reading of risk, prescriptions for reaction, assessments of quality and indicia of performance—not just for buyers and sellers but also for regulators. Corollaries to this approach are that regulation should be minimally intrusive and market activity should be seen as socially beneficent. This view can lead a policymaker to abdicate a statutory duty to combat “abuses” (which could generously be seen as innovation) while a market bubbles in quantitatively impressive activity. This regulatory tendency was visible in the run-up to the global financial crisis (“GFC”) and is still visible to some extent in the regulatory

treatment of highly fragmented securities trading in the United States, where computers fire orders at a growing number of platforms under conditions whose complexity and opacity have reached previously unimaginable levels.¹¹

This Article addresses the relationship between QR and law- and rulemaking as follows. Part II provides a brief overview of QR, laying out some of the main building blocks of quantitative analysis, explaining why the results it produces are at times not as definitive as they may appear, and discussing the methodological controls that can be used to strengthen and verify findings. Part III examines five prominent cases of QR and the embrace of quantitative measures in regulatory thinking. These include the use of quantified cost-benefit analysis (CBA) to evaluate the quality of rulemaking, the evaluation of legal traditions and levels of debt for an economy's healthy development, the manner in which market activity can come to be used as a proxy for the quality of regulation, and how, in markets dominated by algorithmic trading, QR is built into market design, so that the use of QR to assess markets has a circular nature that equates market (hyper)activity with market health.

Part IV offers three sets of recommendations to the research community and to policymakers with respect to the use of QR for designing law and regulation. This Article suggests that research teams should take their own potential influence into account before acting. In light of such potential impact, researchers could increase the level of care applied to verify their own results, consult with independent experts in the subject-matter at hand when their data consists of complex phenomena such as law and regulation, and publish code and data so that others can attempt to replicate the QR results before they become the basis for policies. It would be useful if these practices were memorialized in a code of professional ethics. This Article offers somewhat stronger recommendations for policymakers, who consume QR and translate it into action. Any decision to adopt the findings of QR and implement

¹¹ These two examples are discussed below. *See infra* Parts III.E–F.

them through law or rules should be held to meet a high standard of skill, care and diligence, which would entail appropriate investigation and vetting of the QR. An important check on policymakers' behavior is that they must be held to the mandates expressed in legislation controlling the regulatory framework in their charge. For example, when assessing the quality of a securities market, if law- or rule-makers were to decide categorically that lower trading costs are always good because they tend to increase the amount of trading which usually translates into higher liquidity, they would be ignoring regulatory mandates like duties to prevent "excessive speculation" and "unreasonable expansion" of the market. While this sort of neglect of duty might well be popular with market participants and create positive feedback for regulators, it would not only be contrary to legislative intent, but also—as history has repeatedly demonstrated—tend to usher in market damaging reversals. The pursuit of qualitative criteria is often difficult to explain and assess, and policymakers should look to the objectivity of QR when possible. However, they should aspire to a more sober relationship between the findings of QR and their express duties in connection with the law they administer.

II. THE NATURE OF "QUANTITATIVE ANALYSIS" AND THE SOURCES OF ITS OBJECTIVITY

A. Removing Ego from the Equation

In his historical treatment of the quantitative sciences, Theodore Porter argues that the "objectivity" which we recognize as scientific occurs at an intersection of methods and communities. He understands the use of QR by policymakers as the interaction of a "disciplinary community" of research providers with "public officials" within a language of "mechanical objectivity" that "implies personal restraint [and] following the rules [which] are a check on subjectivity."¹² Porter compares this to the

¹² PORTER, *supra* note 4, at 3–4.

impartiality on which the “credibility of courts depends.”¹³ The discursive, communicative, focus of this definition resembles Melvin Eisenberg’s theory of the common law, as a body of decisions that is objective (because impartial and universal), supported by generally held “standards of the society or the special standards of the legal system,” and applies “consistent methodology across cases” that can be replicated by “all members of the [legal] profession.”¹⁴ In both law and science, however, consistently applied rigorous methodology alone is not enough to create the generality that commands obedience. Credibility has an important institutional element, what H.L.A. Hart calls “a general habit of obedience” to “bodies of persons giving general orders . . . and receiving habitual obedience,”¹⁵ in most cases law-making bodies of the government. Porter appears to acknowledge this factor in QR when he observes: “In short, it requires institutional or personal credibility even to produce impersonal numbers. If experimental reports or the numbers fed into calculations cannot be replicated at will, their authors will only be believed if they can impress readers somehow with their skill and probity. . . . Trust is inseparable from objectivity, rather like a Doppelgänger. But the form of trust supporting objectivity is anonymous and institutional rather than personal and face to face.”¹⁶

While a judicial decision, the decisions in a respected QR finding, and the decision to translate this finding into policy all require institutional support, there is a significant difference between how we treat the different decisions. The power of the court and the decision of the judge are inserted in a carefully balanced framework that protects against potential bias and abuse of authority: a judicial decision can be brought into a second, somewhat more limited, frame of analysis and reversed for any conflict with the law as understood by the appellate court. Even if this is not done, a

¹³ *Id.* at 4.

¹⁴ MELVIN A. EISENBERG, *THE NATURE OF THE COMMON LAW* 8–12 (1988).

¹⁵ H.L.A. HART, *THE CONCEPT OF LAW* 24–25 (3d ed. 2012).

¹⁶ PORTER, *supra* note 4, at 214.

legislative body could still override the decision unless prevented from doing so by a higher level piece of legislation, like a constitution (which itself can be changed by sufficient support in the populous). That such carefully wrought frameworks are necessary is evidenced by the fact that notwithstanding such checks the existence of systematic bias in judicial decisions has repeatedly been demonstrated.¹⁷

QR offered within a discursive community to policymakers can be freely ignored, but if it is to be engaged at all, this requires using analytical methods that replicate or sufficiently overlap with the original research's methodology, and the acceptability of such methodology will be determined by the discipline, not the policymakers. In this way, the "disciplinary community" between experts and policy makers is closed, and the findings generated by a given research method remain powerfully persuasive unless called into question by the institutions originating QR. This of course presents a problem for those not trained in quantitative methodology. When discussing the activity of courts, we never shy away from questioning possible abuses of power, but when addressing QR, we understand ourselves confined to questions of "true" or "false" within a closed methodological channel. Discussions of power or even morality remain tangential to the matter at hand.¹⁸ Although some social scientists do at times replicate and directly confront the research generated by others, this

¹⁷ This was argument was raised in Legal Realism, carried forward in the early stages of Critical Legal Studies, and more recently evidenced repeatedly with empirical proof. *See, e.g.*, Theodore Eisenberg & Michael Heise, *Plaintiphobia in State Courts? An Empirical Study of State Court Trials on Appeal*, 38 J. LEGAL STUD. 121, 137 (2009); Nancy Staudt et al., *Judging Statutes: Interpretive Regimes*, 38 LOYOLA L.A. L. REV. 1909, 1953–54 (2005).

¹⁸ For example, recent work of Michael Sandel takes place at the edges of neo-classical models of the efficient market, questioning the (arguably efficient) use of market mechanisms to obtain organs for transplant, discover potential targets of terrorists, or provide employers with alternative income by purchasing life insurance on their employees with the employer as beneficiary. *See generally* MICHAEL SANDEL, *WHAT MONEY CAN'T BUY* (2012).

depends on the publication or replication of the original researcher's data and code, and the ensuing debate—which would not be a speedy process—takes place at a level that the public could find esoteric and unconvincing.¹⁹ Thus, in order to achieve its status as social science, QR must be understood as objectively de-politicized in spite of the fact that we know that its power depends greatly on social institutions and its findings can have great political significance.

More transparency must be achieved regarding whether QR is result-focused, generated to find a remedy for a known social or political ill, and when it is investigative, with an honest aspiration to complete scientific neutrality. To address this situation it is necessary to better understand both the methods employed to meet quality standards within the given disciplinary community and the institutional framework within which these methods have been developed and continue to evolve.

Econometrics is just the most recent and the most powerful in a long line of quantitative tools used by those interested in measuring social and natural phenomena. During its first stages in the late seventeenth and throughout the eighteenth century, quantitative research served explicitly as a political instrument, and statistics, or *Staatenkunde*, was known in Germany as “the right eye of the politician,” whose duty it was to watch out for the nation's resources and prosperity.²⁰ Another key determinant

¹⁹ See the discussions of the “legal origins” and “optimal level of public debt” debates in Part III.C–D.

²⁰ Karin Johannisson, *Society in Numbers: The Debate over Quantification in 18th-Century Political Economy*, in *THE QUANTIFYING SPIRIT IN THE EIGHTEENTH CENTURY* 344 (eds. Tore Frängsmyr, J. L. Heilbron & Robin E. Rider 1990). Some of the actors in this first stage also included William Petty, John Graunt, Charles Davenant and Gregory King in England, along with Francois Bois Guilbert and Marshall Vauban in France. See GAY, *supra* note 2, at 344–53. Statistics during this period was seen as supporting decision-making in fields such as commerce, colonization, “rational agriculture” and military strategy. *Id.* Heilbron argues that the 18th century surge in quantification can in part be attributed to better-organized and more powerful states (“benevolent

in the rise of the quantitative was also the Enlightenment drive to replace arbitrary fiat with rational accountability and (eventually) democratic rule, an aspect of QR that has remained attractive to this day.²¹ The origins of econometrics can be found in a second stage of quantification that emerged in the nineteenth century, in response to the planning needs of businesses. Modern historians of statistics and economics agree that the discipline was not born of theoretical scholarship, but from rules of thumb on temporal comparisons of prices, sales and assets used by business enterprises.²² Nevertheless, the social impulse to seek objective and responsible answers to pressing problems also animated the development of this discipline.²³

despots of central Europe, with their cameralist bureaucracies and programs of economic rationalization”), more scholarly activity (the multiplication of Enlightenment philosophers) and economies increasingly based on industrial innovation (particularly in Britain). Heilbron, *Introductory Essay* of Frängsmyr et al., *supra*.

²¹ This is of course a theme that runs throughout the Enlightenment, and which Gay, *supra* note 2, sums up well in the subtitle of the cited book, “the science of freedom.” It also goes to the character of the quantitative, which Porter explains has been seen as a check on the arbitrary exercise of power in government. PORTER, *supra* note 4, at 8 (“In a political culture that idealizes the rule of law, it seems bad policy to rely on mere judgment, however seasoned. This is why a faith in objectivity tends to be associated with political democracy.”). Hamilton’s famous remark in Federalist No. 1 also reflects this attitude: “whether societies of men are really capable or not of establishing good government from reflection and choice, or whether they are forever destined to depend for their political constitutions on accident and force.” THE FEDERALIST NO. 1 (Alexander Hamilton).

²² Judy L. Klein, *Institutional Origins of Econometrics: Nineteenth Century Business Practices*, in MEASUREMENT, QUANTIFICATION AND ECONOMIC ANALYSIS: NUMERACY IN ECONOMICS 87 (I Ingrid H. Rima, ed. 1995) (“The practices of merchants, bankers and captains of industry . . . had more influence on early mathematical statistics than did the logic of mathematical philosophers.”). See also THEODORE M. PORTER, THE RISE OF STATISTICAL THINKING: 1820–1900 81–88 (1986); LAURA TILLING, THE INTERPRETATION OF OBSERVATIONAL ERRORS IN THE EIGHTEENTH AND EARLY NINETEENTH CENTURIES (1973).

²³ For example, Ragnar Frisch, widely seen as the founder of econometrics as a discipline, has been depicted historically as “a devout Lutheran Christian . . . supporter of the Labour Party . . . upset by

When tools used for business planning and forecasting were transplanted into the realm of public policy, the problem of addressing qualitative concerns with quantitative studies came to the forefront. In her history of econometric ideas, Mary Morgan shows how two contemporary nineteenth century economists evidence the transition from qualitative analysis (albeit with statistics) to quantitative analysis. She argues that in studying business cycles, Clément Juglar presented substantial data on cycles, but “discussed the data on each individual cycle and then, as it were, piled up the cases to provide support for his theory by repetition,”²⁴ thus treating statistics like qualitative data. His contemporary, William Stanley Jevons, on the other hand, “expected the constancy of economic behavior to be reflected in statistical regularities in the mass of the data,” and these statistical regularities were then analyzed for connection with independent variables.²⁵ In spite of Jevon’s unfortunate choice of sunspots as a causal factor, Morgan sees his methodology as presenting the “first econometric theory and treatment of the business cycle.”²⁶ Nevertheless, even though the methodological bridge was crossed in the nineteenth century, econometrics did not receive its recognition as a discipline until 1931, with the founding of the Econometric Society. There is no consensus in the literature on why this was the case, but for the purposes of this Article it is useful to note that one of the problems

unemployment and war . . . [whose] commitment to social justice . . . [led him to] rigorous economic thinking, modelling and estimation . . . for introducing those reforms needed to prevent new wars and fresh waves of unemployment and despair.” FRANCISO LOUÇÁ, *THE YEARS OF HIGH ECONOMETRICS: A SHORT HISTORY OF THE GENERATION THAT REINVENTED ECONOMICS* 18 (2007). This historical image of the concerned, social *bricoleur* who throws himself into pressing problems with an assortment of borrowed tools appears in many respects to present a plausible lineage for current QR research that confidently comments on a heterogeneous basket of social questions, adjusting old tools and picking up new ones as its range of research expands.

²⁴ MARY S. MORGAN, *THE HISTORY OF ECONOMETRIC IDEAS* 44 (1990).

²⁵ *Id.*

²⁶ *Id.* at 18, 44.

Srinivasa Ambirajan sees evidenced in the historical material available was the economists' fear that, unlike errors in logic, statistical errors are so difficult to discover and refute that QR might be put to nefarious use.²⁷ This is essentially the same reservation held by Adam Smith, who famously had "no great faith in political arithmetic."²⁸ If the founders of the discipline saw the same structural problems that arise today, it is certainly necessary that more light be cast on the institutional, political and social factors influencing the use of QR for law and regulation.

B. The Working Model

In spite of the formidable position that QR holds today in supporting arguments that shape the decisions of both public and private bodies, it is important to highlight that it is (still) a discipline under construction. New statistical methods are constantly being developed, and old ones falling into disuse. QR in economics is criticized both from the "humanist sciences," which may object to its "frequentist"/positivist approach,²⁹ and from the "hard sciences," on a number of points, including how the teaching of econometrics fails to provide a coherent mathematical notation that distinguishes causal from statistical concepts.³⁰ In their attempts to respond to such criticism, quantitative researchers may attempt to stress or expand one aspect of their methodology or another, which can result in slightly

²⁷ Srinivasa Ambirajan, *The Delayed Emergence of Econometrics as a Separate Discipline*, in MEASUREMENT, QUANTIFICATION AND ECONOMIC ANALYSIS, 198, 207.

²⁸ ADAM SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS 345 (1776).

²⁹ See, e.g., DAVID BYRNE: INTERPRETING QUANTITATIVE DATA 84 (2002) (discussing the critique of Karl Pooper & Ray Kent, *Case Centred Methods and Quantitative Analysis*, in HANDBOOK OF CASE-BASED METHODS 184–207 (2009)).

³⁰ Bryant Chen & Judea Pearl, *Regression and Causation: A Critical Examination of Six Econometrics Textbooks*, 65 REAL-WORLD ECON. REV. 2, 14–15 (2013), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2338705, archived at <http://perma.cc/8APN-28QX>.

different methodologies. The discussion that follows is restricted to “mainstream” QR of the type used and cited in policy circles.³¹

As mentioned above, one of the most important mathematical procedures on which econometricians rely is regression, which allows quantification of the relationship between two or more variables. Regression analysis helps us understand how the average value of an outcome variable (also called the dependent variable) changes when one of the explanatory variables (also called the independent variables) changes. For example, by running a regression of share price on the governance structure of a company (independent directors, specialized committees, etc.), one can put a number on how share price varies with changes in the type of governance structure used. These variables are analyzed on the basis of *samples* extracted from the total *population* of things actually existing. To employ the same example, we might well lack full information on share price and governance structure for the entire population of companies to which a given study might refer, let alone data on other relevant variables the researcher, or more frequently, other researchers, believe are important for determining share price. The reduction which occurs in the process of selecting and using samples is one of the reasons why the results of QR usually are neither universally applicable nor completely immune to future revision. The set “population” is often large with complex characteristics, and creating the subset “samples” requires a careful analysis to ensure it is representative. A goal of QR is to ensure that all relevant variables present in the set are also present in the subset.

As in the practice of case law, the power of CR demands a binding relationship between the specific and the general, between a subset and a larger set. It is important, however, to remember that both qualitative and quantitative analysis usually aim to achieve general validity, or are at least used

³¹ That is, research drawing relatively straightforward assertions of causality from a given data set, without use of, *inter alia*, highly theoretical modeling arguments, newer statistical methods still being tested or heterodox economics.

as such. The quantitative method of econometrics does not use individual samples to derive general findings in the same way that a court would use a specific case qualitatively to generate common (law) rules.³² The set of circumstances captured in law by the concept of *stare decisis* has unity because abstract qualities highlighted in the determination of a case present conceptual identity (same legal right, question or status) and factual similarity (which cannot be defined exactly in advance as a certain set of variables).³³ The relationship between set (population) and subset (sample) in QR should, however, be determined by the presence of explanatory and outcome variables in both, and a defining characteristic of amenability to quantitative analysis. However, as Krzanowski explains, because QR includes “abstract[ing] the essence of the data-producing mechanism into a form that is amenable to mathematical equations that express relationships between measured ‘variables’ and assumptions,” the avowedly open-ended nature of QR has much in common with how a court will (according to legitimate and declared law) decide that some facts are relevant and others are not. A primary difference is that much debate over the years has addressed the (at least partly) political question of what facts form part of a cause of action, while an unsophisticated consumer of QR might believe that the variables included in a study are simply “raw” and unadulterated reality.³⁴

³² See the discussion of Clément Juglar’s work as assessed by MORGAN, *supra* note 24.

³³ See, e.g., RUPERT CROSS & J. W. HARRIS, PRECEDENT IN ENGLISH LAW 186–99 (4th ed. 1991). While it is the role of counsel to attempt to stretch or shrink the application of a precedent’s *ratio decidendi* to the case at hand, it is the role of the court to decide whether sufficient similarity exists, and while various forms of reasoning are used in this process, the decision ultimately boils down to authority, not philosophy. See also EISENBERG, *supra* note 14, at 50–60.

³⁴ WOJTEK KRZANOWSKI, AN INTRODUCTION TO STATISTICAL MODELLING at ix (1998).

Analysis . . . assumes *inter alia* that the available data forms only a subset of all the data that might have been collected, and then attempts to use the information in the

It should thus be emphasized that when conducting QR on law or regulation, there will be two factors affecting the quality of the bridge between the general set “population” and the subset “sample”: first, it is assumed that the population is not affected by variables not present in the sample, and second, that the type of variables used are amenable to mathematical expression. A typical multivariate regression function can be expressed in an equation like the following:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + u$$

It describes the average value of Y for *any given value* of X . β_1 represents the predicted change in Y associated with a one-unit increase in X_1 , while holding X_2 constant; β_2 represents the predicted change in Y associated with a one-unit increase in X_2 , while holding X_1 constant. The error term u contains all variables other than X_1 and X_2 that also affect Y . The parameters β_0 , β_1 and β_2 are “population parameters”; they represent something about the relationship between our variables in the population of interest (i.e., in the real world). To estimate population parameters, the person performing regression collects data from a sample and applies an estimator to that sample.³⁵ In our share price and type of governance structure example, if

available data to make more general statements about either the larger set or about the mechanism that is producing the data. . . . In order to make such statements, we need first to abstract the essence of the data-producing mechanism into a form that is amenable to mathematical equations that express relationships between measured ‘variables’ and assumptions about the random processes that govern the outcome of individual measurements. This is the statistical *model* of the system. Fitting the model to a given set of data will then provide a framework for extrapolating the results to a wider context or for predicting future outcomes, and can often also lead to an explanation of the system.

Id.

³⁵ The sample regression function would be: $Y = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \hat{u}$. Here, $\hat{\beta}_1$ measures the extent to which X_1 can explain “the part of Y unexplained by X_2 .”

X_1 were governance structure³⁶ and X_2 were variation in the relevant market for the product the company makes (which itself could be an independent variable), β_1 would represent the predicted change in share price associated with the addition of a specified governance mechanism *for the companies in our data*, while holding product prestige constant (i.e., comparing the market for one product to the aggregate of the market for all products).

The example given is a multiple regression of a single dependent variable (share price) on a set of more than one independent variables (governance structure and product market), and belongs to the General Linear Model in econometrics. The difference between the actual value of the dependent variable and its predicted value for a particular observation is the error of the estimate, which is known as the “deviation” or “residual.” It is the change in the dependent variable for a given case which is left unexplained by the model. The fit of the model overall is generally evaluated by comparing the sum of the variation “explained” across all cases for the “dependent variable” with the sum of the variation left unexplained. This is measured by a “regression line”, which is drawn as if one were to plot data as points on a graph, where the x-axis is the average number of governance measures selected for inclusion, and the y-axis represents average share price, regression analysis would produce the single line that best summarizes the distribution of points.³⁷ The goal of regression analysis is to determine the values of the parameters such that the regression line most closely approximates the real data points.

³⁶ In order to include “governance structure” in a relationship of this kind, certain legal relationships would have to be selected and quantified, such as by decisions that the right to vote on the selection of board directors or to sue the same for good governance should be elements of “good” governance, while the right to nominate the candidates for which votes are cast or to sue the controlling shareholder for a breach of fairness are irrelevant. Many, including the authors, might object to the judgments made in creating this classification.

