

# TRANSFORMATION COST ENGINEERING

MATTHEW JENNEJOHN\*

Transactions in the market for corporate control are not fully standardized but rather exhibit a material amount of variation. This Essay explores a possible structural explanation: That the complexity of merger and acquisition (M&A) agreements makes them susceptible to multiple sources of path dependency, which introduce tensions that unsettle incentives toward uniform standardization. Using natural language processing techniques and standard regression analysis, the Essay presents preliminary evidence indicating that the level of standardization of various M&A agreement provisions correlates differently with multiple sources of path dependency, lending support to the hypothesis that endogenous structural factors limit the standardization of M&A transactions. Those findings underscore the importance of including scope economies in theories of contractual innovation and enforcement and emphasize the role of transaction designers' organizational routines as a source of market resilience.

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\* Justin W. D'Atri Visiting Professor of Law, Business, and Society, Columbia Law School and Professor of Law, BYU Law School. Many thanks to Afra Afsharipour, Curt Anderson, Robert Anderson, Todd Baker, Bill Bratton, Emiliano Catan, Albert Choi, Steve Choi, John Coates, Giuseppe Dari-Mattiacci, Elisabeth de Fontenay, Merritt Fox, Jens Frankenreiter, Ron Gilson, Mitu Gulati, Sean Griffith, Claire Hill, Grant Hodgson, Dave Hoffmann, Cathy Hwang, Jeff Manns, Daniel Raff, Barak Richman, Usha Rodriguez, Bob Scott, Eric Talley, and participants at Columbia Law School's Blue Sky Workshop, the Columbia/Duke/NYU Conference on Contractual Black Holes, and the University of Minnesota's Conference on the New Realism in Business Law and Economics for helpful thoughts and comments. Meg Krivanec, Mariah Moody, and Melanie Williams provided excellent research assistance, and Annalee Moser provided superb library support. All errors are the author's. This research was generously supported by a BYU Law School internal research grant.

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## INTRODUCTION

In contract economics and classical contract law, it is typically assumed that agreements are customized to the interests of the parties entering into them. Contracts are “bargained for,” to use the language of the Restatement (Second) of Contracts.<sup>1</sup> From that perspective, the deal lawyer’s role is one of precise tailoring: To advise on commercial transactions is to be a “transaction cost engineer,” who carefully designs complex contractual instruments specific to the circumstances of a particular deal.<sup>2</sup>

However, one of the central teachings of recent legal research on contracting is that attorneys’ production costs can materially affect how contracts are designed.<sup>3</sup> Lawyers often standardize governance mechanisms across deals in order to reduce transaction costs,<sup>4</sup> thereby achieving scale economies a la early to mid 20th century mass production.<sup>5</sup> As these boilerplate provisions are deployed repeatedly in a market, they experience network effects.<sup>6</sup> That can lead to problems, such as the lock-in of inefficient terms or, perhaps, the ossification of contractual language to the point that the original intent of a provision becomes lost to memory—a “contractual black hole.”<sup>7</sup>

One way to understand the dilemma of path dependency in commercial boilerplate is as an intertemporal trade-off between the familiar idea of *transaction costs* and the less-appreciated notion of *transformation costs*. Williamson famously likens transaction costs to “friction” in a physical system.<sup>8</sup> In turn, devices that reduce those frictions, such as standardized contract terms, are viewed as beneficial. As Stark points out, however, those frictions within a market can have a silver

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1. RESTATEMENT (SECOND) OF CONTRACTS § 71 (AM. LAW INST. 1981).

2. Ronald J. Gilson, *Value Creation by Business Lawyers: Legal Skills and Asset Pricing*, 94 YALE L.J. 239, 297–98 (1984).

3. MITU GULATI & ROBERT E. SCOTT, THE THREE AND A HALF MINUTE TRANSACTION: BOILERPLATE AND THE LIMITS OF CONTRACT DESIGN 6, 90 (2013).

4. Charles J. Goetz & Robert E. Scott, *The Limits of Expanded Choice: An Analysis of the Interactions between Express and Implied Contract Terms*, 73 CALIF. L. REV. 261, 263, 265 (1985).

5. Barak Richman, *Contracts Meet Henry Ford*, 40 HOFSTRA L. REV. 77, 77–82, 84–85 (2011).

6. See generally Michael Klausner, *Corporations, Corporate Law, and Networks of Contracts*, 81 VA. L. REV. 757 (1995).

7. Stephen Choi et al., *The Black Hole Problem in Commercial Boilerplate*, 67 DUKE L.J. 1, 3–5 (2017) [hereinafter Choi et al., *Black Hole*].

8. OLIVER E. WILLIAMSON, THE ECONOMIC INSTITUTIONS OF CAPITALISM: FIRMS, MARKETS, RELATIONAL CONTRACTING 19 (1985).

lining: They can disrupt the feedback loops that lead to institutional lock-in over time.<sup>9</sup> Put another way, the institutions designed to reduce near-term transaction costs can raise the long-term costs of transforming those institutions.

The question then is how to balance the trade-off between transaction costs and transformation costs. The growing body of legal research studying innovation (or lack thereof) in boilerplate terms largely side-steps that question by focusing on how exogenous shocks—such as an unexpected judicial interpretation of a boilerplate term—disrupt path dependent production and spur innovation, a focus largely driven by the causal identification strategies those studies typically employ.<sup>10</sup> With notable exceptions, much less attention has been paid to endogenous aspects of innovation—how “internal” factors, such as product architecture or the routines within a law firm or the legal department of a large company, reduce transformation costs.<sup>11</sup>

This Essay takes a first step in combining those two perspectives. It explores a possibility evoked by Stark’s counter-intuitive notion of beneficial institutional frictions: That the complexity of modern agreements can render them susceptible to multiple sources of path dependency, which introduce tensions that require the attorneys designing a particular type of transaction to regularly interrogate the meaning of the contractual language they employ.<sup>12</sup> The dynamic here is similar to companies that develop multiple software platforms, each of which have their own network effects in their respective markets, and then try to deploy new technology across the separate platforms.<sup>13</sup> Because modern contracts are so complicated, incentives for standardization affect an agreement asymmetrically, having the paradoxical effect of sowing boilerplate’s limits.

This Essay analyzes a sample of merger and acquisition (M&A) agreements to see whether patterns of standardization within the

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9. DAVID STARK ET AL., *THE SENSE OF DISSONANCE: ACCOUNTS OF WORTH IN ECONOMIC LIFE* 21 (2009).

10. Choi et al., *Black Hole*, *supra* note 7, at 8–9, 12–14; Albert Choi & George Triantis, *Market Conditions and Contract Design: Variations in Debt Contracting*, 88 N.Y.U. L. REV. 51, 72–73 (2013); Stephen J. Choi et al., *The Dynamics of Contract Evolution*, 88 N.Y.U. L. REV. 1, 3, 11 (2013) [hereinafter Choi et al., *Dynamics*].

11. See Matthew Jennejohn, *The Architecture of Contract Innovation*, 59 B.C. L. REV. 71, 95–96 (2018); GULATI & SCOTT, *supra* note 3, at 90–91; John F. Coyle & Joseph M. Green, *Contractual Innovation in Venture Capital*, 66 HASTINGS L.J. 133, 177–79 (2014).

12. To extend Choi, Gulati & Scott’s black hole metaphor, perhaps complex agreements are like an object subject to gravitational tides from other bodies of comparable mass—the unsettled character of the object is a result of the opposing forces to which it is subject.

13. Alan MacCormack & Macro Iansiti, *Intellectual Property, Architecture, and the Management of Technology Transitions: Evidence from Microsoft Corporation*, 26 J. PRODUCT INNOVATION MGMT. 248, 249 (2009).

agreements reflect different possible sources of path dependency. M&A is studied because thousands of transactions are executed every year in the market for corporate control, and yet M&A agreements exhibit a circumscribed amount of standardization.<sup>14</sup> Rather than being fully standardized and subject to boilerplate lock-in's host of pathologies, they experience "constrained variation" and may be considered a form of a "mass customizable" product.<sup>15</sup>

The study explores three possible sources of path dependency in the design of M&A agreements. First, it asks whether there are patterns of standardization that reflect the different overarching transactional structures available in the M&A market. U.S. corporate law allows M&A transactions to be structured in two primary ways—tender offers and negotiated transactions—the latter of which can be broken down into mergers, asset purchases, or stock purchases. Legal rules, such as Delaware's doctrine of independent legal significance, preserves those separate approaches to achieving an M&A transaction. That raises the possibility that the way a transaction is structured affects the patterns of standardization in M&A agreements. A second possibility is that standardization patterns reflect distinct bodies of legal precedent, which parties select in the governing law provisions of their M&A agreements. Finally, another possibility is that the drafting preferences of the attorneys advising on a deal will lead to standardization patterns.