³⁷ Usually, the goal is to minimize the sum of the squared residual values for the set of observations. This is known as a “least squares” regression fit.

Multiple regression is also useful when the two explanatory variables X_1 and X_2 are not independent of one another. For example, a company might be statistically more likely to have a higher share price if its product enjoys higher prestige. This means that we need to separate out the part of X_1 that is correlated with or predictable from X_2 in order to avoid “double counting” the information that is contained in both the X_1 and X_2 variables. A multiple regression performed in the manner outline above automatically adjusts the coefficients so that when the X_1 and X_2 variables contain redundant information, it is not double counted. This is one of the simpler reasons why regression is such a useful tool.

Regression can be used for understanding how related a given explanatory variable is to the outcome variable. In the example used above, there are a number of explanatory variables, including governance structure, the prestige of the company’s products, reputation of individuals in the company, and the stock market as a whole. It is important to understand which of these—if any—is most closely related to the outcome variable, share price. It can also be used to *predict* the outcome variable \hat{Y}_i given the explanatory variable data. For example, regression could be used to predict the effect on share price of an additional governance measure being introduced into a company with a certain level of product prestige and management reputation in a generally falling market. Regression is such a powerful tool because simply “running” a function provides coefficients for all estimators, along with the confidence interval associated with each coefficient. That is, once a regression model is specified, the sample data can be used to quantify the association between the explanatory variables and the outcome variable, and this also provides a minimum and maximum value for the association *given the sample data*, along with a pre-specified level of confidence, which gives an

indication of how much uncertainty there is in the estimate of the true value—the standard number being 95%.³⁸

From the above, it is clear that the analysis itself is generated automatically, and its quality depends on both how the form of the function is specified in advance (e.g., a linear relationship between the variables), and the choice of explanatory variables included. It is also important to note that least squares estimation can be inefficient, or even biased, if certain assumptions are not met.³⁹

Most QR research attempts to distinguish any asserted causation from mere correlation, which is crucial from a policy standpoint; simple regression analysis only helps establish the existence of connections that call for closer investigation. This is because when conducting regression analysis using non-experimental data, there are a number of pitfalls that can prevent a finding of causality. For example, the correlations might occur because X causes Y, Y causes X, they are both related to some other variable Z, or the correlation could simply be spurious. The existence of causation by other variables, such as political events, is prominently visible in the example of the QR making a “legal origin” assertion, discussed in Part III.C.⁴⁰ Although measurement error during data collection or the selection of

³⁸ If we drew 100 samples of the same size, we would get 100 different sample means and 100 different confidence intervals. We expect that in 95 of those samples the population parameter will lie within the estimated 95% confidence interval.

³⁹ These assumptions include that data must be a random sample of the population, that the average of the error terms (given values for the independent variables) has an expected value of zero, that the error terms all have the same variance and are not correlated with each other, that there is no measurement error, and that it must not be possible to express one of the independent variables as a linear combination of the others. When these assumptions do not hold there are a number of possible fixes, such as adding further variables to the regression, changing the model (for example, if the relationship between the variables is not linear, but curvy), cutting the number of predictors to a smaller set of uncorrelated components, transforming the independent variables, analyzing the data separately for different subgroups, or using robust standard errors. On failures and fixes, see *infra* Part II.D.

⁴⁰ See *infra* Part III.C.

a biased sample are concerns, problems more often arise at the data analysis stage,⁴¹ and usually entail reverse causality (in which the “dependent” variable is actually causing change in the “independent” variable) and omitted variable bias⁴² (where a third, underlying variable not included in the regression is actually driving results). These are two of the most common illustrations of what economists call “endogeneity.”⁴³ This uncertainty exists because we cannot observe the “counterfactual” of an action—we cannot both simultaneously enact and not enact a policy affecting the same variables at the same time and place, and then compare the two outcomes.⁴⁴ Thus single historical events marking significant changes in law may well be the best way to attempt to measure actual causality.⁴⁵

A good example for illustrating the problem of endogeneity is that of the relationship between public debt and growth (QR on this question will be discussed in Part III.C). Measuring debt as a ratio to GDP automatically creates a negative correlation between debt and growth (a growing GDP reduces the ratio of debt to GDP if debt in the absolute remains unchanged), and this negative correlation can be amplified by the presence of automatic stabilizers or

⁴¹ See D.A. Hollanders, *Five Methodological Fallacies in Applied Econometrics*, 57 REAL-WORLD ECON. REV. 115, 118–19 (2011).

⁴² If an X_2 variable is included although it is irrelevant, the β_1 will still be consistent, but will be estimated with lower precision.

⁴³ Endogenous variables are variables determined by other variables in the same system.

⁴⁴ Experiments (preferably using random assignment) are generally regarded as the best way to try and “reconstruct” the counterfactual, and thus make valid causal inferences. However, many of the questions tied to law and rulemaking are not amenable to experiments, at least at a macro-level. Mechanism experiments, however, could prove for some questions, as shown in Jens Ludwig, Jeffrey R. Kling, & Sendhil Mullainathan, *Mechanism Experiments and Policy Evaluations*, 25 J. ECON. PERSPECTIVES 17, 19–20 (2011).

⁴⁵ See, e.g., Amir N. Licht et al., *What Makes the Bonding Stick? A Natural Experiment Involving the U.S. Supreme Court and Cross-Listed Firms* 4 (Harvard Business School Working Paper 11-072), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1744905, archived at <http://perma.cc/W9UY-5KNS> (last visited Mar. 11, 2015).

by discretionary countercyclical fiscal policy (i.e., debt-accumulating measures taking place as a result of low growth). Alternatively, a correlation between debt and growth could be due to a third factor that has a joint effect on both of these two variables (for instance, an economic crisis could jointly cause a growth slowdown and a sudden debt explosion). In the simple corporate governance to share price example presented above, a company's management quality could be driving both higher share price and good governance, and the source of this causation could be much more difficult to detect as the subject matter and relationship among variables become more complex.

Two popular (non-experimental) ways of ruling out reverse causality are either an "ad hoc" technique or "instrumental variables" estimation.⁴⁶ In the former case, it may be impossible for Y to cause X in the specific regression (say, if X is something like rainfall), but researchers are seldom so fortunate. A more common approach is to "lag" the suspect variables by one or more periods, i.e., include only explanatory variables that precede the outcome variable in time. Arindrajit Dube used this approach of leveraging the time pattern of changes on Reinhart and Rogoff's 2010 data

⁴⁶ The key to the instrumental variable approach is finding a genuinely exogenous variable (instrument) that is strongly correlated with the potentially endogenous independent variable (in the case of growth and debt-to-GDP ratios, debt), but has no *direct* effect on growth. This is called the "exclusion restriction." A caveat is that this restriction can only be tested in identified models. However, approaches have been developed to show if small violations of the exclusion restriction affect results. Panizza and Presbitero use this approach to test whether public debt has a causal effect on economic growth (by using valuation effects brought about by exchange rate movements, and controlling for debt composition and the effective exchange rate), and find no evidence for such an effect. See Ugo Panizza & Andrea F. Presbitero, *Public Debt And Economic Growth: Is There A Causal Effect?* 41 J. MACROECONOMICS 21, 21–41 (2014). Other popular ways to address this issue are fixed effects models, difference-in-difference methods, or propensity score matching and regression discontinuity designs to approximate randomized controlled experiments. For a non-technical overview, see generally BARBARA SCHNEIDER *et al.*, ESTIMATING CAUSAL EFFECTS USING EXPERIMENTAL AND OBSERVATIONAL DESIGNS (2007).

regarding growth and debt-to-GDP ratios.⁴⁷ He finds that current period debt-to-GDP is a pretty poor predictor of future GDP growth at debt-to-GDP ratios of 30 or greater—the range where one might expect to find a tipping point dynamic. He does find, however, that the debt-to-GDP ratio does a great job predicting past growth (in this robustness check he used a “distributed lag” model—the results of this are consistent with reverse causality).⁴⁸ As a reminder of the possible outcomes from using even sophisticated control mechanisms in QR, it is useful to note that at the same time, there is an established literature that *does* document the adverse effect of debt on growth.⁴⁹

C. Judgment Calls (and Other Sources of Opaqueness)

Aside from some of the “heavier” questions of validity, such as disentangling causation from correlation, there are a number of different steps in the process of analysis that require researcher to make decisions or assumptions. Data collection is one of these steps. Quantitative research always starts with data, and high quality research requires high quality data. While some researchers have funding to collect their own data, many researchers work with second-hand data. This means that they are relatively in the dark about how the data was collected and must trust the institution that collected it. Next, a researcher must decide if the data requires “cleaning” that places it in a format suitable for analysis. This process seeks to weed out duplicate observations, isolate outliers, and correct any typos. Further, qualitative data will often require quantification, such as when a set of legal rules or institutions are translated into a numerical index on which the existence or absence of a given

⁴⁷ See Arindrajit Dube, *Guest Post: Reinhart/Rogoff and Growth in a Time Before Debt*, NEXT NEW DEAL: THE BLOG OF THE ROOSEVELT INSTITUTE (April 17, 2013), <http://www.nextnewdeal.net/rortybomb/guest-post-reinhartrogoff-and-growth-time-debt>, archived at <http://perma.cc/KF56-SXTG>. It is important and commendable that Dube released his full statistical code for verification of his procedure and results.

⁴⁸ *Id.*

⁴⁹ See *infra* Part III.D.

rule or institution will mean a higher or lower score on the index. The creation of indexes generally ranking the quality of competing legal systems is an extremely problematic undertaking. An index of this type requires assumptions about underlying legal, social and economic circumstances,⁵⁰ as well as regarding institutions in place for enforcement or informal bonding, and could not operate without them. When indexes are created in QR relying on unrelated scholarship in law, the risks are much higher than when the ranking of legal provisions and institutions is done specifically by legal scholars working with economists or other social scientists.⁵¹

The choice of a proxy is another judgment call. The decision might be based on findings achieved in the theoretical literature, such as in the example used above (which employs share price as a proxy for the impact of governance), the long-established understanding that investors will favor a better-run, lower risk company, which in turn will drive up the share price. Because quantitative methods explain phenomena and predict behavior or consequences only through changes in quantity, only those

⁵⁰ See, e.g., Bernard S. Black et al., *Methods for Multicountry Studies of Corporate Governance (and Evidence from the BRIKT Countries)*, 182 JOURNAL OF ECONOMETRICS 230 (2014); Holger Spamann, “*Law and Finance*” Revisited (Harvard Law School John M. Olin Center Discussion Paper No. 12), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1095526 (last visited Mar. 10, 2015), archived at <http://perma.cc/VWC7-SALR>; Sanjai Bhagat, Brian J. Bolton & Roberta Romano, *The Promise and Peril of Corporate Governance Indices* (ECGI - Law Working Paper No. 89/2007; Yale Law & Economics Research Paper No. 367).

⁵¹ For examples of legal scholars conducting QR of corporate and securities law, see John Armour et al., *Shareholder Protection and Stock Market Development: An Empirical Test of the Legal Origins Hypothesis*, 6 J. EMPIRICAL LEGAL STUD. 343, 372 (2009); Brian R. Cheffins, Steven A. Bank & Harwell Wells, *The Race to the Bottom Recalculated: Scoring Corporate Law Over Time* (Temple University Legal Studies Research Paper No. 2014-38; UCLA School of Law, Law-Econ Research Paper No. 14-10; ECGI - Law Working Paper No. 261/2014; University of Cambridge Faculty of Law Research Paper No. 54/2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2475242 (last visited Mar. 10, 2015), archived at <http://perma.cc/T38B-N5K4>.

phenomena that can be summarized in a quantitative way will be taken into consideration for a proxy. This allows us to understand why the use of a company's share price as a proxy for the quality of its governance structure is attractive despite the high risks of mere correlation, alternative causes, or even reverse causality. If "hypothesis testing" and neatly packaged results are a researcher's method of choice, *before* he or she begins to reflect on what best measures variations in the problem at hand, then both what is studied and the results produced may well be biased at a meta-level. Because the model used in analysis is usually derived from past literature, there is a conservative path dependence in QR, just as in any discipline.

While other disciplines may not aspire to scientific objectivity, quantitative studies do. Nevertheless, it is wholly possible that the literature review conducted at the outset of a quantitative study and the methodology employed may reflect only a subsample of the literature representing merely one vein of methodological understanding. This aspect of the QR may be overlooked in a critical analysis, for it is not thought to be of "scientific" character. However, it can serve as the basis for selection of method, data, proxy and variables. Another decision concerns the relative weighting given to different observations in the analysis, or classification of certain data points. This will be discussed in Part III.D with the reference to the paper, *Growth in a Time of Debt* by Reinhart and Rogoff, which weighted each country's growth rate during high-debt episodes equally, rather than by the number of years for which the debt persisted.⁵²

⁵² See generally Carmen M. Reinhart & Kenneth S. Rogoff, *Growth in a Time of Debt*, 100 AM. ECON. REV. 573 (2010). There are reasons for and against this methodology (the authors cited serial correlation as the motivation for their choice—i.e., if a country had a debt load above 90% of GDP last year, it's much more likely to have a similar debt load this year than is a country which had a debt load in the range of 30% of GDP). See *id.* at 575. See also *infra* Part III.D.

D. Failures and Fixes

While QR produces knowledge that is (in principle) rigorously verifiable, and allows the discovery of unexpected causal relationships, the quality of its output rests on a series of decisions, some of which are more consciously monitored than others during the production process. Methodology can be determinative: different researchers might use different methodologies on the same research question, reaching different results. Data selection affects results: numerous questions can be raised about the data employed, any proxy chosen and the quantification of qualitative data. Even with good methodology and data, misinterpretations are possible, particularly in the case of a policymaker under public pressure for a quick fix. Most of these risks are not made transparent to the consumers of a given study's results. Although objectivity in QR can be achieved *provided that* all of the above fall into line, this is far from given.

A peer-reviewed journal to which a paper using quantitative analysis is submitted for publication would, according to best practice, subject the research to a battery of "robustness checks." These test the sensitivity of results to the model specified and to the inclusion or exclusion of certain data points or variables. They can also include the use of different datasets to ascertain whether the significance of the paper's results depend on the particular sample from which the initial data is derived. It is therefore likely that the academic community itself would identify and exclude a paper with faulty methodology before it is published. However, this alone does not settle the issue. First, many articles are published by private institutes (which may or may not be politically partisan) that require no extensive review, but may still carry weight in policy circles. Second, the robustness checks do not necessarily catch possible problematic decisions that are non-methodological in nature, especially during the process of data selection, generation, cleaning and analysis. Third, the review system can also create bias instead of quality, for when it simply seeks to ensure publications "meet standard

tests of statistical significance,” its standardizing function has little to do with quality.⁵³ Fourth, quantitative researchers often analyze content from different disciplines, such as law, without due consideration to the substance or methods of these disciplines. Fifth, when stepping outside of the academic community, the relative quality weighting of the importance of a piece of research is often lost. Policymakers can seize “sound bites” contained in abstracts of research papers to further a certain ideology or agenda, without the capacity, knowledge or (sometimes) will to grasp the message, quality or context of the research. Sixth, there is a view—somewhat foreign to lawyers—that if certain steps are taken, the product will be objective science free of all bias, and will not be subject to an objection that could be robust unless the commenter is intimately schooled in the methodology employed. This view can affect a researcher’s quality of circumspection.

QR results receive their scientific character from the potential for verification through the tools of the statistical sciences. The potential of such verification is reduced by the facts that it may not cover all important questions, can be performed only by a select group of experts, and could take a significant amount of time, far longer than it takes for the succinct results of a QR study to have an impact on policymakers and the public. The following Part III examines the interaction between QR and policymaking. Each of the examples used raises warnings for the use of QR, but that is a central aim of this Article, and should not be understood to translate into a call to abandon, or even decrease, its use in law and rulemaking. The widespread acceptance, use and impact of QR speak for themselves as to its utility in this area.

⁵³ See John J. Donohue & Justin Wolfers, *Uses and Abuses of Empirical Evidence in the Death Penalty Debate*, 58 STAN. L. REV. 791, 838 (2006) (“[P]ublication bias’ arises when journals only publish estimates that meet standard tests of statistical significance.”).

III. CASES STUDIES ON THE ROLE OF QUANTIFICATION IN LAW

A. Displacing, Preempting, and Dodging Difficult Problems Through Quantification

The characteristics of QR discussed in Part II both promote its use in making regulatory policy and, in some cases, can lead to flaws in the same policy. Prominent among the attractive characteristics of QR is its ability to generate results that are simple to communicate and verifiably objective. These results are achieved, however, through methods of derivation whose complexity breeds opaqueness and which are based on the numerous assumptions used by experts in the field. Moreover, the key objective base of such research is found in data that are sometimes estimated in ways that can be misleading. The concisely expressed result (e.g., “countries with debt exceeding 90% of GDP do not grow”) can be stated quickly and grasped by all, but is not open to argument on a moral or philosophical plane (as would be, say, Calvin Coolidge’s “Industry, thrift and self-control are not sought because they create wealth, but because they create character”⁵⁴). The statistical sound bite is quickly expressed in public debate and is grasped as only the tip of an iceberg of cool objectivity. While the statistical sound bite’s reliance on assumptions and estimations may be

⁵⁴ Coolidge makes a moral assertion that subordinates quantitative ends to values borrowed from both Jefferson and Weber, with a voter appeal spin for his specific audience:

In all our economic discussions we must remember that we cannot stop with the mere acquisition of wealth. The ultimate result to be desired is not the making of money, but the making of people. Industry, thrift, and self-control are not sought because they create wealth, but because they create character. These are the prime product of the farm. We who have seen it and lived it—we know.

President Calvin Coolidge, Address at the Annual Convention of the American Farm Bureau Federation (December 7, 1925), *available at* <http://www.presidency.ucsb.edu/ws/?pid=480> (last visited Mar. 10, 2015), *archived at* <http://perma.cc/NM2Y-3BUZ>.

vaguely well known, Part II has shown that verification of conclusions is difficult for quantitative researchers, requiring both time and access to data. Moreover, performing such verification remains nearly impossible for those not versed in econometrics. Most importantly, by the time an assumption loses its force, a practice based on this may be so well established that its reversal is not realistic prior to a collapse that creates sufficient public attention and support for change. For example, while the tenet that markets spontaneously and efficiently self-adjust to risk as it arises might be refuted in theory, its real impact remains in the shape of a market in which regulation is largely reserved to private ordering. When an argument's communication is simple and quick, but its refutation is complex and lengthy, it becomes a powerful rhetorical weapon. For example, with regard to the "legal origin" case study discussed in Part III.C, below, at the time that the euro was introduced and the European Union comprehensively remodelled its regulation with the hope of creating global financial markets to match the United States,⁵⁵ the simple sound-bite that "common law origin" legal systems were objectively proven better to support capital markets was just what the dollar ordered. Showing that the statement was wrong from a legal, regulatory, political, economic, and historical perspective consumed thousands of pages of academic journals over a decade, but the sound bite still had a strong impact at a decisive point in policymaking. The infiltration of a simple idea was given wings by national pride and interest. Because of the complexity of modern regulatory systems and the many historical threads interweaving common and civil law over the centuries, particularly in Europe, the impact could be rolled back only very slowly.

Thus, despite benefits of objectivity, foundations on broad based data, and ultimate verifiability, the mixture of how QR is created, communicated and ultimately used has a potentially distorting impact on policymaking that must be

⁵⁵ See, e.g., EILÍS FERRAN, BUILDING AN EU SECURITIES MARKET (2004); NIAMH MOLONEY, EU SECURITIES REGULATION (2nd ed. 2008).

understood. This Part III discusses five cases in which QR can either lead to problematic policy decisions or inevitably support such decisions because a quantitative process of market activity has been presupposed as the actual measure of value. The first (Part III.B) examines the impact of using quantified cost-benefit analysis (“CBA”) to evaluate the quality of rulemaking, even in cases where many of the variables of the CBA can only with great uncertainty be reduced to quantities. In this case, CBA displaces the difficult decisions underlying QR, so that they need not clutter the CBA nor damage its claim to objectivity. This also tends to focus attention on a quantified result while deemphasizing the difficult and questionable judgments that were made to achieve it. The second and third case studies (Parts III.C and III.D) are situations in which quantitative “proof” is offered as a simple solution to a very difficult problem, only to later be found to contain errors of data and methodology. The two findings are that common law is the key to developing strong capital markets and an absence of public debt is the key to economic growth. In each of these cases, the “statistical sound bite” aspect of QR results lead to a “policy bubble” that later deflates, destabilizing the public’s understanding of the question the QR was meant to clarify. The fourth case study (Part III.E), which looks at financial regulation in the lead up to the GFC, shows how a belief in the market as the most efficient arbiter of social interaction couples perfectly with quantified proof about the quality of action. The growth and vitality of the market then serve as proxies for the quality of its relationship with the larger society. Private actors guided by the profit incentive supplant regulators as the best judges of regulatory choices. The last case study (Part III.F), which examines the regulation of markets dominated by algorithmic trading, is an example of what a regulatory atmosphere with very mature QR can look like. Quantitative research on market mechanisms has served as a basis both for writing algorithms to guide computer-driven trading and designing market structure. As a result, the research has been hardwired into both the policymaker’s and the trader’s

behavior. When further QR is applied to measure the quality of these markets, the findings can be expected to be positive, as the assessments are in effect evaluating patterns of their own creation. In such an atmosphere, it becomes easy for law- and rule-makers to lose their legislative moorings.