Analyzing overlapping path dependencies requires expanding the frame of reference we typically use to study contract design. Much of the light shed by the existing boilerplate literature has come from qualitative and quantitative empirical research focusing upon the characteristics and evolution of discrete contract terms. Research has yet to dilate upon the behavior of broader combinations of governance mechanisms in agreements, which is the critical step that this study takes.<sup>16</sup>

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14. John C. Coates IV, *M&A Contracts: Purposes, Types, Regulation, and Patterns of Practice* 6 (Eur. Corp. Governance Inst., Working Paper No. 292, 2015), <https://papers.ssrn.com/abstract=2593866> [hereinafter Coates, *M&A Contracts*]; John C. Coates IV, *Why Have M&A Contracts Grown? Evidence from Twenty Years of Deals* 1, 14–15 (Eur. Corp. Governance Inst., Working Paper No. 333, 2016), <https://papers.ssrn.com/abstract=2862019> [hereinafter Coates, *Why Have M&A*]; Robert Anderson & Jeffrey Manns, *The Inefficient Evolution of Merger Agreements*, 85 GEO. WASH. L. REV. 101, 132–33 (2017).

15. Coates, *M&A Contracts*, *supra* note 14, at 6, 8; Jennejohn, *supra* note 11, at 75–76.

16. Macher & Richman note in an interdisciplinary review of empirical contract scholarship that interaction effects between contract provisions are rarely studied. Jeffrey T. Macher & Barak D. Richman, *Transaction Cost Economics: An Assessment of Empirical Research in the Social Sciences*, 10 BUS. & POL. 1, 41 (2008). Hwang and Jennejohn, writing together and separately, provide early efforts to think systematically about interactions among provisions within complex agreements. See generally Cathy Hwang & Matthew Jennejohn, *The New Research on Contractual Complexity*, 14 CAP. MKTS. L.J. 381 (2019) [hereinafter Hwang & Jennejohn, *Contractual Complexity*]; Jennejohn, *supra* note 11;

Specifically, this study analyzes the standardization of a number of exemplary terms in a sample of twenty years of M&A agreements designed by Wilson Sonsini Goodrich & Rosati, an international law firm headquartered in San Francisco that advises many of the Bay Area's tech companies. The study employs natural language processing techniques and regression analysis to study whether those terms appear to respond differently to multiple potential sources of path dependency. The analysis unfolds in two steps.

First, the study analyzes the extent of standardization across the agreements in the hand-collected sample. This analysis shows that standardization is asymmetric across the contract terms included in the study. Provisions fall into three categories: (1) Those with a dominant common standard; (2) those with a few discrete competing standards; and (3) those that appear customized to each respective deal, rather than following a standard. In short, M&A agreements are internally diverse.

Second, the study asks whether those different patterns correlate with possible sources of path dependency. As noted above, those sources include: (1) the "structure" of the transaction—*i.e.*, whether it is a merger, an asset purchase, or a stock purchase; (2) the legal precedent governing the transaction—*i.e.*, Delaware, New York, California, or other states' law; and (3) the preferences of the relationship partner advising on the transaction. The results of this analysis suggest that deal structure is the most powerful source of path dependency, but it affects provisions within the agreements differently: Some provisions cluster around common standards according to the transaction's structure, but others are unaffected. Interestingly, evidence of attorney preferences affecting the level of standardization is surprisingly weak. Finally, parties' choice of law also has little statistically significant correlation with the extent of standardization for any of the provisions studied.

One way to understand the patterns observed is that deal attorneys engage in a form of "multihoming" to different contractual standards.<sup>17</sup> That is, they combine in a single agreement universal standard terms, terms standardized for a given deal structure, and customized terms designed for a specific deal. The meaning of terms is retained in the market

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Cathy Hwang & Matthew Jennejohn, *Deal Structure*, 113 NW. U. L. REV. 279 (2018) [hereinafter Hwang & Jennejohn, *Deal Structure*].

17. Multihoming to different technical standards is the topic of an extensive literature in information technology and is a growing subject of study in economics. See, e.g., Toker Doganoglu & Julian Wright, *Multihoming and Compatibility*, 24 INT'L J. INDUS. ORG. 45, 46 (2006); Jean J. Gabszewicz & Xavier Wauthy, *Two-Sided Markets and Price Competition with Multi-homing* (Ctr. for Operations Res. & Econometrics, Discussion Paper No. 30, 2004), <http://papers.ssrn.com/sol3/papers.cfm?abstract-id=975897>; Jo Reynaerts & Patrick Van Cayseele, *Complementary Platforms 2* (LICOS Ctr. for Institutions & Econ. Performance, Discussion Paper No. 186, 2007), <http://hdl.handle.net/10419/75019>; Jean-Charles Rochet & Jean Tirole, *Platform Competition in Two-Sided Markets*, 1 J. EUR. ECON. ASS'N 990 (2003).

as Stark argues—multihoming to different standards requires deal lawyers to regularly revisit the purposes underlying the provisions they are recombining from deal to deal.<sup>18</sup>

Those preliminary results call for taking scope economies seriously in our models of contractual innovation.<sup>19</sup> Whereas existing scholarship emphasizes scale economies and an assembly line-like organization of production, asymmetric standardization emphasizes deal lawyers' ability to recombine different technological platforms across a high volume of deals.<sup>20</sup> To capture this aspect of transactional lawyers' role, this Essay coins the term "transformation cost engineering"—the idea that effective deal design includes the minimization of not only immediate transaction costs but also the long-term costs of transforming practices over time and across a market. A foundation for including scope economies in our models of contractual innovation can be found in a line of strategy research on "ambidextrous" organizations, which are capable of pursuing both scale and scope economies simultaneously.<sup>21</sup>

This Essay proceeds as follows. First, I briefly discuss current research on contractual standardization and its inability to explain the mass customization of M&A agreements. Second, I present the results of the empirical analysis, which supplies tentative evidence that the standardization of certain agreement terms correlates differently with various potential sources of path dependency, suggesting that standardization is asymmetric. Finally, I discuss the possibility that corporate law firms involved in the design of M&A agreements are examples of "ambidextrous" organizations and outline next steps for future research in that regard.

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18. For readers familiar with the modularity literature, see CARLISS YOUNG BALDWIN & KIM B. CLARK, *DESIGN RULES: THE POWER OF MODULARITY* 139–40 (2000). Multihoming requires deal lawyers to regularly engage in architectural rather than infra-modular innovation. *Cf.* BALDWIN & CLARK, *supra*.

19. See generally Merritt B. Fox, *Promoting Innovation: The Law of Publicly Traded Corporations*, 5 *CAPITALISM & SOC'Y* 1, 14–16 (2010) (discussing economies of scope and how integration within a firm, or other types of relational contracts, are often superior to markets for the transfer of certain types of information).

20. Richman, *supra* note 5, at 79.

21. See Charles A. O'Reilly III & Michael L. Tushman, *Organizational Ambidexterity: Past, Present, and Future*, 27 *ACAD. MGMT. PERSP.* 324, 325 (2013) [hereinafter O'Reilly & Tushman, *Past, Present, and Future*] (explaining that ambidextrous organizations simultaneously explore and exploit); Charles A. O'Reilly III & Michael L. Tushman, *Organizational Ambidexterity in Action: How Managers Explore and Exploit*, 53 *CAL. MGMT. REV.* 5, 5–6, 8–9 (2011) [hereinafter O'Reilly & Tushman, *Organizational Ambidexterity in Action*]; Charles A. O'Reilly et al., *Organizational Ambidexterity: IBM and Emerging Business Opportunities*, 51 *CAL. MGMT. REV.* 75, 84 (2009).