B. The Displacement of Knotty Questions Through Cost-Benefit Analysis

Cost-benefit analysis in regulatory decision-making depends greatly on QR. In doing so it displaces potentially disputed judgments, estimations and assumptions about the impact of a proposed rule from a prominent position in policymaking to the inconspicuous preliminary stage of creating quantities capable of precise comparison in a CBA weighting. If it is the dream of every regulatory agency (or their reviewing court) that the advisability of rules be proved in clear, quantified terms, then CBA can be understood to serve as this dream's "displacement" function in the Freudian sense. In the work of Sigmund Freud, "displacement" (*Entstellung*) occurs in dreams to repress an embarrassing and troublesome object or idea and make way for an innocuous or desirable substitute.⁵⁶ When rigorously

⁵⁶ See SIGMUND FREUD, *THE INTERPRETATION OF DREAMS* 180–81, 307–8 (James Strachey trans., 1900). This strategic ploy need not be sought solely in dreams, and has been analyzed from a number of angles. "Post-structural" thinkers such as Michel Foucault and Jacques Derrida employ this Freudian notion of displacement to describe the strategy of validation that both official discourse and philosophy in many cases employ, which not only ignores but actively represses the assumptions or reasoning flaws on which their pretention of rigor is based. See, e.g., JACQUES DERRIDA, *Plato's Pharmacy* in *DISSEMINATION* 67 (Barbara Johnson trans., 1983); MICHEL FOUCAULT, *THE ARCHEOLOGY OF KNOWLEDGE* 60 (A.M. Sheridan Smith trans., 1972) ("A dispersion that characterizes a type of discourse, and which defines . . . displacement, etc. Such an analysis . . . concerns, at a kind of preconceptual level, the field in which concepts can coexist and the rules to which this field is subjected."). From a completely different theoretical approach, the work of Douglass North shows how and why "[i]nstitutions . . . are created to serve the interests of those with the bargaining power to devise new rules." DOUGLASS NORTH, *INSTITUTIONS, INSTITUTIONAL CHANGE AND ECONOMIC PERFORMANCE* 16 (1990). Such self-

quantified CBA supports a rule, the approximations and assumptions that go into estimating the rule's potential impact are displaced to the studies that quantify the values weighed in the CBA. Following such displacement, the decision maker can show the world a precise and objective mathematical ratio demanding the rule be adopted or removed. As Richard Nathan puts it in his study of social science research in government policymaking, "politicians want—some even demand—one clear, simple bottom-line number."⁵⁷ Analysis of any knotty and questionable judgments made in quantitative studies that generate the quantified criteria employed in the CBA would be time consuming and difficult (as discussed in Part II) and would take place outside of the rulemaking process itself. Disputes on fine points can then remain "academic" in every sense of the word. Such displacement is part of the institutional role played by CBA.

CBA has been required by law in the United States for certain types of government action since 1936. As Porter explains, the Army Corp of Engineers used CBA well before this date, and had "relied increasingly on quantification to impose discipline."⁵⁸ Eventually, "[c]ost-benefit methods were introduced to promote procedural regularity and to give public evidence of fairness in the selection of water projects."⁵⁹ The 1936 Flood Control Act CBA requirement was introduced in an effort to control the significant temptation of "pork barrel politics" that Army Corp projects presented to members of Congress,⁶⁰ so that "economic

serving intention would not be openly announced, and often it is unconscious or preconceptual.

⁵⁷ RICHARD P. NATHAN, *SOCIAL SCIENCE IN GOVERNMENT: THE ROLE OF POLICY RESEARCHERS* 76 (2000).

⁵⁸ PORTER, *supra* note 4, at 155.

⁵⁹ *Id.* at 149.

⁶⁰ *Id.* at 155 ("The cost-benefit provision of the 1936 Flood Control Act was one of the heroic efforts of the United States Congress to control its own bad habits A preliminary examination and then a full survey, each running through several levels of Corps bureaucracy, required months or years, and could not be completed to satisfy the sudden whim of

quantification grew up not as the natural language of a technical elite, but as an attempt to create a basis for mutual accommodation in a context of suspicion and disagreement.”⁶¹ When seen in this historical light, it is not surprising that the highly partisan politics of the early 21st century have led to a renewed battle over the use of CBA. Yet the institutional role played by CBA in partisan politics is far from simple. Porter notes two contradictory characteristics in the historical record of the Army Corp of Engineers. First, “[n]obody noticed or cared that a probable error of .05 might not redound to the credit of the proposed project. The numbers were almost never questioned.”⁶² Second, the “Corps transgressed its customary standards most egregiously when the political forces were overwhelming, and when they were all arrayed on one side,”⁶³ such as when the Corp’s CBA was contested by a major utility or railroad. Recently, a new chapter in an old battle in the Court of Appeals for the District of Columbia Circuit regarding shareholders right to nominate candidates for the board led the demand for quantified CBA in independent regulatory agencies, repeatedly striking down SEC regulatory efforts for lacking, unquantified or faulty CBA.⁶⁴ One such rule—which sought to bring federal proxy

a legislator. When, now more rarely, really disgraceful projects were authorized, a modest standard of decorum was maintained.”).

⁶¹ *Id.* at 149.

⁶² *Id.* at 157.

⁶³ *Id.* at 161–62.

⁶⁴ See *Bus. Roundtable v. SEC*, 647 F. 3d 1144, 1155 (D.C. Cir. 2011); *Am. Equity Inv. Life Ins. Co. v. SEC*, 613 F.3d 166, 179 (D.C. Cir. 2010); *PAZ Sec, Inc. v. SEC*, 494 F.3d 1059, 1066 (D.C. Cir. 2007); *Fin. Planning Assoc. v. SEC*, 482 F.3d 481, 492 (D.C. Cir. 2007); *Goldstein v. SEC*, 451 F.3d 873, 884 (D.C. Cir. 2006); *Chamber of Commerce v. SEC*, 412 F.3d 133, 143 (D.C. Cir. 2005). These holdings are discussed in depth by John C. Coates IV, *Cost-Benefit Analysis of Financial Regulation: Case Studies and Implications* 26 (European Corporate Governance Institute (ECGI) - Law Working Paper No. 234/2014, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2375396 (last visited Mar. 11, 2015), archived at <http://perma.cc/28E4-4AXF>). See also Richard L. Revesz, *Quantifying Regulatory Benefits*, 102 CAL. L. REV. 1423, 1429–30 (2014) (discussing case law regarding CBA).

rules in line with a state law right of shareholders to nominate candidates for corporate boards—was found to lack sufficient support despite being based on over three decades of study, proposals, public comment, and revisions.⁶⁵ Commentators have found little rational justification for the Court’s actions.⁶⁶

The history and strategic use of CBA to justify regulatory action thus presents one of the most concrete and problematic examples of QR feeding into law- and rulemaking. Although CBA can be found in both “conceptual” and “quantified” forms,⁶⁷ quantified CBA achieves most essentially the goal of neutral objectivity that CBA is meant to provide. As mentioned above, if a probable (positive or negative) result of a proposed rule is a value which does not

⁶⁵ State corporate law generally allows shareholders to nominate candidates for election to the board, but the proxy process is preempted by federal law and rules in the case of a company whose securities are registered with the SEC. The SEC has been aware of this problem since the 1970s and at intervals has proposed various rules to correct it. The question and its history are discussed in David C. Donald, *Shareholder Voice and Its Opponents* 5 J. CORP. L. STUD. 305, 338–43, 357–59 (2005). See also Jeffrey N. Gordon, *The Empty Call for Benefit-Cost Analysis in Financial Regulation*, 43 J. LEGAL STUD. S351, S370 (2014) (“Thus in light of the extensive deliberation by two different Commissions over shareholder proxy access over a multi-year period and the extensive analysis in the proposing release, the assertion by the court in *Business Roundtable v. SEC* (647 F.3d 1148) that the decision was ‘arbitrary and capricious’ for its failure ‘adequately to assess the economic effects of a new rule’ itself seems an arbitrary and capricious conclusion.”).

⁶⁶ See, e.g., James D. Cox, *Iterative Regulation of Securities Markets after Business Roundtable: A Principles-Based Approach* 5 (July 25, 2014), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2471554 (last visited Mar. 11, 2015), archived at <http://perma.cc/LM5U-9M6J> (“[The] *Business Roundtable* . . . opinion is little less than a harangue on agency excess. The most troubling feature of *Business Roundtable* is it ignores the clear meaning of the congressionally established review standards for SEC rulemaking and clear import of the legislative intent behind the review standards.”); Coates, *supra* note 64, at 29 (“In *Business Roundtable*, the D.C. Circuit went so far as to characterize (without explanation) a peer-reviewed article published in the *Journal of Financial Economics* as ‘relatively unpersuasive.’”); Gordon, *supra* note 65, at S370.

⁶⁷ Coates, *supra* note 64, at 6–9.

already exist as a quantity (say, the value of a life, freedom from anxiety or the elimination of fraud), it must be translated into quantitative terms—preferably “monetized”⁶⁸—in order for it to be weighed as a quantity. This task is performed by QR, through either empirical studies or mathematical models.⁶⁹ For example, although we are at a loss assigning a monetary value to an average life, “[r]evealed preference studies infer the value people place on mortality risk reduction by measuring how they have respond to risk in the marketplace, such as by demanding greater compensation for riskier jobs (‘wage-risk’ studies) or by paying higher prices for safety features in consumer products.”⁷⁰

The U.S. Environmental Protection Agency synthesized the results of twenty-one such “wage-risk studies” to derive the “value of a statistical life” (“VAS”) it uses in CBA of proposed rules.⁷¹ While the result of this synthesis unquestionably adds to the quality of analysis, its derivation and those of the numerous other studies on which it is based

⁶⁸ While monetization is a goal in weighing benefits against costs, the research on a particular question may be limited to quantification, with only questionable transition to monetization. *See, e.g.*, Cass R. Sunstein, *The Limits of Quantification*, 102 CAL. L. REV. 1369, 1382 (2014) (“Perhaps an agency is able to project the number of prison rapes that will be prevented by a regulation, but it may not be confident about any effort to turn those benefits into dollars.”).

⁶⁹ As Coates observes:

Research in economics, sociology, psychology, and other relevant fields proceeds along paths that are not random If agencies ask pointed research questions in their rulemaking proposals, they will encourage private researchers to answer those questions. Private actors with an interest in the answers may fund such research; tenure can be granted in part on the ground that an academic has answered a socially valuable question; and grant proposals are more likely to be funded if they relate to research topics that have direct potential value to regulatory agencies.

Coates, *supra* note 64, at 86–87.

⁷⁰ Revesz, *supra* note 64, at 1437.

⁷¹ *Id.* at 1428.

should in some sense be visible and open to requests for verification. In a sketch of how one might attempt to quantify the benefit of a rule preventing fraud in order to run a CBA for such rule, Coates cites a study that “exploits the failure of Arthur Andersen to estimate an incidence of fraud among public companies of 15% [and] estimates fraud generates direct losses of between 22% and 40% of enterprise value, implying a lower bound on hidden fraud of 3% of enterprise value ($0.15 \times 0.22 = 0.03$), or losses of over \$500 billion.”⁷² It cannot be expected that the details of each wage-risk study or the data and methodology behind the finding that there is a 15% incidence of fraud in public companies would appear in the CBA itself. Rather, discussion of how these quantities are derived would be largely restricted to the original vetting and reception of the papers leading to such quantitative results.

The difficult transformation of qualitative information into a measurable quantity is displaced from the regulatory choice and the CBA supporting it to the QR establishing values for CBA. The value of such research might in some cases be unquestioned, or assumed from the signals of institutional reputation, rather than actually being tested by another researcher.⁷³ The choice itself will appear as the clean result of one figure (costs or benefits) outweighing the other (benefits or costs), while the choice of a possible proxy, the derivation of the quantities balanced, the selection of data, and the analysis of relationships between variables occur two steps removed from the agency’s decision, such as in the EPA’s VAS figure, which was distilled somehow from twenty-one separate wage-risk studies, each of which run the numerous risks of errors discussed in Part II, above. In this way, as QR becomes an indispensable prerequisite to well-supported rulemaking, the rule maker’s decision can displace

⁷² Coates, *supra* note 64, at 36 (citing Dyck, *et al.*, *How Pervasive is Corporate Fraud?* (Rotman School of Management Working Paper No. 2222608), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2222608 (last visited Mar. 11, 2015), archived at <http://perma.cc/YFF2-WJRC>).

⁷³ See *supra* Part II.A.

the difficulties of quantification to a less conspicuous level while conveying an impression of precise objectivity to the world.

Coates refers to the risk of using CBA as “camouflage” to cover “guesstimation,”⁷⁴ and Gordon refers to this use of CBA as something that “simply gets in the way of the genuinely hard work to be done.”⁷⁵ Both of these authors raise the point that the regulation of financial markets and services and the related flow of information is an immensely difficult project. It takes place in an environment of complex human behavior within and among groups of actors⁷⁶ whose choices will also change in relation to each piece of significant regulation adopted.⁷⁷ While a simple CBA ratio may appear to cut through biased subjectivity, it risks dangerously displacing information about judgments and assumptions that should be visible in the rulemaking process.

If a problem is displaced without being noticed, it remains both unsolved and unsolvable, because its existence is tacitly denied. This “camouflage” that “gets in the way” of understanding complexity ensures that such complexity remains institutionally repressed because the difficult choices and assumptions have been made prior to the CBA, in the process of quantifying the elements included in the CBA. Part II⁷⁸ has discussed some of this complexity. There is no doubt that quantification, even when it falls short of monetization, runs significant risks of error when applied to a socio-economic phenomenon as complex as law. This does not mean that quantification for analysis should be avoided altogether, but rather that the “objectivity” CBA presents as a numerical result using quantified qualities must be carefully vetted and taken as the construction and proxy that it is. The following section examines a set of quantitative studies that launched themselves into the highly political, centuries-old debate on whether the common law or the civil

⁷⁴ Coates, *supra* note 64, at 14.

⁷⁵ Gordon, *supra* note 65, at 3.

⁷⁶ Coates, *supra* note 64, at 89–90.

⁷⁷ Gordon, *supra* note 65, at 6.

⁷⁸ *See supra* Part II.C.

law offers a better legal system, providing a quick, quantified answer that had tremendous impact internationally.

C. Preempting Difficult Questions Through Quantification: Legal Origin and Economic Development

The problems present in quantified assessment of law are perhaps nowhere better exemplified than in the turn-of-the-century QR assertion that common law is the key to financial market development. This assertion's core finding was that countries using common law can protect investors better and thus create the legal conditions to develop capital markets, and derived from a series of quantitative studies undertaken by a team of economists generally referred to with the initialism "LLSV."⁷⁹ This was not expressed vaguely, but with the precise quantity that, while French origin law achieved a score of only 1.76 on a scale of rights protection against director abuse of power, English origin law achieved nearly double that, a whopping 3.39 on the same scale.⁸⁰ This hard fact meshed perfectly with intuitive understanding in the late 1990s, as leading financial centers like New York, London, Singapore and Hong Kong are all governed by common law, while the civil-law-governed Frankfurt, Paris and Madrid were trying to play catch-up. Nevertheless, the research backing the assertion of common law superiority suffered from a poor understanding of securities regulation, only a vague grasp of comparative law, and an attempt to exclude the impact of events as large as the two world wars of the 20th century.

In less than a decade this finding was embraced by the world's preeminent development institution, and the advice that the World Bank then gave to developing countries in 2004 on the basis of those studies was: "Common law countries regulate the least. Countries in the French civil

⁷⁹ Rafael La Porta, Florencio Lopez-De-Silanes, Andrei Shleifer & Robert W. Vishny, *Legal Determinants of External Finance*, 52 J. FIN. 1131, 1149 (1997).

⁸⁰ *Id.* at 1138, tbl. II.

law tradition regulate the most.”⁸¹ This is accompanied by a second, pithy principle: “heavier regulation brings bad outcomes.”⁸² Hence the assumed “light touch” of common law in securities regulation became the touchstone for capital market development.⁸³ Here, the solution offered by means of quantitative proof had two dimensions. First, it asserted that “law matters” for economic development, which is something all legal scholars and practitioners had known (or at least hoped). Second, it more specifically appealed to both popular understanding at the time and the national pride and interest of persons affiliated with common law jurisdictions, providing quantitative support for the superiority of the English-speaking world in equity market matters. On a political level, the message appealed specifically to those persons who saw private ordering as superior to state regulation, and thus dovetailed well with the neoliberal “Washington Consensus” then practiced in leading international economic organizations,⁸⁴ and discussed in the following section.

As will be discussed below, while the “law matters” assertion of this QR stimulated an entire field of legal study, its legal origins component was contradicted both by the actual nature of securities regulation in common and civil law jurisdictions and by major independent variables that the studies ignored. The legal origins component of LLSV’s theory thus ascended to fame and plummeted into discredit (at least within the legal, academic community) within the span of a single decade. On its way up, however, it brought not only the World Bank but also the major rating agencies in tow, which meant that this theory about the superiority of common law not only affected developing countries’ decision-making, but also forced companies whose debt was governed

⁸¹ WORLD BANK, DOING BUSINESS IN 2004: UNDERSTANDING REGULATION xiv (2004).

⁸² *Id.* at xiv.

⁸³ The larger trend of deregulation will also be discussed in Part III.D, *infra*, with regard to preparing the ground for the global financial crisis.

⁸⁴ See, e.g., JOSEPH STIGLITZ, GLOBALIZATION AND ITS DISCONTENTS 53–89 (2003).

by civil law to pay higher rates of interest.⁸⁵ As the rise and fall of this theory created (unsubstantiated) gains and losses that dissipated upon examination of the fundamentals, it resembles a bubble in shape. This legal origin bubble evidences the pattern of rapid, strong impact and slow, deflating reversal that can occur when the crisp numerical conclusions of a complex quantitative study are published and the slow process of examining the study's data and methodology begins.

Here, QR's instruction for policymakers could not have been more pointed: "civil law, and particularly French civil law, countries, have both the weakest investor protections and the least developed capital markets, especially as compared to common law countries."⁸⁶ In French origin legal systems, neither protection against director abuse (1.76 versus 3.39) nor the number of initial public offerings (0.19 versus 2.23) can measure up to English origin legal systems.⁸⁷ As we have seen in Part I, because verification of QR results is impossible for many of the laymen who use them, such research depends heavily on institutional reputation. LLSV's findings had exceptional support from institutional reputation: they were expressed in the most prestigious journals⁸⁸ by persons engaged by leading

⁸⁵ An analysis of the criteria applied by the leading credit rating agencies post-2000 found systematic biases against transactions governed by the cases of the highest French court (which, according to a simplified understanding of the civil law are not binding, but are in practice) and in favor of transactions governed by common law rather than civil law. This meant that parties using civil law in their transactions had to pay a higher rate of interest to borrow money. Bertrand du Marais et al., *Rating the Law: How Financial Rating Agencies Are Assessing the Legal Risks of Financial Transactions*, in *LAW AND ECONOMICS OF RISK IN FINANCE* 15, 15–34 (Peter Nobel & Marina Gets, eds., 2007).

⁸⁶ La Porta et al., *Legal Determinants*, *supra* note 79, at 1133.

⁸⁷ *Id.* at 1138, tbl. II.

⁸⁸ Rafael La Porta et al., *Legal Determinants of External Finance*, 52 *J. FIN.* 1131, 1131–50 (1997); Rafael La Porta et al., *Corporate Ownership Around the World*, 54 *J. FIN.* 471, 471–517 (1999); Rafael La Porta et al., *What Works in Securities Laws*, 56 *J. FIN.* 1, 1–32 (2006); Rafael La Porta et al., *Law and Finance*, 106 *J. POL. ECON.* 1113, 1113–55 (1998); Rafael

universities. The ostensible foundation in objective data appeared broad and deep: data for the various studies was drawn from forty-nine countries, even if only in the form of a one year snapshot about 1994.⁸⁹ These studies entered an almost ideally fertile academic and political context for their reception. First, debates between economics and legal scholars had been stirring for over a decade around the question, “does law matter?”⁹⁰ Some economists and legal scholars had asserted that efficient systems would develop and survive apart from or despite laws,⁹¹ while the professional bias and anecdotal experience of law scholars naturally told them that “law does matter.” This made the economists of the LLSV team champions of law. Second, it is difficult for a legal professional with detailed knowledge of both systems to single out essential differences between common law and civil law in the areas of corporate and securities law, which are mainly statutory.⁹² What scholars

La Porta et al., *Investor Protection and Corporate Governance*, 58 J. FIN. ECON. 1, 3 (2000).

⁸⁹ La Porta et al., *Legal Determinants*, *supra* note 79, at 1133–36.

⁹⁰ As one legal scholar observed when discussing scholarship that examined the connection between economic development and law: “Such data understandably fascinates legal scholars because it suggests a conclusion that financial economists tend to slight: namely, law matters.” John C. Coffee, Jr., *The Future as History: The Prospects for Global Convergence in Corporate Governance and Its Implications*, 93 NW. U. L. REV. 641, 644. *See also* Brian R. Cheffins, *Ownership and Control in the United Kingdom*, 30 J. LEGAL STUD. 459 (2001).

⁹¹ A famous example of this is found in HENRY G. MANNE, *INSIDER TRADING AND THE STOCK MARKET* 1966, which argues that insider trading does not prejudice long-term investors, that it offers a form of compensation for executives, and that it piggybacks on the profit incentive to bring information into the market price faster than law can. Another regards rules on mandatory disclosure or information to investors, regarding which an argument can be made that a bargain between firm and investor is sufficient to meet the needs of transparency. *See* FRANK H. EASTERBROOK & DANIEL FISCHEL, *THE ECONOMIC STRUCTURE OF CORPORATE LAW* 280–83 (1996).

⁹² Even in common law systems, the term “common law” refers to judge-made law, not statutes.

have come to call the “legal family”⁹³ or “tradition”⁹⁴ of common law arose on the opposite side of the English Channel from civil law, but was both established by a French aristocracy ruling England,⁹⁵ and was expressed in French for hundreds of years.⁹⁶ The complexity of the common-civil relationship, even when mapped clearly by prominent comparative legal scholars like H. Patrick Glenn⁹⁷ or Hein Kötz,⁹⁸ would still likely put a policymaking committee to sleep.

The statistical sound bite announcing the superiority of common law, on the other hand, brought a breath of fresh air into a question that was hundreds of years old. The strongest impetus for the sound bite’s acceptance was, however, far from based in objective information regarding the natures of either common or civil law. A number of important geopolitical events, including multiple political and economic competitions between many countries of Continental Europe and the Anglo-American tradition were underway when the scholarship began to appear. This was an era in which centrally planned economies and socialistic forms of government were being consigned to the historical dustbin following the collapse of the Soviet Union,⁹⁹ and Western democracies, the civil law countries of Europe most prominently embraced some form of the market socialism which from an Anglo-American position was expected to

⁹³ See RENÉ DAVID & JOHN E.C. BRIERLEY, MAJOR LEGAL SYSTEMS IN THE WORLD TODAY 1–33 (3d ed. 1985).

⁹⁴ See, e.g., H. PATRICK GLENN, LEGAL TRADITIONS OF THE WORLD (4th ed. 2010).

⁹⁵ For example, see the discussion of the jury in RC VAN CAENEGEM, THE BIRTH OF THE ENGLISH COMMON LAW 85–86, 93–96 (2d ed. 1988).

⁹⁶ H. PATRICK GLENN, ON COMMON LAWS 125 (Oxford 2005); VAN CAENEGEM, *supra* note 95, at 97 (“It is not surprising that the technical language of this ‘English’ Common Law was French and remained so . . . until the seventeenth and eighteenth centuries.”).

⁹⁷ See, e.g., *id.*

⁹⁸ KONRAD ZWEIGERT & HEIN KOETZ, AN INTRODUCTION TO COMPARATIVE LAW (Tony Weir trans., 3d ed. 1998).

⁹⁹ See generally TONY JUDT, POSTWAR (2005).

voluntarily declare itself extinct.¹⁰⁰ As mentioned above, this fit together very well with the deregulatory, free market stance of the “Washington Consensus”¹⁰¹ which was the foreign policy face of the belief in market primacy discussed in Part III.E.

The intuitive correlation between common law and the growth of stock markets was as definite as the objective proof of causation between the same is elusive. For this reason, the legal origin bubble tended to deflate as quickly as it had expanded. In praising the open flexibility of US, court-centered, common law,¹⁰² the authors failed to notice that the

¹⁰⁰ This primary tension was reinforced by a number of others. Second, at the time, two civil law countries, France and Germany, had led a push to create a new currency—the euro—which appeared in 1999 and which they hoped would compete with the U.S. Dollar. Third, and related to the first, in 1998 the European Union had announced a Financial Services Action Plan to create strong, international capital markets in (civil law) Continental Europe to support national pension schemes, see THE EUROPEAN COMM’N, FINANCIAL SERVICES: BUILDING A FRAMEWORK FOR ACTION 625 (1998), and certainly also to compete with London. Fourth, one year before the World Bank published its advice that common law best promotes development, a bitter division erupted between the United States and the United Kingdom on the one side, and France and Germany on the other, regarding the Iraq War. Not only “freedom fries,” see, e.g., Sheryl Gay Stolberg, *An Order of Fries, Please, but Do Hold the French*, N.Y. TIMES, Mar. 12, 2003, at A1, but also flexible, pragmatic common law were on the menu in Washington. It was a time when the normally taboo practice of judging quality by national origin became the touchstone of insight not only for the leading development institution in the world, but also the international rating agencies and a host of pile on teammates.

¹⁰¹ See, e.g., STIGLITZ, *supra* note 84, at 53–80.

¹⁰² As LLSV remarks:

Legal rules in the common law system are usually made by judges, based on precedents and inspired by general principles such as fiduciary duty or fairness.... In contrast, laws in civil law systems are made by legislatures, and judges are not supposed to go beyond the statutes and apply ‘smell tests’ or fairness opinions. As a consequence, a corporate insider who finds a way not explicitly forbidden by the statutes to expropriate outside investors can proceed without fear of an adverse judicial ruling.

U.S. capital markets are some of the most heavily regulated in the world, that their regulation derives primarily from hundreds of pages of statutes and thousands of pages of rules¹⁰³—rather than from the intuition of a flexible and savvy judiciary—and are supervised by one of the most powerful and intrusive state market regulators in the world.¹⁰⁴ As John Coffee puts it, “[u]nder the LLS&V interpretation, small and (to lawyers) inconsequential legal differences were assigned great weight and presented as the minority shareholders’ shield against exploitation by the majority.”¹⁰⁵ The studies also contained incorrect information about what the law was in the various countries they compared,¹⁰⁶ as well as incorrect characterizations of civil

Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer & Robert W. Vishny, *Legal Investor Protection and Corporate Governance*, 58 J. FIN. ECON. 3, 9 (2000).

¹⁰³ A very compact version of just the Securities Act of 1933 (regulating primary market sales of securities) and the Securities Exchange Act of 1934 (regulating secondary market sales of securities) before the enactment of the 850 page Dodd Frank Wall Street Reform Act of 2010 consisted of over 300 pages. The rules written for the ’33 and ’34 Acts (again prior to amendment pursuant to the Dodd Frank Act) consisted of about 2,000 pages on densely packed regulations.

¹⁰⁴ For a discussion of this point, see David C. Donald, *Approaching Comparative Company Law*, 14 FORDHAM J. CORP. & FIN. L. 83, 94–95.

¹⁰⁵ John C. Coffee, Jr., *Law and the Market: The Impact of Enforcement*, 156 U. PA. L. REV. 229, 242–43 (2007).

¹⁰⁶ This is inevitable in any research that is based culling information from summary studies put together by various organizations whose purpose is not to provide a full and detailed picture of the law—such as the reports of bar or development associations. An example of this which can be shown here without going into lengthy analysis of the law is the errors occurring when LLSV disregard uniform European law that imposes identical or nearly identical provisions in all member countries. In both the United Kingdom and Austria, measures from 2004 ensured nearly identical law. Directive 2003/71/EC of the European Parliament and of the Council of 4 November 2003 on the Prospectus To Be Published When Securities Are Offered to the Public or Admitted to Trading and Amending Directive 2001/34/EC, 2003 O.J. (L 345) 64 (Prospectus Directive); Commission Regulation (EC) No. 809/2004 of 29 April 2004 Implementing Directive 2003/71/EC of the European Parliament and of the Council as Regards Information Contained in Prospectuses as Well as

law courts as not applying fiduciary duties.¹⁰⁷ LLSV also somehow decided to ignore the impact in Europe of a history as extraordinary and transformative as that of the 20th century. Mark Roe, in his published criticism of this point, observed that the fall of Brussels and Berlin from their 1913 leadership in the global capital markets ranking likely had more to do with their countries being destroyed in two world wars and then Europe being divided between East and West than with legal strategies inherited from Plantagenet Kings.¹⁰⁸ Causal variables for later financial market development were not merely the destruction brought by the two wars, but also the economic and political conditions that resulted. Following the Second World War, infrastructure needed to be rebuilt, and the rebuilding of infrastructure is the kind of project that banks (as opposed to equity markets) finance well.¹⁰⁹ Germany was for decades divided into West and East, and in its battle for the hearts and minds of the

the Format, Incorporation by Reference and Publication of Such Prospectuses and Dissemination of Advertisements, 2004 O.J. (L 149) 1 (Prospectus Regulation); Directive 2004/109/EC of the European Parliament and of the Council of 15 December 2004 on the Harmonization of Transparency Requirements in Relation to Information About Issuers Whose Securities Are Admitted to Trading on a Regulated Market and Amending Directive 2001/34/EC, 2004 O.J. (L 390) 38 (Transparency Directive). However, in spite of having identical law, the UK and Austria received the following ratings: disclosure requirements (UK=0.83, A=0.25), liability standard for false disclosure (UK=0.66, A=0.11). See Rafael La Porta, Florencio Lopez-de-Silanes & Andrei Shleifer, *What Works in Securities Law*, 61 J. FIN. 1, 15–16 (2006).

¹⁰⁷ In the area of corporate law, German courts have developed both a duty of care (*sorgfaltspflicht*) and a duty of loyalty (*treupflicht*) to govern the behavior of company directors. See ANDREAS CAHN & DAVID C. DONALD, *COMPARATIVE COMPANY LAW: TEXT AND CASES ON THE CORPORATE LAWS OF GERMANY, THE UK AND THE US* 332, 338–41 (2010). A prominent example of fiduciary duties under German law is when Josef Ackermann, then CEO of Deutsche Bank, was tried for criminal breach of trust (*untrue* pursuant to §266 of the German Penal Code) for his approval of a £10 million ‘golden handshake’ retirement payment to the outgoing CEO of Mannesmann AG when it was taken over by Vodafone plc. See *id.* at 435–41.

¹⁰⁸ Mark J. Roe, *Legal Origins, Politics, and Modern Stock Markets*, 120 HARV. L. REV. 460 (2006).

¹⁰⁹ *Id.* at 502.

German people, it was highly inadvisable for West Germany to champion the rights of capital over those of labor.¹¹⁰

Historical facts consistently contradict the assertion that common law stimulates capital market development. One such fact is that the model for the English financial system was developed in (civil law) Holland. The Dutch Stadtholder, William III of Orange, transplanted sophisticated Dutch financial infrastructure of civil law origin into England after becoming the English king.¹¹¹ Another historical fact is that war in Europe not only damaged the Continent, but gave periodic boosts to London finance through safe haven capital inflows. During William's reign, England received significant investments from Amsterdam to finance wars against France and in Spain,¹¹² two competitors of England and the

¹¹⁰ *Id.* at 501.

¹¹¹ See Larry Neal, *The Integration and Efficiency of the London and Amsterdam Stock Markets in the Eighteenth Century*, 47 J. ECON. HIST. 97, 98–99 (1987) (“To aid him in raising money for his War of the League of Augsburg against Catholic France, William brought with him numerous financial advisors and military contractors from Holland. Many were Jews and Huguenots who were eager to apply in a relatively backward England the financial techniques and institutions that had been developed over the past century in Amsterdam.”); Eric S. Schubert, *Innovations, Debts, and Bubbles: International Integration of Financial Markets in Western Europe, 1688–1720*, 48 J. ECON. HIST. 299, 300–04 (1988) (“After the Glorious Revolution of 1688 England made important changes in its underdeveloped system of public finance and credit the administration of William III imported Dutch techniques of finance founding of the Bank of England in 1694 The modernization of the financial system gave London the opportunity to develop into a major financial center on par with Amsterdam.”); Douglass C. North & Barry R. Weingast, *Constitutions and Commitment: The Evolution of Institutional Governing Public Choice in Seventeenth-Century England*, 49 J. ECON. HIST. 803, 822 (1989) (“[A]t a time when Holland was borrowing £5 million long term at 4 percent per year, the English Crown could only borrow small amounts at short term, paying between 6 and 30 percent per year. The [Glorious] Revolution radically altered this pattern.”). The origin of modern European finance in The Netherlands is also described at some length in NIALL FERGUSON, *THE ASCENT OF MONEY* ch. 3 (2008).

¹¹² See Neal, *supra* note 111, at 98; North & Weingast, *supra* note 111, at 822–23. This is a topic ripe for an historical quantitative study of

Netherlands. London's function as an offshore staging ground for military campaigns conducted on the Continent and a safe haven for investment from the Continent existed beyond William's lifetime, continuing into the Napoleonic Wars¹¹³ and the Second World War.¹¹⁴ By the time of the latter, New York had become an even safer haven for European capital.¹¹⁵ What the countries of Continental Europe (i.e., the civil law jurisdictions) lost in these flows, the offshore safe havens of London and New York (i.e., common law jurisdictions) gained in a zero-sum game of political risk.¹¹⁶

funds flows, but evidence of these flows showing trends from war to war currently remains anecdotal.

¹¹³ For a discussion of funds flows during the Napoleonic Wars see, for example, NIALL FERGUSON, *THE HOUSE OF ROTHSCHILD: MONEY'S PROFITS, 1798–1848* at 60–85 (1998).

¹¹⁴ The flow of funds into New York is discussed by ERIC HELLEINER, *STATES AND THE REEMERGENCE OF GLOBAL FINANCE: FROM BRETTON WOODS TO THE 1990S* at 39 (1996).

¹¹⁵ This is a topic ripe for an historical quantitative study of funds flows, but evidence of these flows currently remains anecdotal. For a history of European finance during the Napoleonic Wars, see Ferguson, *supra* note 113, at 60–85. With respect to the period during World War II, see HELLEINER, *supra* note 114, at 31–32 (1996).

¹¹⁶ Another historical contradiction is found in the history of competitive colonial development, which also tends to contradict the attribution of causality to legal origin. As Daron Acemoglu, Simon Johnson and James Robinson have argued, Great Britain's colonies may well have developed superior institutions for reasons quite unrelated to their legal system—primarily because they used colonies more to export people than to extract minerals. Daron Acemoglu, Simon Johnson & J.A. Robinson, *The Colonial Origins of Comparative Development: An Empirical Investigation*, 91 *AM. ECON. REV.* 1369, 1369–1401 (2001). Settlers required a very different set of institutions than did a mining company. Hong Kong, which was more an outpost on Chinese territory than a settlement (as were Australia and New Zealand), developed its institutional infrastructure slowly because the vast majority of inhabitants were Chinese and had little regular contact with their colonial masters or legal institutions. This is discussed at some length in DAVID C. DONALD, *A FINANCIAL CENTRE FOR TWO EMPIRES: HONG KONG'S CORPORATE, SECURITIES AND TAX LAWS IN ITS TRANSITION FROM BRITAIN TO CHINA* 9–21 (2014). Although the colony of Hong Kong was linked at its creation to a body of common law that was centrally refined and harmonized among all

Another historical fact that was not addressed in LLSV's work is the trend of gradual increases in shareholding size in the United States from the 1960s to the 2000s, which LLSV itself observes.¹¹⁷ This trend belies the argument that quality of law promotes dispersed shareholding. As corporate governance improved in the United States during that same 40 year period,¹¹⁸ shareholdings became more concentrated, not more dispersed.

In spite of their exceptional qualifications, the LLSV team made these numerous errors about law and development because they were unable to bring the necessary understanding of the common and the civil law, the nature of securities regulation, and law's historical development within the ambitious breadth of their quantitative

colonies and Britain through operation of the Judicial Committee of the Privy Council, the fact that there is rule of law in Hong Kong—a trait certainly shared by European civil law countries—has played a much larger role for its development as a financial center. *See id.* at 22–36.

¹¹⁷ This was noted very early on by MELVIN EISENBERG, *THE STRUCTURE OF THE CORPORATION* 45–52 (1976) and is discussed at length with more citations in Rafael La Porta, Florencio Lopez-de-Silanes & Andrei Shleifer, *Corporate Ownership Around the World*, 54 *J. FIN.* 471 (1999).

¹¹⁸ In 1974, about the time that the dispersed ownership in the United States was beginning to fall from its peak, SEC Commissioner William L. Cary documented the past quality of Delaware corporate law with the publication of his 'race to the bottom' thesis in William L. Cary, *Federalism and Corporate Law: Reflections upon Delaware*, 83 *YALE L.J.* 663, 665–66 (1974). Bratton and McCahery note that following this, "Delaware's customers thereupon might have reappraised the costs and benefits of domicile in the state." William W. Bratton & Joseph A. McCahery, *The Equilibrium Content of Corporate Federalism*, 41 *WAKE FOREST L. REV.* 619, 639 (2006). The Delaware court then became significantly more active in protecting investor rights. Macey calls the "landmark decision" of *Smith v. Van Gorkom*, 488 A.2d 858 (Del. 1985), "the starting point for any discussion of the role played by process in the production of non-contractual rules of corporate governance." JONATHAN R. MACEY, *CORPORATE GOVERNANCE: PROMISES KEPT, PROMISES BROKEN* 470 (2008). The increasing concentration of shareholdings in the United States has been a function of portfolio diversification through investment in mutual and pension funds, and runs directly contrary to the idea that greater investor protection leads to more diversified holdings.

methodology.¹¹⁹ This exhibits similarities to the problems of quantified CBA discussed in the foregoing section. LLSV saw themselves as entering a new field, announcing hitherto unknown truths, such as: “We show that laws vary a lot across countries, in part because of differences in legal origin.”¹²⁰ They saw their comparative work as new because they understood that “[t]here is no systematic knowledge . . . of whether different countries actually do have substantially different rules that might explain differences in their financing pattern.”¹²¹ Although in this sentence LLSV might have used the word “systematic” as a synonym for “quantified” or “tabular,” both this statement and the entire body of their work appeared to ignore that fact that comparative law has existed as a practical matter at least

¹¹⁹ In a final paper in the series, LLS (without Robert Vishny) essentially state that after reading the various critiques of their work, they discovered the deep phenomenon that English-speaking countries (i.e., countries whose legal systems are built on the English common law, which in almost every case once colonies of Great Britain) exhibit many common legal and cultural characteristics. Moreover, for the period studied, these characteristics showed a pattern in which common law countries favored less government control in areas such as “ownership of banks . . . the burden of entry regulations . . . regulation of labor markets . . . incidence of military conscription . . . and government ownership of the media . . . formalism of judicial procedures . . . and greater judicial independence.” Rafael La Porta, Florencio Lopez-de-Silanes & Andrei Shleifer, *The Economic Consequences of Legal Origins*, 46 J. ECON. LITERATURE 285, 286 (2008). This analysis boils down to a judgment made by economists in American institutions, formed at a time when American economic theories were predominant internationally in policy matters, that English-speaking countries exhibited the traits such predominant theories deemed important. Beyond that, this 2008 study attempts to characterize the economic and legal history of the English-speaking world as a dependent variable of the one independent variable “legal origin,” and in so doing dramatically simplifies the matrix of generally accepted causation. As such, it offers a lesson in the limits of this method, in which form of data processing precedes understanding of the data processed, and thus limits the manner in which this data can be interpreted.

¹²⁰ La Porta et al., *Law and Finance*, 106 J. POL. ECONOMY 1113, 1116 (1998).

¹²¹ *Id.* at 1115.

since Aristotle¹²² and as an academic discipline at least since the nineteenth century.¹²³ LLSV also seemed unaware that specifically articulated comparative law with an economic development focus had been in high gear in Europe at least since 1987, when the European Economic Community took steps that would eventually lead to the European Union and the Euro Zone.¹²⁴ Because LLSV focused on producing a methodologically rigorous quantitative analysis while remaining unfamiliar with the details of the field they analyzed, they relied on various summary and secondary materials¹²⁵ instead of undertaking a primary comparative legal analysis of the actual law that interested them.¹²⁶ The

¹²² David and Brierley explain that Aristotle, “in considering what form of political community would be best, studied 153 constitutions of Greek and other cities in his treatise, *Politics*.” DAVID & BRIERLEY, *supra* note 93, at 1–2.

¹²³ THE OXFORD HANDBOOK OF COMPARATIVE LAW 3 (Mathias Reimann & Reinhard Zimmermann eds., 2006); DAVID & BRIERLEY, *supra* note 93, at 2 This is no place to retrace this history, but good introductions to the discipline can be found in ZWEIGERT & KOETZ, *supra* note 98, at 48–62; GLENN, TRADITIONS *supra* note 94, at 1–55.

¹²⁴ See The Single European Act, 1987 O.J. (L 169) 1; PAUL CRAIG & GRAINNE DE BURCA, EU LAW: TEXT, CASES, AND MATERIALS 10–13 (2011).

¹²⁵ For example, “Rule of Law: Assessment of the law and order tradition in the country Source: *International Country Risk Guide*.” LaPorta et al., *supra* note 79, at 1134. On the same page, there is a reference to “Company Law or Commercial Code,” but then no references are given to specific laws, or information about whether originals, translations or summaries of the laws were used.

¹²⁶ LLSV includes as an important right the presence of a mechanism to protect “oppressed minorities,” LaPorta et al., *supra* note 79, at 1134, tbl. I, but apparently does not look at the law in either the US, the UK or major civil law jurisdictions like Germany. While German (civil law) and U.S. (common law) courts have both developed a fiduciary duty (in German, a *Truepflicht*) that applies to discipline the unfair acts of controlling shareholders, see CAHN & DONALD, *supra* note 107, at 574–81, Commonwealth countries have no such thing. Their law does contain an action for “unfair prejudice” when the company has been “mismanaged” in a way that “equitable considerations” or “legitimate expectations” arising from agreement in a “quasi-partnership” arrangement of personal dealings has been breached, see e.g., *O’Neill and Another v. Phillips and Others* [1999] 1 W.L.R. 1092, with further citations, but this is never applied to a public companies, save for a new trend recently begun in Hong Kong. See

result is that aspects of the law that either were not addressed in the studies they relied on or did not fit within the framework of their methodology fell by the wayside, while others aspects of the law, particularly how it works in context, appear to be misunderstood,¹²⁷ and the legal systems

Luck Continent Ltd v. Cheng Chee Tock Theodore [2013] 4 H.K.L.R.D. 181. Thus the common law scores on this point are incorrectly inflated because LLSV apparently did not fully understand the operation of the law as applied in the various jurisdictions they compared.