## I. THE DESIGN OF COMPLEX CONTRACTUAL SYSTEMS

## A. Designing Customized and Standardized Governance Mechanisms

Conventional contract economics is rooted in the insight that markets do not operate as smoothly as general equilibrium models theorize.<sup>22</sup> The uncertain decision-making environments of modern markets often limit humans' ability to foresee future events, which makes determining and enforcing performance obligations difficult.<sup>23</sup> As Coase pointed out, transactions are costly, and the neoclassical assumption that markets naturally clear does not necessarily hold.<sup>24</sup> This has led to two great literatures: one on the theory of the firm, which understands the modern company as a solution to contractual incompleteness,<sup>25</sup> and one on contract design, which explores how parties can use contractual governance mechanisms to mitigate the effects of incompleteness to the extent that market exchange is efficient.<sup>26</sup>

Most research on contract design makes two fundamental simplifying assumptions, which are useful for rendering contracting problems more tractable for systematic study. First, it is commonly assumed that agreements are fully customized, and therefore the terms of a contract are direct reflections of the parties' preferences, capacity to foresee future contingencies, risk tolerances, and bargaining positions. The potential for path dependencies is afforded little place in the standard families of models. Second, most research abstracts away from complexity, so that governance mechanisms are often studied in isolation. In a certain sense, complexity plays an important role in contract economics, but it is largely limited to environmental complexity—*i.e.*, the extent to which complicated decision landscapes prevent parties from specifying obligations *ex ante*.<sup>27</sup> Interactions between collections of terms in complex agreements are often overlooked.<sup>28</sup>

Recent legal scholarship has added an important dimension to the contract design literature by relaxing that first assumption. Beginning with

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22. See Joseph E. Stiglitz, *Where Modern Macroeconomics Went Wrong*, 34 OXFORD REV. ECON. POL'Y 70, 70–71 (2018).

23. Herbert A. Simon, *Theories of Decision-Making in Economics and Behavioral Science*, 49 AM. ECON. REV. 253, 256 (1959).

24. R. H. Coase, *The Nature of the Firm*, 4 ECONOMICA 386, 387 (1937).

25. See Oliver Hart, *Hold-up, Asset Ownership, and Reference Points*, 124 Q.J. ECON. 267, 290 (2009); OLIVER E. WILLIAMSON, *THE MECHANISMS OF GOVERNANCE* 98, 178 (1996).

26. *THE ECONOMICS OF CONTRACTS: THEORIES AND APPLICATIONS* (Eric Brousseau & Jean-Michel Glachant eds., 2012).

27. Ilya Segal, *Complexity and Renegotiation: A Foundation for Incomplete Contracts*, 66 REV. ECON. STUD. 57, 57–58 (1999).

28. See Macher & Richman *supra* note 16, at 41–43.

pioneering work by Goetz and Scott, Klausner, and Kahan and Klausner, a rich literature has grown exploring the standardization of governance mechanisms across transactions.<sup>29</sup> This work emphasizes that attorneys' pursuit of scale economies can affect the choice of governance mechanisms, separate from bargaining dynamics. As markets grow thicker and the costs of negotiating and drafting contracts increase, transaction designers may economize on production costs by reusing contract language from one deal to the next. At least, that strategy is available to address low-uncertainty exchange hazards, which recur frequently enough for attorneys to gravitate toward a standardized governance response.<sup>30</sup> Producing contractual governance mechanisms at scale has its obvious benefits: Use of a widely accepted standard allows parties to reduce *ex ante* negotiating costs and *ex post* enforcement costs, and it may serve as a signaling mechanism within the market.<sup>31</sup> But it also comes with an important cost: the increasing returns to scale that contractual standards enjoy can lead to lock-in, as parties' costs of switching from the standard rise, which in turn may result in parties using provisions that are in fact inefficient with respect to the details of their particular deal.<sup>32</sup> In that respect, the boilerplate literature problematizes contractual innovation, whereas conventional contract economics assumes innovation is readily achievable.

Just why parties' switching costs may increase as contractual language becomes more standardized has been a matter of debate. A number of explanations focus, as one would expect, on the incentives transaction designers face. From this perspective, lock-in is rational because boilerplate terms may reduce learning costs for transaction designers, who can come to rely on contractual language that is worked pure through the standardization process, or, relatedly, because switching from standardized terms may be costly if other market actors will not be able to accurately price a formulation that deviates from the standard.<sup>33</sup> Another group of studies points to agency cost explanations: that standardization is the result of inefficient organizational routines at large

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29. See generally Goetz & Scott, *supra* note 4, at 261–64; Klausner, *supra* note 6, at 851–52; Marcel Kahan & Michael Klausner, *Standardization and Innovation in Corporate Contracting (Or “The Economics of Boilerplate”)*, 83 VA. L. REV. 713, 715–16 (1997) [hereinafter Kahan & Klausner, *Standardization*]; Marcel Kahan & Michael Klausner, *Path Dependence in Corporate Contracting: Increasing Returns, Herd Behavior and Cognitive Biases*, 74 WASH. U. L.Q. 347, 347–49 (1996) [hereinafter Kahan & Klausner, *Path Dependence*].

30. Ronald J. Gilson et al., *Contract and Innovation: The Limited Role of Generalist Courts in the Evolution of Novel Contractual Forms*, 88 N.Y.U. L. REV. 170, 200–01 (2013).

31. See Kahan & Klausner, *Path Dependence*, *supra* note 29, at 348.

32. See *id.* at 352–53.

33. See GULATI & SCOTT, *supra* note 3, at 6.



law firms, attorneys free-riding on others' work, or rent-seeking by lawyers insulated from rigorous competition.<sup>34</sup>

Court interpretation of contract terms can also contribute to their standardization. Courts can provide definitive interpretations, which confirm the market's understanding of a standardized contract term.<sup>35</sup> In a broad study of a variety of transaction types, including M&A agreements, Eisenberg and Miller find evidence that contract terms standardize around legal precedent in certain circumstances.<sup>36</sup> Conversely, if a court interpretation of a term conflicts with the market's conventional wisdom, then an overhang may result, where the contracts in parties' portfolios now have provisions that mean something different than what parties originally thought.<sup>37</sup> Where courts' interpretations conflict with market understandings, available evidence suggests that court intervention can spur the recalibration of a contractual standard.<sup>38</sup>

### B. The Puzzle of Mass Customization

Current theory struggles to explain the mass customization of M&A agreements. Given the maturity and thickness of the market for corporate control, which in the United States has experienced thousands of transactions each year for decades, one would expect a significant amount of contractual standardization as deal lawyers converge on best practices. Yet, M&A agreements occupy a hybrid ground of "constrained variation,"<sup>39</sup> which some have taken for grounds that greater efficiencies can be achieved through further standardization of M&A contracts.<sup>40</sup>

Existing theory struggles to explain the material amount of customization observed in M&A agreements because it overlooks "infra-transactional complexity."<sup>41</sup> Contractual complexity raises the possibility of endogenous sources of variation in contract design: First, that terms may be interdependent, so that a change in one term affects another; and, second, that expanding an agreement's design space increases the

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34. See Anderson & Manns, *supra* note 14, at 104–06; Gillian K. Hadfield, *Legal Barriers to Innovation: The Growing Economic Cost of Professional Control over Corporate Legal Markets*, 60 STAN. L. REV. 1689, 1694–95 (2008).

35. See GULATI & SCOTT, *supra* note 3, at 2–3; Eric A. Posner, *A Theory of Contract Law Under Conditions of Radical Judicial Error*, 94 NW. U. L. REV. 749, 752–53, 767, 771–72 (2000).

36. Theodore Eisenberg & Geoffrey P. Miller, *Flight to New York: An Empirical Study of Choice of Law and Choice of Forum Clauses in Publicly-Held Companies' Contracts*, 30 CARDOZO L. REV. 1475, 1476, 1479, 1488–90 (2008).

37. Choi et al., *Black Hole*, *supra* note 7, at 3–9.

38. *Id.* at 58–59, 69–71.