¹²⁷ As already mentioned, LLSV creates a comparative grid for “anti-director rights” serving as criteria of a legal system’s quality. The judgments behind the selection of such rights are already problematic. With respect to the problems associated with the creation of rating indices, see Bhagat, Bolton & Romano, *supra* note 50, 1832–37; Spamann, *supra* note 50, at 5–9. However, whether done intentionally or unintentionally, some of the rights chosen as significant determined the outcome in advance. One such right in their schema is “shareholders are not required to deposit their shares prior to the General Shareholders’ Meeting.” LaPorta et al., *supra* note 79, at 1134–35, tbl. I.

Prior to voting at any general meeting, shareholders must prove their status as such in order to participate. Corporations in all common law countries issue registered shares, so that members prove their right to vote by their presence in the register of members when the meeting is called. (This is discussed at length in David C. Donald, *Heart of Darkness: The Problem at the Core of the U.S. Proxy System and Its Solution*, 6 VA. L. & BUS. REV. 41, 44 (2011)). A cut-off date is generally fixed up to 60 days before the meeting, determining who can attend and vote. See, e.g., Del. Code Ann. tit. 8, § 213 (2012). If a shareholder sells shares between that date and the meeting, she will still be able to vote, but if she buys the shares after the cut-off date, she will not be on the invitation list and will not have a voting right, despite being a shareholder. Companies incorporated in French origin civil law countries issue bearer shares. Although France dematerialized its shares, they still exist primarily in bearer form. See Antoine Maffei, *Pour une Modernisation du Régime de la Dématérialisation en France: Le Projet Paris Europlace*, in 20 ANS DE DÉMATÉRIALISATION DES TITRES EN FRANCE: BILAN ET PERSPECTIVES NATIONALES ET INTERNATIONALES 103, 103–04 (Hubert de Vauplane ed., 2005). The calling of meetings in French public companies (*société anonyme*) is provided for in the French *Code de Commerce* and decrees of the *Conseil d’État*, which means that the only way to ascertain the identity of a shareholder is have them present their shares (which are bearer notes with no registered name). Maffei, *supra*. Thus under French civil law, it would have been possible that a “deposit of shares” was required as a mode of presentation, while the same would not have been

in question are grasped only in a vague way that generally matches popular beliefs of home country bias.

Thus, the succinct, quantitative relationships argued to exist between legal origin and market development unravel because of the choice, characterization, and evaluation of the qualitative elements of law included in the analysis. In light of the complexity of the laws studied, it was not realistic to think that an assortment of introductory texts, general studies, and “doing business” reports could serve as the basis to reduce the essence of the world’s legal systems in the area of investor protection to a set of quantified ratings. Deflation of the bubble was to be expected. When Armour, Deakin, Sarkar, Siems and Singh undertook a similar analysis with more carefully designed criteria and a much better understanding of corporate and comparative law, they found that they could not affirm any of the causal assertions made by LLSV.¹²⁸ Moreover, even when assuming common law techniques of investor protection to be superior, they found that “civil-law countries were catching up with” common law jurisdictions.¹²⁹ This state of “catching up” highlights the importance of historical and political forces in the development of both law and financial markets, the argument raised by Roe in 2006.¹³⁰ While the methodological sophistication and enthusiasm LLSV brought to the question is admirable, significant facts were excluded from the data and methodology was not up to the task undertaken.¹³¹

possible under the law of any common law jurisdiction, given that registration is the only manner of proving one is a shareholder. *See* Maffei, *supra*. Each of these two methods of ascertaining shareholder status have advantages and disadvantages, but when “deposit of shares” is singled out as not protecting shareholders against directors, all common law origin company laws receive higher or equal ratings to French law origin company laws. Such an *a priori* litmus test by nationality could not be what LLSV was hoping to achieve.

¹²⁸ Armour et al., *supra* note 51, at 372–73.

¹²⁹ *Id.*

¹³⁰ *See supra* note 108–110 and accompanying text.

¹³¹ This collaboration should continue and deepen. Detailed information about legal systems is more available than ever, as are opportunities for multi-disciplinary collaboration. Deakin and Siems

D. Preempting Difficult Questions Through Quantification: National Budgets and Growth

There can be no question that political interest can drive the shape of QR, and the research backing austerity programs presents a prime example of this problem. Since 2011, austerity policies and politics have been at the forefront of debates in both Europe and the United States, with heated disputes on the economic and social effects of reducing government spending. In Europe, spending cuts and tax increases have formed the core of loan conditions for crisis-stricken countries such as Greece and Portugal.¹³² Meanwhile, concern about “runaway government spending” underlies debate in the United States, and led to the formation of the Tea Party, which emerged in 2009 with a focus on reducing public spending and regulation.¹³³

This section discusses influential QR produced by two teams of authors that instructed policymakers on the amount of debt a country can carry and still sustain growth and on whether austerity (understood as the reduction of government spending) can create enough growth to offset its own direct impact on spending. The first and most influential of these, expressed in a 2010 paper by Reinhart and Rogoff, provided an exact, quantified level at which public debt will seriously affect growth, giving policymakers

provide a good overview of the current state of scholarship in the area and some indications for the way forward. Simon Deakin & Mathias Siems, *Comparative Law and Finance: Past, Present and Future Research*, J. INST. THEORETICAL ECON., 120, 120–40. As an example of the kind of collaboration that is possible, the Hong Kong Research Grants Council has funded five finance scholars, three legal scholars, and two geography scholars to collaborate on a project to understand the nature and future of Hong Kong as an international financial center. That project, entitled, “Enhancing Hong Kong’s Future as a Leading International Financial Centre,” funded this Article in part.

¹³² See, e.g., Zsolt Darvas, *The IMF Is Right: Debt Should Be at Heart of Greece’s Deal*, FIN. TIMES, Nov. 22, 2012, at 11.

¹³³ See, e.g., Kate Zernike, *Republicans Strain to Ride Tea Party Tiger*, N.Y. TIMES, Jan. 23, 2010, at A1.

the powerful “statistical sound bite” of a 90% limit.¹³⁴ While Reinhart and Rogoff provided both mean and median growth outcomes in their paper, and did not assert causality, they were less careful in media interviews, where they asserted that “current debt trajectories are a risk to long-term growth and stability, with many advanced economies already reaching or exceeding the important marker of 90 percent of GDP.”¹³⁵ Such disparity in communication displays a particular problem of QR that this Article seeks to highlight: “sound bites” not only discourage communication of nuanced, theoretical qualification, they radically exclude it.¹³⁶ Policymakers with complementary positions in the deficit debate promptly made use of (the simplified form of) this QR finding. As *The Economist* writes, “Paul Ryan, a Republican congressman, cited [Reinhart and Rogoff’s] ‘conclusive empirical evidence’ in a budget plan calling for significant cuts to public spending. Similarly, in a February letter to European Union finance ministers, Olli Rehn, the vice-president of the European Commission, touted the ‘widely acknowledged’ 90% limit as a reason to press on with European fiscal cuts.”¹³⁷ Furthermore, George Osborne,

¹³⁴ Other research suggested a 80% “tipping point” at which debt would stifle growth. See David Greenlaw et al., *Crunch Time: Fiscal Crises and the Role of Monetary Policy* 153 (Nat’l Bureau of Econ. Research, Working Paper No. 19297, 2013), available at <http://www.nber.org/papers/w19297>, archived at <http://perma.cc/SV5X-3WWX>.

¹³⁵ Carmen M. Reinhart & Kenneth S. Rogoff, *Too Much Debt Means the Economy Can’t Grow: Reinhart and Rogoff*, BLOOMBERG (July 14, 2011), <http://www.bloomberg.com/news/articles/2011-07-14/too-much-debt-means-economy-can-t-grow-commentary-by-reinhart-and-rogoff>, archived at <http://perma.cc/M92L-BAB8> (last visited Mar. 11, 2015).

¹³⁶ Thomas Piketty argues the same dichotomy between careful quantitative scholarship and exaggerated public statement existed in Simon Kuznets’ creating the Cold War tool of decreasing income inequality in the West: “But in December 1954, at the Detroit meeting of the American Economic Association, of which he was president, he offered a far more optimistic interpretation of his results than he had given in [his] 1953 [book on the subject].” THOMAS PIKETTY, *CAPITAL IN THE TWENTY-FIRST CENTURY* 13 (Arthur Goldhammer trans.) (2014).

¹³⁷ *The 90% Question*, ECONOMIST, April 20, 2013, <http://www.economist.com/news/finance-and-economics/21576362-seminal->

Chancellor of the Exchequer in the U.K., also cited Reinhart and Rogoff when explaining the need for deficit reduction.¹³⁸

A second team of authors offering QR on debt, austerity and growth published findings even before those of Reinhart and Rogoff. As Jeffrey Frankel writes in an Op-Ed for *Project Syndicate*,¹³⁹ arguments for deficit reduction were also formulated in a series of influential papers written by Alberto Alesina (with Roberto Perotti in 1995 and 1997, and with Silvia Ardagna in 1998 and 2010),¹⁴⁰ which suggested that fiscal contraction is *not* contractionary, and may even be expansionary. The conclusions left little room for doubt on their policy implications: “fiscal contractions can be expansionary,” and “the efforts toward fiscal adjustment . . . is strictly linked to the problem of reforming the welfare state.”¹⁴¹ Focusing on Europe, the authors concluded that “a large scale adjustment that is expenditure based and is accompanied by wage moderation and devaluation is

analysis-relationship-between-debt-and-growth-comes-under, *archived at* <http://perma.cc/UH48-AH2W>.

¹³⁸ George Osborne, *A New Economic Model*, in POLICY MAKERS ON POLICY: THE MAIS LECTURES 210–11 (Forrest Capie & Geoffrey Wood, eds., 2012).

¹³⁹ Jeffrey Frankel, *On Whose Research is the Case for Austerity Mistakenly Based?*, PROJECT SYNDICATE (May 20, 2013), <http://www.project-syndicate.org/blog/on-whose-research-is-the-case-for-austerity-mistakenly-based>, *archived at* <http://perma.cc/A9NE-P9Z4>.

¹⁴⁰ Alberto Alesina & Roberto Perotti, *Fiscal Expansions and Fiscal Adjustments in OECD Countries* (Nat'l Bureau of Econ. Research, Working Paper No. 5214, 1995), *available at* <http://www.nber.org/papers/w5214> *archived at* <http://perma.cc/UK9R-UNMV>; Alberto Alesina & Roberto Perotti, *Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects*, (Nat'l Bureau of Econ. Research, Working Paper No. 5730, 1996), *available at* <http://www.nber.org/papers/w5730>, *archived at* <http://perma.cc/D6Q6-D7KK>; Alberto Alesina & Silvia Ardagna, *Tales of Fiscal Adjustment*, 13 ECON. POL'Y 487 (1998); Alberto Alesina & Silvia Ardagna, *Large Changes in Fiscal Policy: Taxes Versus Spending*, 24 TAX POL'Y & ECON. 35, 35–68 (2010).

¹⁴¹ Alesina & Perotti, *Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects*, *supra* note 140, at 40–41.

expansionary,”¹⁴² leaving the policy recommendation clear: “The next decade has to witness a . . . shrinking of government. The alternative is an even worse case of Eurosclerosis.”¹⁴³

Compared to Reinhart and Rogoff, Alesina was much less nuanced in his policy prescriptions. In a policy op-ed, he wrote that “[t]he evidence speaks loud and clear: when governments reduce deficits by raising taxes, they are indeed likely to witness deep, prolonged recessions. But when governments attack deficits by cutting spending, the results are very different.”¹⁴⁴ Alesina’s work has similarly had policy repercussions. In addition to being cited in the official communiqué of the EU finance ministers’ meeting in 2010,¹⁴⁵ his work also influenced the UK Treasury, which argued in the 2010 Emergency Budget: “These [the wider effects of fiscal consolidation] will tend to boost demand growth, could improve the underlying performance of the economy and could even be sufficiently strong to outweigh the negative effects.”¹⁴⁶ Christina Romer, who, in her capacity as Chair of the President’s Council of Economic Advisors, led the design of the U.S. Government’s fiscal stimulus package to cope with the Great Recession following the GFC, acknowledges that Alesina’s co-authored paper became “very influential.”¹⁴⁷

¹⁴² Alesina & Ardagna, *Tales of Fiscal Adjustment*, *supra* note 140, at 516.

¹⁴³ *Id.* at 517.

¹⁴⁴ Alberto Alesina, *The Kindest Cuts*, CITY J. (Autumn 2012), http://www.city-journal.org/2012/22_4_spending-cuts.html, archived at <http://perma.cc/YP4S-GZF3> (emphasis added).

¹⁴⁵ Peter Coy, *Keynes vs. Alesina. Alesina Who?*, BLOOMBERG BUSINESS WEEK, June 30, 2010, <http://www.bloomberg.com/bw/stories/2010-06-29/keynes-vs-dot-alesina-dot-alesina-who>, archived at <http://perma.cc/KQ7U-Z5NG>.

¹⁴⁶ Jonathan Portes, *Fiscal Policy: What Does ‘Keynesian’ Mean?*, NOT THE TREASURY VIEW BLOG (Jan. 27, 2012), <http://www.niesr.ac.uk/blog/fiscal-policy-what-does-keynesian-mean#.VTQe0SFVikp>, archived at <http://perma.cc/8SFV-4CTZ> (citing TREASURY, BUDGET 2010, H.C. 61, at 19 (U.K.)).

¹⁴⁷ Christina Romer, *What Do We Know About the Effects of Fiscal Policy: Separating Evidence from Ideology*, Address at Hamilton College

Alesina's work also influenced the Joint Economic Committee Republican budget proposal in 2011.¹⁴⁸

The IMF offered one of the main methodological critiques of expansionary austerity, arguing that identifying periods of fiscal consolidation by an increase in the cyclically adjusted budget surplus, as these studies do, is flawed.¹⁴⁹ Herdon, Ash and Pollin published a paper (originally in early 2013) explaining that when they replicated the study undertaken by Reinhart and Rogoff, they could “show that (i) selective exclusion of available data, (ii) coding errors and (iii) inappropriate methods for the weighting of summary statistics have generated serious measurement problems that produce inaccurate figures on the relationship between public debt and growth.”¹⁵⁰ Alesina's co-author, Roberto Perotti, also cast doubt on the possibility of “expansionary contractions” in two other papers. A significant problem of the methodology earlier employed was in the dating scheme, so that a given year could count as a “consolidation,” “pre-consolidation,” or “post-consolidation.”¹⁵¹ This was obviously significant given the asserted correlations between years of growth and years of fiscal consolidation. When the presence of significant, alternative independent variables (e.g.,

18, Nov. 7, 2011, available at <http://eml.berkeley.edu/~cromer/Written%20Version%20of%20Effects%20of%20Fiscal%20Policy.pdf>, archived at <http://perma.cc/LG53-QW3C>. She also acknowledged: “And every one has been citing it.” *Id.*

¹⁴⁸ Joint Econ. Comm. Republicans, *Spend Less, Owe Less, Grow the Economy* (Mar. 15, 2011), available at http://www.speaker.gov/sites/speaker.house.gov/files/UploadedFiles/JEC_Jobs_Study.pdf, archived at <http://perma.cc/888D-W3LB>.

¹⁴⁹ INT'L MONETARY FUND, WORLD ECONOMIC OUTLOOK, 94 (Oct. 2010), <http://www.imf.org/external/pubs/ft/weo/2010/02/pdf/c3.pdf>, archived at <http://perma.cc/Y7NE-DAYZ>.

¹⁵⁰ Thomas Herndon, Michael Ash & Robert Pollin, *Does High Public Debt Consistently Stifle Economic Growth? A Critique of Reinhart and Rogoff*, 38 *CAMB. J. ECON.* 257, 258 (2014).

¹⁵¹ Roberto Perotti, *The Austerity Myth: Gain Without Pain?*, 2–3 (Nat'l Bureau of Econ. Research, Working Paper No. 17571, 2011), available at <http://www.nber.org/papers/w17571>, archived at <http://perma.cc/7PQD-YYQ8>. The significance of these papers was raised by Jeffrey Frankel, *supra* note 139.

interest rate drops and devaluations) were considered, the “results cast doubt on some versions of the “expansionary fiscal consolidations” hypothesis, and on its applicability to many countries in the present circumstances.”¹⁵² In a second paper, Perotti concluded that, “[b]ased on the discussion above, the fiscal consolidations implemented by several European countries could well aggravate the recession.”¹⁵³

As in the case of the legal origin “bubble” discussed in the previous section, QR findings were picked up quickly by policymakers and began to have a real impact on people and institutions before the methodological untangling and refuting of their claims could be completed. Gradually, official positions regarding the 90% “tipping point” for debt-causing slow growth and the existence of expansionary austerity were reversed. For example, the IMF’s April 2014 World Economic Outlook warned several European countries, including the U.K., to rethink their austerity plans.¹⁵⁴ In addition, the President of the European Commission, José Manuel Barroso, stated that while further consolidation and reform efforts are required, such an approach had “reached its limits in many aspects.”¹⁵⁵ The Commission now warns member states about the fraying of social safety nets and a rise in unemployment, and is slowing the pace at which austerity measures are introduced in the European Union.¹⁵⁶

¹⁵² Perotti, *The Austerity Myth*, *supra* note 151, at 42.

¹⁵³ Roberto Perotti, *The Sovereign Debt Crisis in Europe: Lessons from the Past, Questions for the Future*, Address at the Fed. Reserve Bd.’s Academic Consultants Meeting (May 6, 2013), at 1, *available at* http://www.rperotti.com/corso30030/recent_developments.pdf, *archived at* <http://perma.cc/FAU2-FRSS>.

¹⁵⁴ INT’L MONETARY FUND, WORLD ECONOMIC OUTLOOK 55 (April 2014), <http://www.imf.org/external/pubs/ft/weo/2014/01/pdf/text.pdf>, *archived at* <http://perma.cc/S2P9-CG7N>.

¹⁵⁵ Peter Spiegel & Peter Ehrlich, *Austerity Is Near Its Political Limit, Says Barroso*, FIN. TIMES, April 23, 2013, at 6.

¹⁵⁶ Peter Spiegel, *EU Economies Win Reprieve on Budget Deficit Targets*, FIN. TIMES, May 29, 2013, <http://www.ft.com/intl/cms/s/0/1de6c8cc-c85a-11e2-acc6-00144feab7de.html#axzz3ROKP7gUO>, *archived at* <http://perma.cc/G5G5-JBPN>.

It is unclear what direct impact studies like *Growth in a Time of Debt* had in convincing certain politicians to push for austerity measures,¹⁵⁷ and it is much more likely that politicians sought objective support for a position they already held. Regardless, it is undeniable that such research was repeatedly cited to convince policymakers and the general public of scientific backing for austerity. This research in turn altered the nature of the discussion by anchoring the legitimacy of political choices in objective truth derived from the data analyzed by QR, thus restricting normative debate and relegating any challenges to the highly technical (assuming full access to the data on which the relevant studies were based). A divisive political platform was transformed into an inexorable scientific fact. However, as highlighted in Part II, true objectivity in QR is very difficult to achieve. As will be discussed in Part IV, although this Article supports continued attempts at quantitative measure of policy efficacy, it advocates that necessary efforts be taken to ensure proper vetting and sufficient verification exercises precede the translation of QR results into law. With the vast media coverage on the flaws of Reinhart and Rogoff's 2010 paper, the veneer of authority of QR has begun to chip, but the effects of the austerity measures it supported remain.¹⁵⁸ Given the widespread, high-level acceptance that this research enjoyed in both the U.S. and Europe, the deflation of this knowledge bubble has not only affected public and institutional support for austerity programs, but

¹⁵⁷ See *Reinhart-Rogoff Reprise*, THE ECONOMIST (April 23, 2013), <http://www.economist.com/blogs/freeexchange/2013/04/debt-and-growth-0?fsrc=rss>, archived at <http://perma.cc/5CXX-NK5M> (offering a general discussion of the context of austerity politics into which the Reinhart and Rogoff paper entered).

¹⁵⁸ See, e.g., Joseph E. Stiglitz, *Europe's Lapse of Reason*, PROJECT SYNDICATE (Jan. 8, 2015), <http://www.project-syndicate.org/commentary/european-union-austerity-backlash-by-joseph-e--stiglitz-2015-01>, archived at <http://perma.cc/C53Q-XJD2> ("What Europe needs more than structural reform within member countries is reform of the structure of the Eurozone itself, and a reversal of austerity policies, which have failed time and again to reignite economic growth.").

also may be affecting public acceptance of economics' overall claim to objectivity.¹⁵⁹

E. Dodging Regulatory Tasks Through Submissive Embrace of Market Logic

Another set of concerns regarding the use of QR regard those cases in which conscious use of research is facilitated by the existence of a less-than-conscious assumption that our world is governed by laws that match the parameters used in such research. This section briefly sketches the philosophy of market primacy that accompanied the rise in recent decades of QR in its role as guide for regulatory policy. If invisible forces of the market are seen as sustaining a just equilibrium, research measuring these forces can take precedence over even an unambiguous statutory mandate in which the aim is expressly set to prevent “excessive speculation.”¹⁶⁰ In such cases, specified quantitative indicators—such as market prices or turnover—are understood to be reliable proxies of the overall quality of market health. The acceptance of the market as a proxy for society is by no means restricted to a neoliberal brand of *laissez faire* deregulation. It occurs, for example, if we think of human interaction in terms of a fundamentally efficient marketplace (the marketplaces of ideas, education, labor, companionship, religion or health) in which supply, demand, entry, elasticity and other quanta or relationships can be measured and assessed. Cass Sunstein, a leading authority on regulatory CBA, provides a good insight on the bridge between our faith that quantified measures enhance the quality of policy decisions and our belief that market functions provide accurate expression of the most essential human values:

¹⁵⁹ See, e.g., *Unreliable Research: Trouble at the Lab*, THE ECONOMIST, Oct. 19, 2013, at 26; Mark Blyth, *The Austerity Delusion: Why a Bad Idea Won Over the West*, FOREIGN AFFAIRS, May/June 2013; Tom Clark, *How the Tories Chose to Hit the Poor*, THE GUARDIAN, July 2, 2014, <http://www.theguardian.com/commentisfree/2014/jul/02/tories-poor-george-osborne-inequality-conservatives>, archived at <http://perma.cc/K6DT-ZSET>.

¹⁶⁰ 15 U.S.C. § 78b (2006).

When regulators quantify and monetize relevant goods, the goal is to promote sensible tradeoffs. People pay certain amounts, and neither more nor less, on personal safety, on leisure, on children, on (what they see as) their own dignity, on health, on aesthetics, and more. They make tradeoffs, and they often use the same currency (money), even while recognizing qualitative differences among human goods. The fact of monetization is not inconsistent with a recognition of those differences. Quantification, and appropriate tradeoffs, are possible while not only recognizing but insisting on them.¹⁶¹

If we understand a person's willingness to trade "dignity" for a sum of money to indicate that market price is a useful proxy for the value of a human right,¹⁶² the market becomes

¹⁶¹ Sunstein, *supra* note 68, at 8.

¹⁶² "Dignity" is an interesting example for this purpose, because before its incorporation into Art. VII of the 1975 Helsinki Declaration, *see* World Medical Association, *Conference on Security and Cooperation in Europe*, Aug. 1, 1975, in 14 INT'L. LEGAL MATERIALS 1293, 1295, Postwar Germany selected it as the first right named in the 1949 constitution (*Grundgesetz* or Basic Law), with which it hopes to bury the spirit of Nazism once and for all, by declaring "dignity" to be "inviolable": "Human dignity shall be inviolable" ("*Die Würde des Menschen ist unantastbar*"). GRUNDGESETZ FÜR DIE BUNDESREPUBLIK DEUTSCHLAND [GRUNDGESETZ][GG][BASIC LAW], May 23, 1949, BGBl. I, at 1 (Ger.). This is followed by the duty of the state to "respect" and "protect" such dignity. *Id.*, at Art. 1(1), sentence 2. In this context, if we understand the price a person receives to lose her dignity to be an objective "tradeoff" for it, we will have achieved a bridge between the unquantifiable and the quantifiable. However, the freedom not to engage in such trade would then be prerequisite, as would the questions of unconscionability and whether the standard of unconscionability applied should be as high in such situations as it would be for deciding the enforceability of a contract. Beyond that comes the ethical concern that a transfer of dignity would mainly occur in a context where those without funds become the transferors and those with funds the transferees of dignity. *See* MICHAEL J. SANDEL, *WHAT MONEY CAN'T BUY: THE MORAL LIMITS OF MARKETS* 33–35 (2012). In the German case, such a transfer might also likely violate the spirit of their Basic Law. If it is arguable that our bridge between qualitative and quantitative values is unethical, should it be used as the foundation for policymaking?

the preferred medium of association between the individual and the community, between our interior and outside worlds. Importantly for decision-making on regulation, the market becomes an unseen force of benevolence guiding the interaction of individuals in society at a level that mere reason could never achieve.¹⁶³ The leading school of thought on financial regulation was not far away from this position preceding the GFC. The collective autopsy of the regulatory model that led to the collapse of the international financial system in 2008 has shown that substantial contributing elements were an underlying faith in the perfection of the self-adjusting market,¹⁶⁴ a view that self-interest and private ordering were the keys to unlocking the innovation necessary to match the market's genius,¹⁶⁵ and a failure to understand both systematic connections of market risk¹⁶⁶ and the institutional ordering that had in the past cabined in such risk.¹⁶⁷ Simon Deakin puts it very well: “The assumption in

¹⁶³ This of course requires assumptions about rational choice and availability of information that have led, on the one hand, to investigations on the nature of human behavior which have undercut classical views on the market and, on the other, to regulatory efforts seeking to eliminate market imperfections. This Article could be seen in the latter camp of attempting to correct informational asymmetries and barriers to entry regarding QR in the market for ideas and influence on policymakers.

¹⁶⁴ See, e.g., SIMON JOHNSON & JAMES KWAK, 13 BANKERS: THE WALL STREET TAKEOVER AND THE NEXT FINANCIAL MELTDOWN 100–04 (2010); Simon Deakin, *The Legal Theory of Finance: Implications for Methodology and Empirical Research*, 41 J. COMP. ECON. 338, 341 (2013); Dan Awrey, *Toward A Supply-Side Theory of Financial Innovation*, 41 J. COMP. ECON. 401, 402 (2013).

¹⁶⁵ See JOHNSON & KWAK, *supra* note 164, at 104–19; Awrey, *supra* note 164, at 402.

¹⁶⁶ Unregulated sectors of the financial system were used for regulatory arbitrage to offer services equivalent to those found in the regulated sectors, leading both to pockets of risk that was unaccounted for and to connections carrying contagion between the two sectors. On this problem of arbitrage, see Katharina Pistor, *A Legal Theory of Finance*, 41 J. COMP. ECON. 315, 328 (2013).

¹⁶⁷ A critique leveled at the originate-to-distribute model used in securitization is that when a bank retains a loan on its books (it keeps “skin in the game”), it will be much more careful in screening borrowers

each case was that legal regulation was more likely than not to be an impediment to efficiency.”¹⁶⁸

When the market alone is seen as capable of efficiently expressing human interaction (whether through sales of “dignity” or of bonds), the bounded thinking of a regulator guided by politically charged concepts of social policy or ethics should not be given free reign. Moreover, as no one (but the market) knows what the future should hold, regulatory action invariably smothers the dynamics of innovation. Within this world view, if the market were a self-generating ecosystem, regulators would be clumsy loggers. Once enlightened to the beneficent intricacies of the market, policymakers could understand that the persons most able to effectively plug into and move in sync with this ecosystem were its natives, the market players guided by unsullied selfishness.¹⁶⁹ The motivations of such actors are pure because they are focused on profit, and thus market players should shape the market through their profit-driven ordering activity. This regulatory philosophy created a procedural

than it will be if it sells the loan to a third party. Both the moral hazard that arises from securitization and the continued belief that securitization is inherently dangerous for this reason evidence the deep faith in market forces above careful legal engineering. Before the GFC, if more attention had been focused on the nexus of duties owed in the practice of banking, rather than just on the number of loans granted and the interest rates charged, the missing market incentive could have been replaced with a legal incentive. After the GFC, a continued fear that securitization is dangerous for reasons of this missing economic incentive evidences a lack of faith in legal incentives. This is an ideological position related to the belief that the private sector—where motivation derives from the profit incentive—will always be superior, even in governmental services, to a public sector—which generally incentivizes through duty and office rather than with tangible cash payments.

¹⁶⁸ Deakin, *supra* note 164, at 341.

¹⁶⁹ This description of a market-centered philosophy is deliberately stylized to bring out the similarities with Ayn Rand’s egoism, according to which the best social order is one that facilitates the exercise of peaceful and rational human selfishness without self-sacrifice. See Ayn Rand, *The Nature of Government*, in *THE VIRTUE OF SELFISHNESS* 102–09 (1964). Johnson and Kwak note that Alan Greenspan was a “longtime associate” of Rand. JOHNSON & KWAK, *supra* note 164, at 100.

“presumption” that the market in its native state brought the highest benefits to society, and the ecological balance of the self-adjusting market environment was not to be tinkered with unless convincing proof was offered otherwise (presumption of beneficence absent compelling proof of hazard). Myron Scholes expresses this philosophy in a 1996 explanation of how derivative instruments reduce risk:

To the extent . . . that financial institutions and corporations use derivative contracts to hedge or to share the risks more broadly throughout the economy by using derivative contracts, the risk in the financial system might be less concentrated. In effect, derivatives allow for the provision of more risk capital by outsiders at less cost than does direct equity issuance. Unfortunately, regulators and legislators around the world are prone to concentrate almost exclusively on systemic risk. *Their focus should be on building the proper infrastructure to support the evolving nature of derivatives and other financial contracts. With this focus, regulators could encourage and help to coordinate the development. If governments concentrate only on systemic risk issues and write new rules to address this question, they might create disruptive effects. There may be severe limits to the role of governments in the evolving global financial arena. Because of the dynamics of innovation, it has become very difficult for Congress to draft specific rules to regulate institutions. The half-life of the regulations is very short. As a result, regulators must rely more on the industry that is motivated by their own self-interest to provide the appropriate economic level of risk controls and management. There is no empirical evidence that supports the conjectures that derivative contracts can lead to massive failures and create systemic risk.*¹⁷⁰

A regulator, Brooksley Born, who was the Chair of the Commodity Futures Trading Commission (“CFTC”),

¹⁷⁰ Myron S. Scholes, *Global Financial Markets, Derivative Securities, and Systemic Risks*, 12 J. RISK & UNCERTAINTY 271, 280, 283–85 (1996) (emphasis added).

unwisely sought to introduce the “disruptive effects” of intervention by discussing the possibility of regulating over-the-counter (“OTC”) derivatives, but the Federal Reserve and the Clinton administration took preventative action according to the philosophy expressed by Scholes. As Scholes advised, Congress and the White House placed “severe limits to the role of governments in the evolving global financial arena,” thereby quashing Born’s proposals and forcing her out of the CFTC.¹⁷¹ Congress and the White House then enacted a bill which would prevent any such regulation in the future, so as “to promote innovation for futures and derivatives and to reduce systemic risk by enhancing legal certainty in the markets for certain futures and derivatives transactions.”¹⁷² Although today it might seem paradoxical that a law preventing regulation is understood to “reduce systemic risk,” if we understand that the government and regulation are seen to be the sources of such risk, the wording would make perfect sense.

The presumption that market forces should enjoy freedom until proven dangerous was also applied to the practice of securitization, which had grown in the U.S. since the 1980s in part due to the liberalization of the Savings and Loan Industry and its impact on mortgage lending.¹⁷³

¹⁷¹ See JOHNSON & KWAK, *supra* note 164, at 136.

¹⁷² See The Commodity Futures Modernization Act of 2000, H. R. 5660, 106th Congress (December 14, 2000), discussed in JOHNSON & KWAK, *supra* note 164, at 134–37.

¹⁷³ As Hendershott observes, “thrifts maintained their share of mortgage originations but reduced their relative investment in home mortgages (sold some of the originated mortgages). . . . This portfolio shift reflected the reduced profitability of S&Ls and the expansion of S&L asset powers.” Patric H. Hendershott, *Housing Finance in the United States, in HOUSING MARKETS IN THE U.S. AND JAPAN*, 70 (Yukio Noguchi & James Poterba eds., 1994). This connection between the Savings and Loan Crisis of the 1980s and the GFC should not be surprising. When regulation prevents on dangerous activity, it might encourage innovation in a different, unregulated, direction. While regulators were focusing attention on corporate governance and the dot.com bubble, writing and implementing the Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, 116 Stat. 745, to prevent accounting fraud in the equity markets, the financial industry shifted its focus to structured products. Much of the problem with

Securitization presented two quantifiable benefits, one well-known legal risk, and a largely unnoticed moral hazard. In the run-up to the GFC, the two quantifiable benefits were visible in well-known increases in the number of loans granted¹⁷⁴ and decreases in the interest rates charged,¹⁷⁵ which made housing more affordable for Americans. The legal risk on which much of the practical securitization literature focuses is making sure that the transfer of a loan portfolio to the entity issuing bonds backed by the transferred loans is an actual, “true sale.”¹⁷⁶ The moral hazard that was both problematic and relatively unnoticed is that when a bank transfers a loan (including default risk) to another, the bank has less incentive to ensure the creditworthiness of the borrower. This can also be understood as a benefit, for it reduces the compliance burden on lending. Moreover, because the lending bank that distributes a loan receives present payment for the value of a stream of future cash flow on the transferred loans, it enjoys an immediate cash benefit, which can further heighten its incentive to originate risky loans. This hazard was invisible not only because it merely informally affected the vetting of creditors, but also because it was tied up with the quantifiable benefit that might be called “reduced compliance costs and counterparty risk.” While every new product brings with it new risks, the moral hazard of securitization remained largely unnoticed both because it is internal and informal, and because it is the verso to a lower

regulatory discourse, whether in connection with quantitative studies or not, is the difficulty in grasping the unintended ramifications of changes in the market and in regulation. In the quotation above, Myron Scholes emphasizes that regulation must adapt to the markets’ needs. The focus post GFC has been more on adaption to its risks.

¹⁷⁴ See Steven L. Schwarcz, *The Roberta Mitchell Lecture: Structuring Responsibility in Securitization Transactions*, 40 CAP. U. L. REV. 803, 804 (2012) (arguing that: “There was significant government pressure on mortgage lenders to make and securitize subprime mortgage loans to expand homeownership.”).

¹⁷⁵ See, e.g., Hendershott, *supra* note 173, at 77–78.

¹⁷⁶ See, e.g., STEVEN L. SCHWARCZ, *STRUCTURED FINANCE: A GUIDE TO THE PRINCIPLES OF ASSET SECURITIZATION* §4:1, at 4-2 to 4-3 (3d ed. 2003).

compliance cost's recto.¹⁷⁷ The decay of the business motivation to ascertain creditworthiness went largely unnoticed until the volume of failures on “sub-prime” loans became visible in 2007. Innovation produced very definite positive quantities for market participants and consumers alike while generating a vague but dangerous disincentive for vetting borrowers.

There is no proof that QR contributed to or caused the GFC, but there can be no doubt that a broadly held position of market primacy, which can be seen as a belief that social relationships are essentially quantifiable and that markets best determine the respective values, certainly did. When preserving the pristine ecosystem of the market presents an ultimate good, one should speak in the same terms as the market does: quantitative. A discussion of quantities tends to exclude inquiry into the potential techniques of regulatory evasion¹⁷⁸ or market “pathologies”¹⁷⁹ inherent in a new law or financial product. Moreover, when quantities are supposed to set milestones, the fact that the market changes in relation to the rules adopted¹⁸⁰ tends to destabilize and relativize these very terms of reference. For example, while an executive director at Morgan Stanley might have had the most sophisticated software telling him that the market risk on a pool of mortgage loans was acceptable, the risk profiles guiding the software were derived from a market with traditional loans contracts, which preceded the securitization boom. The securitization boom in turn led to a new form of contract, riskier lending, and a new quantity of market

¹⁷⁷ As Awrey makes clear, in a product approval regime for innovation in finance, supply-side motivation for innovation must be investigated together with any professed benefits to purchasers. Awrey, *supra* note 164, at 416.

¹⁷⁸ More lending, increased profits and lower interest rates were highly visible quantities, but the motivation to innovate “with a view to mitigating the impact of various regulatory requirements . . . [such as through] the use (and adaptation) of structured finance techniques by banks to circumvent regulatory capital requirements,” Awrey, *supra* note 164, at 410, is less visible.

¹⁷⁹ Gordon, *supra* note 65, at 8.

¹⁸⁰ See Pistor, *supra* note 166, at 317–18.

risk.¹⁸¹ In such an interactive world, “letting the market decide” is a feedback loop in which evasion and innovation become synonyms, and both are praised so long as they generate increased market returns.

F. Dodging Market Structure Decisions by Embracing a Circle of Quantified Research

In markets dominated by algorithmic trading, we see an example of QR looping full circle into a kind of self-reflexive sovereignty. That is, algorithms are mathematical instructions dictating the steps to be taken in a process, and if the proper steps and causal relationships in a process are discovered through analysis of that process that reduces its components to quantified functions, then these functions may serve as the content of the algorithm.¹⁸² As such, algorithmic trading is a by-product of QR, so that when one uses QR to evaluate a market primarily guided by algorithmic instructions, one can rightly expect the results (at least in type, if not in quantity) to be positive. The bridge from QR to algorithmically guided activity within a type of behavior that is regulated—whether that is securities trading, road safety, or a drone defense system—gives us

¹⁸¹ This is taken from a conversation recorded in New York in September 2009 between Ira Glass; Adam Davidson, an economics reporter with Planet Money; and Mike Francis, a residential mortgage trading desk executive director at Morgan Stanley. *This American Life: Return to the Giant Pool of Money*, CHICAGO PUBLIC RADIO (Sept. 25, 2009) (transcript available at <http://www.thisamericanlife.org/radio-archives/episode/390/transcript>, archived at <http://perma.cc/CPB7-RXNV>).

¹⁸² MATTHIAS MÜLLER-HANNEMANN & STEFAN SCHIRRA, ALGORITHM ENGINEERING: BRIDGING THE GAP BETWEEN ALGORITHM THEORY AND PRACTICE 6 (2010).

Algorithm Engineering is always driven by real-world applications. The application scenario determines the hardware which has to be modeled most realistically. In a first phase of Algorithm Engineering not only a good machine model has to be chosen, but also the problem itself has to be modeled appropriately, a task, that is usually excluded from algorithm design.

Id.

further insight into the issues presented when studying the use of QR in law- and rule-making. Through quantification of process elements, QR interprets the world in a way that is much friendlier to computers, and when we demand decision-making through processes like quantified CBA, we too see the advantages of approximating our reasoning processes to that of a computer. Yet through this process we seal out the unquantifiable, and at least from the point of view of policymakers in the area of securities regulation, that should not be done, as the statutory mandates under which they operate are not expressed in quantitative terms.

The transition to machine-readable markets paved by a dense body of quantitative findings has occurred in the last half-century. QR on price discovery conducted during this period has gradually come to define many—if not most—investment and price discovery relationships within securities markets.¹⁸³ First, this QR has served as background knowledge for trading strategies, many of which were eventually written into the algorithms that guide computer-based trading.¹⁸⁴ Second, influential QR guides not

¹⁸³ A critical mass of modern finance scholarship can be understood to have formed in the wake of papers like Franco Modigliani & Merton H. Miller, *The Cost of Capital, Corporation Finance, and the Theory of Investment*, 48 AM. ECON. REV. 655 (1958); Paul A. Samuelson, *Proof that Properly Anticipated Prices Fluctuate Randomly*, 6 INDUS. MGMT. REV. 41 (1965); Michael Jensen, *The Performance of Mutual Funds in the Period 1945–64*, 23 J. FIN. 389 (1968); Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 35 J. FIN. 383 (1970), and Robert J. Shiller, *Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends?*, 71 AM. ECON. REV. 421 (1981).

¹⁸⁴ Gillian Tett has summarized the trend well in a remark on a difficult October 2014 flight to liquidity: “[A]sset managers are becoming more prone to acting as a herd—reinforcing the challenge of matching buyers and sellers. This is partly because investors are increasingly using similar benchmarks to judge performance, . . . the growing use of computer programs to execute trade, . . . [and] the programs that techies at hedge funds and banks create tend to look alike. Computers—like humans—are thus moving as herds, intensifying the imbalance.” Gillian Tett, *Markets Are Parched for Liquidity Despite A Flood of Cash*, FIN. TIMES (Oct. 16, 2014, 5:31 PM), <http://www.ft.com/cms/s/0/3f3d7418-5485-11e4-bac2-00144feab7de.html#axzz3a8n2V3li>. QR may not be the primary ingredient

only the traders themselves (particularly when those traders are machines), but also policymakers who decide on the characteristics that markets should strive to attain.¹⁸⁵ QR is then used to assess the quality of a market shaped significantly by earlier QR.¹⁸⁶ Within this closed circle, the findings of earlier QR substantially influence both the characteristics that markets are designed to achieve and the actual goals and strategies of traders. The outcome of this process is then assessed by more recent QR. This means that although quantities (e.g. trading costs, turnover, spreads, price reaction to information) are assessed rigorously, qualitative factors and quantitative factors that require inclusion of both issuers and investors (e.g. fairness, effective capital allocation, access to market mechanisms) are not. This assessment exercise has become at least partially self-reflexive within the goals and methodology of QR. Such self-reflexive circularity is common in science, as Porter explains: “Chemists buy purified reagents from catalogues—and they would be quite helpless if they had to extract them from the

in a trading algorithm, which would be written in response to any number of factors affecting trading strategies, “such as economic environment, decrease of trading costs, deregulation of markets, new trading venue (e.g. electronic communications networks, dark pools, etc.), new product (e.g. exchange traded funds, commodity indices, etc.), extended access to existing products, technological development (trade execution at increased speed), etc.” Lajos Gergely Gyurkó, *The Evolution of Algorithmic Classes*, in THE FUTURE OF COMPUTER TRADING IN FINANCIAL MARKETS—FORESIGHT DRIVER REVIEW—DR17 3 (Gov’t of the U.K. ed., 2011), available at http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289014/11-1235-dr17-evolution-of-algorithmic-classes.pdf, archived at <http://perma.cc/BZ32-R54B>.

¹⁸⁵ For a recent example, see U.S. Securities and Exchange Commission, *Equity Market Structure Literature Review Part II: High Frequency Trading* (2014), <http://www.sec.gov/marketstructure>, archived at <http://perma.cc/EF5S-H7SN>.

¹⁸⁶ See, e.g., Maureen O’Hara & Mao Ye, *Is Market Fragmentation Harming Market Quality?*, 100 J. FIN. ECON. 459 (2011); Terrence Hendershott & Pamela C. Moulton, *Automation, Speed, and Stock Market Quality: The NYSE’s Hybrid*, 14 J. FIN. MARKETS 568 (2011); Jonathan Brogaard et al., *High-Frequency Trading and the Execution Costs of Institutional Investors*, 49 FIN. REV. 345 (2014).

soil. Cancer researchers depend on patented strains of mice and would not know how to interpret results derived from ordinary field mice.”¹⁸⁷ Nature as studied by science is made more amenable to science in order to achieve better scientific results, and whether this reshaping is done intentionally, as in the hard sciences, or unconsciously, as in the case of modern markets, the outcome is similar: reality is molded to methodology, not the reverse.

Indeed, our main measures of market quality today track the characteristics singled out by QR over the years to study markets.¹⁸⁸ “Efficiency”—understood as the speed and accuracy with which market prices reflect publicly available information¹⁸⁹—is so primary a measure that it is sometimes thought as a synonym for market quality itself.¹⁹⁰ Assumptions on which the theory of an efficient market depends¹⁹¹ have been famously underlined and examined as the institutional “mechanisms of market efficiency” by Gilson and Kraakman,¹⁹² whose examination has influenced the

¹⁸⁷ PORTER, *supra* note 4, at 16

¹⁸⁸ This section borrows from my related paper, David C. Donald, ‘Market Quality’ and Moral Hazard in Financial Market Design (Aug. 19, 2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2483026, archived at <http://perma.cc/AL9A-JCXH>.

¹⁸⁹ See Fama, *supra* note 183. Fama’s work has been carried forward by many studies. See, e.g., S.C. Hillmer and P.L. Yu, *The Market Speed of Adjustment to New Information*, 7 J. FIN. ECON. 321 (1979); James M. Patell & Mark A. Wolfson, *The Intraday Speed of Adjustment of Stock Prices to Earnings and Dividend Announcements*, 13 J. FIN. ECON. 223 (1984). A broader discussion of market efficiency in the century preceding Fama’s work can be found in ROBERT J. SHILLER, *IRRATIONAL EXUBERANCE* 178–93 (2d ed., 2009).

¹⁹⁰ For a critical view of our understanding of “efficiency,” see Gill North & Ross Buckley, *A Fundamental Re-Examination of Efficiency in Capital Markets in Light of the Global Financial Crisis*, 33 U. N.S.W. L.J. 714 (2010).

¹⁹¹ Fama, *supra* note 183, at 387.

¹⁹² The assumptions of a market without transaction costs, in which all available information is costless for all participants, and all agree on the implications of the information for the relevant security, are discussed and then revisited in Ronald J. Gilson & Reinier Kraakman, *The Mechanisms of Market Efficiency*, 70 VA. L. REV. 549 (1984); Ronald J.

shape of market regulation over decades. As an efficient market must perfectly and rapidly impound information into prices, high frequency trading leads to a more efficient market because it can bring information into a securities price faster than ordinary trading.¹⁹³ Examined alone, speed increases efficiency and market quality because information is impounded in price more rapidly. However, a qualitative result of this speed is the adverse selection suffered by slow traders who inevitably find themselves behind high frequency trend chasing.¹⁹⁴ Such “efficient” speed can also lead to accidents, such as the four-minute, six-percent drop of the U.S. equity markets in 2010, referred to as the “flash crash.”¹⁹⁵ Although avoiding market crashes has certainly been a regulatory goal of market development, a one-time or occasional event such as that in 2010 might well fall outside statistical relevance for the data used to assess efficiency as the speed at which information is impounded in price.¹⁹⁶

Gilson & Reinier Kraakman, *The Mechanisms of Market Efficiency Twenty Years Later: The Hindsight Bias*, 28 J. CORP. L. 715 (2003); Ronald J. Gilson & Reinier Kraakman, *Market Efficiency After the Financial Crisis: It's Still a Matter of Information Costs*, 100 VA. L. REV. 313 (2014).

¹⁹³ Jonathan Brogaard, Terrence Hendershott & Ryan Riordan, *High Frequency Trading and Price Discovery*, 32, European Central Bank Working Paper Series No. 1602 (2013), available at <http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1602.pdf>, archived at <http://perma.cc/PR9J-6PKT>.

¹⁹⁴ Breckenfelder, using data from the Swedish exchange, finds that high frequency traders in competition to get ahead of demand innovations (“trend chasing”) increase destabilizing short-term volatility. Johannes H. Breckenfelder, *Competition Between High-Frequency Traders, and Market Quality* 3, NYU Stern Microstructure Meeting 2013 (Nov. 1, 2013), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2264858, archived at <http://perma.cc/XZS3-V28Y>. Hoffmann explains how slow traders likely suffer adverse selection due to high frequency strategies. Peter Hoffmann, *A Dynamic Limit Order Market with Fast and Slow Traders*, 113 J. FIN. ECON. 156, 158 (2014).

¹⁹⁵ This dimension of market damages and the causes of this “flash crash” are analyzed in U.S. COMMODITY FUTURES TRADING COMM’N & U.S. SEC. & EXCHANGE COMM’N, FINDINGS REGARDING THE MARKET EVENTS OF MAY 6, 2010 at 4 (2010).

¹⁹⁶ It is difficult to achieve the correct balance between skewing results through the inclusion of erratic outliers and failing to include

Perhaps the simplest quantitative measures of market quality are the costs of trading and market turnover volume. “The logic of using this variable is that the higher the turnover (the more liquidity), the more efficient the market.”¹⁹⁷ It would be extremely difficult to quantify a point at which trading activity reaches equilibrium at maximum liquidity—but short of speculation inducing destabilizing volatility. However, if the qualitative problem is ignored and the quantum and cost of trading is used as a proxy for liquidity, the lower the trading costs, the more the liquidity and better the market.¹⁹⁸

The reduction of trading costs has been a major initiative of U.S. lawmakers.¹⁹⁹ This exclusively quantitative goal of reducing trading costs operates on a plane distinctly different from and conceptually excludes the argument that an optimal amount of trading exists, and a financial

exactly those cases in the data which a given regulatory framework was designed to prevent. *See generally* Francis J. Anscombe, *Rejection of Outliers*, 2 *TECHNOMETRICS* 123 (1960). This would seem to be an area where interdisciplinary collaboration can offer much. A single Watergate, Chernobyl, Enron, 9/11, or even Flash Crash will be enough to signal that the applicable protective framework should be amended. Nevertheless, we have no coherent theoretical statement on when the quantitative tools should be dropped and a single (or small cluster) or qualitatively important cases will be enough to shape the regulatory discourse. Such theoretical guidance would be useful to deal with very significant, yet perhaps not watershed, events such as the failure of Long Term Capital Management in 1998, which did not bring on the necessary changes in the regulatory framework.

¹⁹⁷ Martin Cihák, Asli Demirgüç-Kunt, Erik Feyen & Ross Levine, *Benchmarking Financial Systems around the World*, 14, World Bank Policy Research Working Paper 6175 (August 2012), *available at* <http://elibrary.worldbank.org/doi/book/10.1596/1813-9450-6175>, *archived at* <http://perma.cc/4Z2J-H9EV>.

¹⁹⁸ Jonathan Brogaard, Terrence Hendershott, Stefan Hunt & Carla Ysusi, *High-Frequency Trading and the Execution Costs of Institutional Investors*, 49 *FIN. REV.* 345, 367 (2014).

¹⁹⁹ *See* Securities Acts Amendments of 1975, Pub. L. No. 94-29, 89 Stat. 97 (codified at 15 U.S.C. § 78f(e)(1) (2012)). The 1975 Amendments instructed the SEC to eliminate, if appropriate, the system of fixed commissions which led to high trading costs on the New York Stock Exchange.

transaction tax should be used to discourage “excessive” speculation.²⁰⁰ On the other hand, such focus on the cost of trading easily supports a policy to encourage competition among trading platforms (causing fragmentation) and to automate trading (dramatically increasing speed),²⁰¹ as QR has found that in such markets “fragmented stocks generally have lower transaction costs and faster execution speed.”²⁰² The nature of the circle between various levels of QR is evident: QR has used trading costs and volume as convenient quantitative proxies for market quality; these factors have served as aims for market development, so that when a market is later assessed for the presence these same criteria, it receives a good score in spite of what some understand to be excessive speculative trading. Words like “excessive” and “fairness” indicate elusive states of affairs, particularly when looking to draw lines in a competitive market, and the circle of securities market QR as currently focused not only fails to address these issues, but also tends to disguise the existence of the same.

One obvious alternative to QR in assessing market quality is to examine market infrastructure and operations for predispositions to serve the interests of some stakeholders while damaging the interests of others.²⁰³ A potential indication of such infrastructural bias would be a market design created by a group of people who have clear conflicts of interests between their own profit incentive and the public good. Market structure is primarily designed and controlled by broker-dealers, for whom market operations

²⁰⁰ See, e.g., Joseph E. Stiglitz, *Using Tax Policy to Curb Speculative Short-Term Trading*, 3 J. FIN. SERVS. RES. 101 (1989); JOHN MAYNARD KEYNES, *THE GENERAL THEORY OF EMPLOYMENT, INTEREST AND MONEY* (Thomas Cate ed. 1945).

²⁰¹ The creation of the “national market system” was the primary thrust of the same Securities Acts Amendments of 1975, see *supra* note 199, which was in part prompted by a desire to eliminate the NYSE’s fixed commissions; see also CHRIS WELLES, *THE LAST DAYS OF THE CLUB* 86–121 (1975).

²⁰² O’Hara & Ye, *supra* note 186, at 460.

²⁰³ The author has done this in Donald, *Market Quality and Moral Hazard*, *supra* note 188.

and gains from trading are their primary means of generating revenue.²⁰⁴ The costs and volume of trading are directly linked to such revenue, and the speed of trading (which is tied to a certain understanding of “efficiency”) is a factor that allows both an increase of volume and a means for broker-dealers with more capital to generate additional returns in competition with smaller market participants. The criteria singled out by QR as important for market quality and which have influenced the shape of modern markets thus line up with the interests of the largest market participants. Rather than merely completing the circle through more recent QR measuring similar criteria, it is advisable to add qualitative elements, or as an alternative, to add QR with a different focus and methodology, such as borrowed from the area of corporate governance.²⁰⁵ Using QR methodology originating in the governance area would allow rigorous analysis of the dynamics of market governance, and such governance displays significant resemblances to corporate governance. Similarly to QR and market design,

²⁰⁴ This fact led to the controversial founding of the Investors’ Exchange (IEX) in 2013, which specifically excluded broker-dealers from ownership positions in the infrastructure, turning instead to various types of investment funds (mutual, pension and hedge). See *Conflicts of Interest, Investor Loss of Confidence, and High Speed Trading in U.S. Stock Markets: Hearing Before the Permanent Subcomm. on Investigations of the S. Comm. on Homeland Sec. and Governmental Affairs* 113th Cong. 9 (2014) (statement of Bradley Katsuyama, President and CEO, IEX Group, Inc.), available at <http://www.hsgac.senate.gov>, archived at <http://perma.cc/7C4X-ZFCH>.

²⁰⁵ For example, QR on executive compensation regularly examines a powerful group (executive management) and the relationships between decisions made in their favor and the overall value of the firm. See, e.g., Michael J. Cooper, Huseyin Gulen & P. Raghavendra Rau, *Performance for Pay? The Relation Between CEO Incentive Compensation and Future Stock Price Performance* (Jan. 30, 2013), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1572085, archived at <http://perma.cc/MA5X-G5HQ>; John Bizjak, Michael Lemmon & Thanh Nguyen, *Are All CEOs Above Average? An Empirical Analysis of Compensation Peer Groups and Pay Design*, 100 J. FIN. ECON. 538 (2011). This type of analysis would likely be useful for illuminating how bias feeds into market design.

corporate governance is affected by the dangers of systemically pre-structuring information in ways that do not allow an accurate understanding of risk. As Julia Black points out, the prices we use to assess company performance “are not simply the outcome of a mutually beneficial agreement but the product of technologies of measurement and calculation, including accounting, audit, and risk modelling. These technologies . . . shape the behavior which they purport to measure.”²⁰⁶ With the appearance of each blind spot in this system via market crash, accounting rules are changed. Eventually, the independent self-regulation of the accounting industry was found to be untenable following the dot.com bubble, when the Sarbanes Oxley Act introduced the Public Company Accounting Oversight Board.²⁰⁷ Given the importance of QR, at least a first stage toward oversight would better come preceding a damaging mistake rather than afterwards.

IV. RECOMMENDATIONS TO IMPROVE THE USE OF QUANTITATIVE RESEARCH IN REGULATORY POLICY

A. The Academic Side: Toward a Professional Ethics of Quantitative Research

As discussed in Part II,²⁰⁸ QR is derived from methodology that is still under development and employs data that often involves considerable uncertainty. Robust professional vetting should accompany the activity of combining data that is in great part affected by its accidental availability with methodological judgments and assumptions which may not be universally accepted even among

²⁰⁶ Julia Black, *Seeing, Knowing, and Regulating Financial Markets: Moving the Cognitive Framework from the Economic to the Social*, Legal Studies Working Paper No. 24/2013, 4 (Nov. 13, 2013), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2346098, archived at <http://perma.cc/46HL-XJAS>.

²⁰⁷ Sarbanes-Oxley Act § 101, Pub. L. 107–204, 116 Stat. 745, codified at 15 U.S.C. § 7211 (2002).

²⁰⁸ See *supra* Part II.D.

specialists in QR. This is particularly important because of the powerful “sound bite” impact that policy prescriptions can obtain from QR. This Part recommends a few internal control measures that could be deployed within the academic community to improve the general reliability of QR for policy use. As discussed below, these controls could be implemented through either academic best practices or an ethical code.

With respect to the kinds of questions discussed here, the first and most obvious recommendation for improvement is that when QR is performed on a subject with which economists or other social scientists are not perfectly familiar, such as in the LLSV research on comparative law, the researcher should seek advice from and discuss findings with neutral experts in the discipline before publication. An understanding of the significance of data regarding complex phenomena like regulatory frameworks and their enforcement would facilitate QR on the topic both to employ appropriate methodology and to interpret its findings with greater circumspection. While high-quality conclusions in this regard can be achieved by legal scholars themselves undertaking QR on an area in which they are very familiar,²⁰⁹ a surrender of such studies to legal scholars is not what this Article is suggesting. Indeed, given the dynamic evolution of QR methodology,²¹⁰ moving QR on law

²⁰⁹ See e.g., Howell E. Jackson & Mark J. Roe, *Public and Private Enforcement of Securities Laws: Resource-Based Evidence*, 93 J. FIN. ECON. 207 (2009) (bringing QR to the complex phenomenon of enforcing securities laws through regulation, litigation, consultation, and preemptive supervision); Hui Huang, *Piercing the Corporate Veil in China: Where Is It Now and Where Is It Heading?* 60 AM. J. COMP. L. 743 (2012) (bringing QR to the mixed statutory and case law question of equitable disregard for the corporate entity, and doing so with materials that are both set in the Chinese legal system and primarily written in Chinese).

²¹⁰ Examples of methodological advances since the turn of the century work of LLSV are in use of “difference-in-differences” studies, such as found in Thorsten Beck, Ross Levine & Alexey Levkov, *Big Bad Banks? The Winners and Losers from Bank Deregulation in the United States*, 65 J. FIN. 1637 (2010); or “regression discontinuity” such as found in Vicente Cuñat, Mireia Gine & Maria Guadalupe, *The Vote Is Cast: The Effect of Corporate Governance on Shareholder Value*, 67 J. FIN. 1943 (2012). I am grateful to Lin Chen for bringing these papers to my attention.

to law schools would seem to risk creating the inverse of the problem discussed in this article. As both QR methodology and the understanding of law and regulation move forward, both sets of knowledge should be brought to bear on research.

Second, beyond the grounding of methodological analysis in a clear understanding of the data, QR should always be subjected to extended verification to ensure its claim on objectivity. Regression analysis, in particular, provides a systematic tool to ensure that an analysis of data is objective, and as mentioned above, methodological advances in this area are being made. The best forms of verification should produce the kind of product that law- and rule-makers look for in QR: findings that are objective, consistent, and capable of full explanation—making them much more useful in both the short and long term. The advantages of analysis employing regression—particularly over decisions relying on simple judgment—are well documented.²¹¹ Once the importance of quantitative analysis for policymaking is fully recognized, it will be understood why the number of assumptions and judgment calls underlying a quantitative study must be taken more seriously. Consider how more complete theoretical work on the likely economic effects of austerity could have affected lives of ordinary Americans and Europeans, but also the future of the European Union as a viable political project. Pre-specifying regressions can help to prevent “data mining” where pressure exists to reach the “right result.” Such a step would be further justified by recent empirical work that has shown researchers might be tempted to inflate the value of almost-rejected tests by

²¹¹ W.M. Grove & P.E. Meehl, *Comparative Efficiency of Informal (Subjective, Impressionistic) and Formal (Mechanical, Algorithmic) Prediction Procedures: the Clinical—Statistical Controversy*, PSYCHOL. PUB. POL'Y & L. 293, 293–23 (1996); J. S. Armstrong, *Judgmental Bootstrapping: Inferring Experts' Rules for Forecasting*, in J.S. ARMSTRONG, PRINCIPLES OF FORECASTING (2001).

choosing a specification they understand journal editors will find “significant.”²¹²

Third, QR should be both reproducible and replicated for different data samples by different researchers, particularly if the research has the potential to influence public policy or law-making. This suggestion should be understood in the context of those in the next section regarding “public offerings” of QR findings. Reproducible code replicated for different data samples by different researchers could avoid the kind of sensation and reversal discussed in Part III with respect to the Reinhart and Rogoff work on debt and growth. Meta-analyses using different methodologies can also provide guidance on the best model to use in future research. Indeed, academic debate on the methodology employed in a given study should even precede the public release of QR. Ideally, this can clarify and iron out any methodological flaws, as well as serve as a robustness check for any potentially problematic decisions, such as the weighting in the Reinhart and Rogoff case or year classification in the Alesina and Perotti case, discussed in Part III. Meta-analyses produce more accurate and less biased summaries than those provided by traditional reviews.²¹³ Models should be tested on different datasets before being heralded as “verified.” Even as far back as 1940, Friedman, wrote that the only way to test an empirically derived model is to see how it performs on other data sets.²¹⁴ Ideally, such disclosure, collaboration, and replication should precede academics “going public” with QR.

Fourth, visual presentation of results should be encouraged to facilitate understanding by a range of people

²¹² Christopher Blattman, *The Other Kind of Star Wars: The Quest for ** and ****, CHRISBLATTMAN (APR. 1, 2013), <http://chrisblattman.com/2013/04/01/the-other-kind-of-star-wars-the-quest-for-and/>, archived at <http://perma.cc/7NB8-TWJ7>.

²¹³ GEOFF CUMMING, UNDERSTANDING THE NEW STATISTICS: EFFECT SIZES, CONFIDENCE INTERVALS AND META-ANALYSIS (2012). Some researchers disagree. See, e.g., Derek C. Briggs, *Meta-Analysis: A Case Study*, 29 EVALUATION REV. 87 (2005).

²¹⁴ MORGAN, *supra* note 24, at 127.

from different disciplines. Although this was emphasized as early as 1973 by Francis Anscombe, there is still room left for improvement.²¹⁵ Confidence intervals should also always be used, and certainly be more prominent than simple reports of statistical significance. Ziliak and McCloskey have documented the damaging impact that statistical results insufficiently understood have had in a number of cases across the sciences.²¹⁶ Hauer presents the specific example of harmful decisions on traffic safety, such as the “right-turn-on-red decision” reached on the basis of statistical significance that was not correctly understood.²¹⁷ Graphs can be used to explain statistical methods and even as alternatives to algebraic processing of variables and arithmetic methods of calculation (e.g., to explain and analyze regression coefficients and correlation).²¹⁸ Although graphs have continued as an important element in the statistical program, algebraic representation of both methods and results came to dominate econometrics by the 1950s. This both increases the chance of misunderstandings and decreases the possibility that lay readers unable to follow the algebraic representations (perhaps expert in an area from which the data is taken, such as law) will be able to comment intelligently on the announced results. Roughly expressed with the lack of user-friendly clarity in which the law once

²¹⁵ Francis J. Anscombe, *Graphs in Statistical Analysis*, 27 AM. STATISTICIAN 17 (1973).

²¹⁶ STEPHEN T. ZILIAK & DIERDRE N. MCCLOSKEY, *THE CULT OF STATISTICAL SIGNIFICANCE: HOW THE STANDARD ERROR COSTS US JOBS, JUSTICE, AND LIVES* (2008).

²¹⁷ Ezra Hauer, *The Harm Done by Tests of Significance*, 36 ACCIDENT ANALYSIS & PREVENTION 495, 495–96 (2004).

²¹⁸ See generally Edward H.S. Ip, *Visualizing Multiple Regression*, 9 J. STATISTICS EDUC. 378 (2001); Peter E. Kennedy, *More on Venn Diagrams for Regression*, 10 J. STATISTICS EDUC. (2002). Morgan points out that one method is that employed in early economics and statistical journals during the late nineteenth century. In addition, early statistics textbooks used by economists also often included dedicated chapters on methods for graphing data, and such focus on the communication of results to laymen lasted until the interwar years. See MORGAN, *supra* note 24, at 70.

shrouded itself, *multiplex indistictum parit confusionem; et quaestiones quo simpliciones eolucidores*.²¹⁹

Fifth, at the very least, researchers should always name the source of their data, and ideally publicly release their database.²²⁰ There are numerous initiatives to collect different sources of data into large public databases, such as that hosted by Harvard's Institute for Quantitative Social Science.²²¹ If the database used for the research involved manipulation of already public data, code detailing this manipulation should be made public. In his book, released in 2014 with high political sensitivity, Piketty made the database he used for the study of wealth inequality publicly available.²²² The availability of this database allowed both academic economists and economists at the *Financial Times* to begin a public debate that aired and vetted the data and methodology used in Piketty's assertions.²²³ In this way, not only academia, but also media with very broad global distribution were in a position to conduct a "clarifying" exercise that assisted the public accurately to digest QR findings.

Lastly, given the unparalleled influence of QR over contemporary law- and rulemaking, the economics profession should consider drafting a complete ethical code for the creation of QR intended to influence policy, beyond the very

²¹⁹ In English: "Multiplicity and indistinctness produce confusion; and questions, the more simple they are, the more lucid." S.S. PELOUBET, *LEGAL MAXIMS IN LAW AND EQUITY* 172 (1880).

²²⁰ For example, in the work on bilateral investment treaties, Julien Chaisse and Christian Bellak make available—on an ongoing basis—the data that they are generating and using as a basis for their analysis of the area. See Julien Chaisse & Christian Bellak, *Coding the Expanding Universe of Int'l Treaties on Foreign Investment—The BITSel Index*, <http://www.cuhk.edu.hk/law/proj/BITSel> (last visited Mar. 25, 2015), archived at <http://perma.cc/R3RR-NJHE>.

²²¹ *Harvard Dataverse*, <http://dataverse.harvard.edu> (last visited May 8, 2015), archived at <https://perma.cc/YH47-2J73>.

²²² Piketty, *supra* note 136, at 17 n.24.

²²³ See Chris Giles & Ferdinando Giugliano, *Thomas Piketty's Exhaustive Inequality Data Turn Out to be Flawed*, *FIN. TIMES*, May 23, 2014.

useful funding disclosure policy the American Economic Association issued in 2012.²²⁴ Short of this, leading institutions conducting QR should create and adopt such a code of ethics as an example of best practice for the profession. This would help to bring economists' conception of their social role into line with the real influence they exercise in the world, comparable to other professions that have recognized their positions of public trust, such as the professions of medicine,²²⁵ law,²²⁶ accounting,²²⁷ and architecture.²²⁸ Such a code could advocate that all adherents undertake some or all of the measures discussed in the preceding paragraphs, particularly making data and code available for peer scrutiny and consulting with neutral experts in disciplines other than economics that are studied in a piece of QR, such as law. My recommendations are merely intended to begin the debate, and any code drafted by the economics profession itself would be far more insightful and complete.

B. Tempering Exuberance in “Public Offerings” of Quantitative Research to Policymakers

Protection against misleading disclosure and an opportunity for careful consideration of the offer before making a decision are core tools of consumer protection when

²²⁴ See *American Economic Association Disclosure Policy*, http://www.aeaweb.org/aea_journals/AEA_Disclosure_Policy.pdf, archived at <https://perma.cc/N53Y-L7WK>.

²²⁵ See *AMA's Code of Medical Ethics*, AM. MED. ASS'N (Mar. 11, 2015), <http://www.ama-assn.org/ama/pub/physician-resources/medical-ethics/code-medical-ethics.page#>, archived at <http://perma.cc/N3TU-4F6D>.

²²⁶ See *Model Rules of Professional Conduct*, AM. BAR ASS'N (Mar. 11, 2015), http://www.americanbar.org/groups/professional_responsibility/publications/, archived at <http://perma.cc/A87M-YCSC>.

²²⁷ See *Code of Professional Conduct*, AM. INST. OF CERTIFIED PUB. ACCOUNTANTS (Mar. 11, 2015), <http://www.aicpa.org/research/standards/codeofconduct/Pages/default.aspx>, archived at <http://perma.cc/65Y2-QHZ5>.

²²⁸ See *2012 Code of Ethics & Professional Conduct*, AM. INST. OF ARCHITECTS (Mar. 11, 2015), <http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiap074122.pdf>, archived at <http://perma.cc/UQ3Y-UVCX>.

any type of complex product is being sold. These tools have been most rigorously applied to offerings of securities to protect not only against misleading or incomplete disclosure, but also against accurate disclosure made at times deemed too sensitive for new information to be ingested. Romano correctly argues that the interaction between the creators of QR and law- or policymakers should be seen as a market for regulatory models and initiatives.²²⁹ Stiglitz goes farther in his analysis of the “battle of ideas” in policymaking by reminding us that the process resembles advertising, so that “simple, distorted stories, often repeated, can be more effective than longer and more subtle ones. Advertisers are good at distilling a message down to a sixty-second ad that strikes just the right notes—an emotional response seemingly reinforced by ‘reason.’”²³⁰

Nothing achieves the fusion of simplicity and science better than a statistical “sound bite”—and over 78% of people polled agree on this point.²³¹ This market—likely brokered, if not promoted through policymakers—would also include the general public. At least two of the cases presented in Part III have demonstrated a particularly troublesome aspect of QR: There is significant asymmetry between its concise, numerical results—the appetizing “sound bite” by which policymakers can be quickly swayed—and its intricate foundation of elaborately interwoven methodological judgments, assumptions and accidentally available data.

²²⁹ This rather Hayekian conception of the regulatory process was forcefully presented ten years ago by Roberta Romano, *The Sarbanes-Oxley Act and the Making of Quack Corporate Governance*, 114 *YALE L.J.* 1521, 1568–71 (2005). For a discussion of von Hayek’s original, see Marie-Laure Djelic, *Spreading Ideas to Change the World: Inventing and Institutionalizing the Neoliberal Think Tank* (2014), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2492010, archived at <http://perma.cc/8RYY-6XA8>.

²³⁰ JOSEPH E. STIGLITZ, *THE PRICE OF INEQUALITY: HOW TODAY’S DIVIDED SOCIETY ENDANGERS OUR FUTURE* 162 (2012).

²³¹ The figure is based on a study performed on January 13, 2015, in which I randomly interviewed the people I found in a hallway outside of my office.

While the “sound bite” is grasped by all, the proofs are reproducible and replicable only by researchers well versed in the methodologies used to generate the results. In this way, QR faces a problem that haunts all public use of science. From the point of view of scientific rigor, the mathematization of QR may well perform a gatekeeper function, but when it comes to public decisions on policy, it also often eliminates the possibility of broad-based, informed debate.²³² The examples of press statements by Reinhart and Rogoff, and by Kuznets, are powerful reminders that simplified QR can have undesirable effects. Even in the case when mathematical relationships are expressed graphically, however, QR results can serve as a Rorschach inkblot for consumers of the research. An example is the reception of a 1997 paper modelling incentives in relation to income and rate of taxation presented by Sir James Mirrlees as his Nobel Prize speech.²³³ A graph plotting these relationships against after-tax income and before-tax income was alleged to mean that the Laureate advocated permanent tax holidays for the richest, and this in spite of a statement in the text that, “[i]n my own paper, all wage distributions were unbounded above. There is considerable uncertainty about the actual highest income: it is very unlikely to be close to the level at which the marginal tax would be zero.”²³⁴ Thus, there is no guarantee that if QR is presented in a format that can be understood without specialized training people will read the whole study carefully. However, the same argument can be raised with respect to disclosure in the offering of securities or any other product.

²³² Lleo and Li argue that the use of mathematics in finance theory has also had a reciprocal, distorting effect on mathematics itself as used in finance, and that the two disciplines should back up to a “partnership” rather than having this branch of mathematics exist “embedded” within financial economics. See Sebastien Lleo & Jessica Li, *Crossing Paths: A Perspective on Mathematics and Finance* 22–23 (Nov. 14, 2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2503130, archived at <http://perma.cc/V37R-6X5K>.

²³³ James A. Mirrlees, *Information and Incentives: The Economics of Carrots and Sticks*, 107 *ECON. J.* 1311, 1315 (1997).

²³⁴ *Id.* at 1320.

Combined with the complex and specialized nature of QR, and a possible tendency to see in its findings what one will, is the public pressure on regulators and legislators to take some sort of action in a crisis. Romano, following Hayek, argues that at this juncture, academics and think tanks work as “policy entrepreneurs” to sell what are often second-best solutions to panicked government officials hoping to show the public that a rapid response is being deployed.²³⁵ Such an atmosphere is ripe for use of a statistical “sound bite” whose abstruse proof can lie quietly in the shadows while the sound bite itself “goes viral” in the media (“over simple, distorted stories, often repeated, can be more effective”).²³⁶ As “buyers” or “promoters” of QR in the market for ideas, regulators and legislators interact with QR for the benefit of third parties—their constituents or the set of persons who should receive the benefit of good regulation. When policymakers’ adoption of a given set of QR conclusions would have significant impact on the people they are entrusted to guide or serve, this interaction with QR should be subject to some form of self-imposed standards of comportment. This standard of care would entail appropriate investigation and vetting of the QR.

For example, if a leading development body were to consider whether it should follow new QR by jumping into a debate stretching back to the seventeenth century on the quality of law between the traditions of England and Continental Europe,²³⁷ particularly at a time when major

²³⁵ Romano, *supra* note 229, at 1591 (“The dismal saga of the SOX governance mandates demonstrates that congressional lawmaking in times of perceived emergency offers windows of opportunity to well-positioned policy entrepreneurs to market their preferred, ready-made solutions when there is little time for reflective deliberation.”). See also Anthony Barker & Guy Peters, *Introduction: Science Policy and Government*, in *THE POLITICS OF EXPERT ADVICE: CREATING, USING AND MANIPULATING SCIENTIFIC KNOWLEDGE FOR PUBLIC POLICY* 1–16 (1993).

²³⁶ STIGLITZ, *supra* note 230, at 162.

²³⁷ The attempt to smooth over the fact that England and been conquered and dominated by the Normans in a total and humiliating way has lent considerable pathos to this debate over the centuries. See, for example, the posthumously published MATTHEW HALE, *THE HISTORY OF*

countries in each camp were in a tense diplomatic standoff, it should be acutely aware of the impact that summary approval of one legal tradition over the other could have. In light of this potential impact, it should, at the very least, solicit opinions from comparative law scholars before “underwriting” the QR in an offering to the public. The same pause for reflection and investigation would also seem appropriate before using a set of QR conclusions to inflict austerity on the poorer half of a country’s population, removing social services supplied by the state during preceding decades. In each of these cases, the policymaker has a role akin to that of a fiduciary and should hold itself to an appropriate standard of care before investing the reputation of its office and the wellbeing of the people it serves in a fresh public offering of QR.

This is not an attempt to cast doubt on the sincerity of policymakers who rapidly adopt QR results without proper vetting and offer them to the public. However, even if their intentions are sincere, duties of office should not be forgotten. Policymakers should be aware of their biases when reading QR that supports their political preferences, of the uncertain value of institutional signaling alone, and of the dangerous disparity between QR’s swift impact and slow refutation discussed in this Article. While the statistical figures may be crisp, Parts II and III of this Article have shown that “facts” as established by QR are much more fragile phenomena than most lay persons (or even some researchers) are willing to accept. Many are, in reality, determined by the shape of theories and methodologies, the data available for investigation, and the particular judgments and measurements made by the researcher. Policymakers must consume and distribute these results with the care, skill, and diligence appropriate to the positions of trust they hold.

THE COMMON LAW 110 (Univ. of Chicago Press ed., 1971) (1713) (“The great Similitude that in many Things appears between the Laws of England, and those of Normandy, has given some Occasion to such as consider not well of Things, to suppose that this happened by the Power of the Conqueror . . . nothing can be more untrue.”).

C. Encouraging Policymakers to Refocus on Statutory Mandates

My final recommendation may appear to be both futile and naïve, as are most appeals for ethical comportment unsupported by a means of enforcement and running against the grain of strong interests. We have seen from the cases discussed in Parts III.E and III.F that dependence on quantitative indicators as proxies for qualitative criteria of market quality can amount to a regulator's abdication of duty. Reminding policymakers of this fact may appear futile because reminders were consistently repeated without result during the decade leading up to the GFC, perhaps most tragically by Chairwoman Born, who lost her CFTC position because she sought to regulate derivatives.²³⁸ Recommending that policymakers not confuse the quantitative and the qualitative may also appear naïve because it is likely that those people who appear to have placed blind trust in the self-regulating power of the market still have an eye focused on the benefits accruing to their allies from light or no regulation; otherwise, what is the use of highly paid lobbyists?²³⁹ Nevertheless, my treatment of QR and policymaking would remain incomplete without this reminder.

²³⁸ See *supra* Part III.E.

²³⁹ The role of the financial services lobby in shaping law and regulation is steadily coming to light. See, e.g., JOHNSON & KWAK, *supra* note 164, at 90 (“According to one analysis, from 1998 to 2008, the financial sector spent \$1.7 billion on campaign contributions and \$3.4 billion on lobbying expenses.”); *id.* at 198 (“The banking lobby . . . closed ranks against the [Consumer Financial Protection Agency]. . . . The full-court lobbying press had an impact.”); CHARLES W. CALOMIRIS & STEPHEN H. HABER, *FRAGILE BY DESIGN: THE POLITICAL ORIGINS OF BANKING CRISES AND SCARCE CREDIT* 237 (2014) (“Fannie and Freddie spent more than \$200 million lobbying Congress to avoid tighter oversight.”) (citing VIRAL V. ACHARYA, MATTHEW RICHARDSON, STIJN VAN NIEUWERBURGH, AND LAWRENCE J. WHITE, *GUARANTEED TO FAIL: FANNIE MAE, FREDDIE MAC, AND THE DEBACLE OF MORTGAGE FINANCE* 32 (2011)). See also Deniz Igan, Prachi Mishra & Thierry Tresselt, *A Fistful of Dollars: Lobbying and the Financial Crisis*, 26 NBER MACROECONOMICS ANNUAL 195 (2011).

If, during the early 2000s, regulators understood the market as a delicate ecosystem which only those guided by the profit incentives could properly inhabit and cultivate, it was natural that quantitative indicators of market health were given privileged weight. These quantitative indicators boomed reassuringly until the crash was in sight, and it was then too late.²⁴⁰ The review in Part III.F of current market structure problems presents another case where this could happen. Indicators of efficiency as time to impound information in prices, trading costs, number of trades and turnover are all booming, but the structure of the market is being changed in ways that are becoming increasingly difficult to repair. Lawmakers and regulators should again give weight to criteria like the adequacy of capital allocation, fairness and safety when making decisions. To undertake this shift, they need to remember that neither the efficiency of the market nor the ratio of its size to its cost were their original aims. Rather, at least in the United States, market transactions were subjected to regulation for a different reason:

[T]ransactions in securities as commonly conducted upon securities exchanges and over-the-counter markets are effected with a national public interest the prices of securities on such exchanges and markets are susceptible to manipulation and control . . . excessive speculation, resulting in sudden and unreasonable fluctuations . . . which (a) cause alternately unreasonable expansion and unreasonable contraction of the volume of credit available for trade, transportation, and industry in interstate commerce, (b) hinder the proper appraisal of the value of securities. National emergencies, which produce widespread unemployment and the dislocation of trade, transportation, and industry,

²⁴⁰ Indeed, regulators seeking to emulate market participants were caught like unskilled traders in a momentum trend. Other traders might have been watching the momentum build unsupported value, and were ready to exit at the first sign of downturn, but the regulators both appeared to believe the trend was real and—given their position—were forced to absorb much of the collapse.

and which burden interstate commerce and adversely affect the general welfare, are precipitated, intensified, and prolonged by manipulation and sudden and unreasonable fluctuations of security prices and by excessive speculation on such exchanges and markets.²⁴¹

While concepts like “excessive speculation,” “unreasonable expansion,” and “the proper appraisal of the value of securities” may appear quaint in a market where ultra-low latency computers jockey for microsecond advantages and matching engines clear over 100,000 trades per second, they spell out the milestones which the law and the regulatory system was created to guard against on the one hand and achieve on the other. While trading algorithms can certainly gauge themselves better among the purely quantitative, law- and rule-makers have been given—and should be ready to carry out—a different set of tasks.

V. CONCLUSION

QR today makes a vital contribution to law, but is a complex process in which the high ratio between pithy conclusions and intricate methodology can present certain dangers for policymaking. To address these dangers, this Article offers some recommendations on increasing interdisciplinary collaboration, academic standards for vetting research, reception of research by policymakers, and a refocusing of the same policymakers to the qualitative standards that define their legislative mandate.

Part II sketched the key elements of QR, particularly the type undertaken to provide policy advice. It showed that neither methodology, nor aspirations, nor tools of verification are universally agreed upon and practiced. While a vast majority of researchers are holding the methods and results of QR to increasingly higher standards, this dynamic and powerful instrument of the social sciences is very much a discipline in evolution.

²⁴¹ Securities Exchange Act of 1934 § 2, codified at 15 U.S.C. § 78b (2010).

Part III provided five case studies on the use of QR in law- and rulemaking. The first (section B) examined the problems connected with using quantified cost-benefit analysis (CBA) to evaluate the quality of rulemaking in cases where important variables of the CBA can be quantified only with great uncertainty. In this case, CBA takes center stage, displacing the difficult decisions underlying QR, so that their complexity need not clutter the CBA and their assumptions and judgments need not damage the CBA's claim to objectivity. This displacement also tends to move the possibility of verification into an inconspicuous hiding place outside of the regulatory process.

The second and third case studies (sections C and D) are situations in which quantitative "proof" has been argued to solve old and difficult problems, only to later unwind when errors of data and methodology were revealed through deeper investigation. These case studies exemplify the potential for the statistical "sound bites" of QR to create "policy bubbles" whose rise and fall destabilize the decision-making process. The fourth case study (section E), looked at financial regulation in the lead up to the GFC, and showed how the performance of market participants was used as a proxy for regulatory quality. This was accompanied by a popular (what some would call "ideological") belief that because market forces are the most efficient arbiter of social interaction, the profit incentive provided the best guide to shape the market. The result was that quantified proof about market activity took the place of reflection on whether markets were safe, fair, and effective.

The last case study (section F) of Part III examined the regulation of markets dominated by algorithmic trading, and showed that in modern markets we have a regulatory atmosphere largely shaped by mature QR. Quantitative research on market mechanisms has served as a basis for both designing markets and writing algorithms to guide the computer-driven trading that dominates markets, so that current QR tends to find its own reflection and values in the markets, naturally with opprobrium. This state of affairs finds QR perfectly in sync with market appraisal, but such

appraisal is divorced from the fundamental aims of regulation. The discussion in this Section also highlights the relationship between QR and automated decision-making, which is a topic that should be given more attention in its own right.

Part IV makes three sets of recommendations with respect to the use of QR for designing law and regulation. The first set focuses on behavior within the social sciences in light of the leading role they are now playing in many aspects of policymaking. Research teams should take even more care to verify their own results, consulting with subject-matter experts when their data consists of complex phenomena such as law and regulation. Particularly if a given study has a potentially significant social impact, code and data should be published so that others may attempt to replicate the results of QR before it becomes the basis for policies. This Article also recommends that the economics profession as a whole, or major institutions within it, should consider memorializing these practices in a code of professional ethics.

The second set of recommendations regards the behavior of policymakers to whom QR is offered for consumption, and who then “underwrite” the QR finding by offering it to the public. The recommendations expressed in this Article can be understood in rough analogy to the concerns raised by offering complex securities to the public. Certainly, neither regulators nor legislators can be equated with unsophisticated investors, but they could be compared to financial intermediaries. When their adoption of a given set of QR conclusions would have a significant impact on the people whose markets or country they are entrusted to manage with skill and diligence, their interaction with QR would benefit from some form of self-imposed standards of comportment. A decision to adopt the findings of QR and bring them into a policy should be held to a high standard of care, which would entail appropriate caution, controls, and vetting of the QR. A cynical and polemic use of QR damages not only government, but also the project to bring objective truth into decision-making.

The final recommendation offered here is rather obvious, although still necessary. Policymakers must make a conscious effort to heed the mandate—usually expressed in legislation—by which they have obtained power, even if the norms expressed in such mandate are vague and require implementation through expert judgment. For example, when assessing the quality of the securities market, if law- or rule-makers were to decide categorically that lower trading costs are always good because they tend to increase the amount of trading which usually translates into higher liquidity, they would be ignoring legislative aims expressly set out in the Exchange Act of 1934, which names “excessive speculation” and “unreasonable expansion” of price as dangers to be combatted in the market. The precision of the quantitative must not lure regulators or lawmakers to abdicate the (sometimes imprecise) duties of their office.

Law- and rulemaking have never before been in a position to aspire to the quality that is within reach today. In areas like the proper regulation of capital markets, in particular, important empirical studies are published daily. If studies of this nature on law and regulation were to be undertaken in active collaboration with experts on the substance of such law and regulation, devoting the methodological rigor that the actual impact of such research advises, vetted externally on the basis of published data and code, and treated with a due amount of prudence by policymakers, we might aspire to an objective standard of justice that has eluded many prior generations.