39. Coates, *M&A Contracts*, *supra* note 14, at 6–7.

40. Anderson & Manns, *supra* note 14, at 105–06.

41. Jennejohn, *supra* note 11, at 73 (emphasis omitted).

likelihood that more than one of the multiple theories of how standardized terms become locked-in, introduced above, affects a portion of the contract.<sup>42</sup> Few studies analyze either how provisions interact or how different incentives to standardize may intersect with one another as they shape parts of an agreement. Presumably, multiple incentives to standardize may reinforce one another, raising impediments to contract innovation even further; but it seems equally possible that incentives to standardize may not work in tandem. This Essay takes a step toward filling that gap in the literature.

## II. ASYMMETRIC STANDARDIZATION IN M&A AGREEMENTS

This section presents the results of a preliminary empirical study that takes a step toward addressing the complexity gap in the literature discussed above. The study attempts to accommodate greater complexity with respect to both the sources of path dependency affecting a transaction and the collections of governance mechanisms combined in modern contracts. It does so by focusing upon three potential sources of path dependency and examining whether there is evidence of any of them correlating with the level of standardization of a variety of exemplary terms in M&A agreements. To measure the standardization of contract provisions, the study follows the methods used in Rauterberg and Talley's research on corporate opportunity waivers by leveraging vector-space natural language processing techniques, although the unsupervised approach here differs from their supervised method with respect to the specific research question being addressed and in certain additional technical aspects.<sup>43</sup> The study then specifies an ordinary least squares model to analyze correlations between the level of standardization of various terms and the potential sources of path dependency.

### *A. Research Design and Hypotheses*

The study's overarching research question asks whether (1) different incentives to standardize contractual language have (2) differing effects on the design of various provisions in M&A agreements. Given the abundance of theories of why provisions become locked-in, and given the large number of terms found in a modern M&A agreement, some choices must be made on how to narrow that question sufficiently to make it tractable and yet not obscure the very complexity it is meant to study. This study therefore focuses on three factors shaping the standardization of

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42. See *id.* at 74–75.

43. Gabriel Rauterberg & Eric Talley, *Contracting out of the Fiduciary Duty of Loyalty: An Empirical Analysis of Corporate Opportunity Waivers*, 117 COLUM. L. REV. 1075, 1078–79 (2017).

contract terms: deal structure, legal precedent, and attorney preference. Controls for deal value and time variance are also included. The study then examines correlations between those three factors and seven types of provisions frequently found in M&A agreements.

Specifically, the following hypotheses are tested:

*H1* - Contract provisions are less standardized *across* agreements, but are more standardized *within* deal types (*i.e.*, a merger, an asset deal, or a stock purchase).

*H2* - Contract provisions are more standardized by the choice of governing law.

*H3* - Contract provisions are more standardized by the relationship partner advising on the deal.

### *B. Data and Variables*

The sample of M&A agreements analyzed here were all negotiated by Wilson Sonsini, as buyer's counsel, from 1996 to 2016. The sample includes agreements of three types: asset purchase agreements, merger agreements, and stock purchase agreements. All agreements are public documents filed with the SEC and can be found on the SEC's EDGAR database.<sup>44</sup>

Two broad categories of data were collected with respect to that sample. First, ten key provisions were extracted from the sampled agreements in order to study the extent of their standardization. Those provisions serve as the dependent variables in this study. Second, certain characteristics of the agreements and the parties to them—such as the deal type, each contract's choice of law, the attorneys advising on the transaction, the date, and the deal value—were hand collected. These characteristics comprise the right-hand side variables of the study.

#### 1. DELINEATING THE DEPENDENT VARIABLES

Testing the hypotheses above requires the collection of a range of provisions from each sampled agreement. The following terms were selected for study: the target company's representations with respect to its corporate authority, current litigation, employee matters, intellectual property, and taxes; interim operating covenants; "no-shop" provisions; indemnification provisions; severability provisions; and the definition of "material adverse effect." Those provisions were selected because they frequently appear in the sampled agreements. A background issue affecting the research design of any study undertaking a textual analysis of M&A agreements is that the incidence of terms found in the contracts

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44. The agreements sampled here were identified using Bloomberg Law's EDGAR search functionality.

is not consistent across agreements. Some provision types are routinely included, while others are not. This study focuses upon those provisions that tend to be included more frequently, which may bias the sample towards finding more evidence of standardization because routine use is typically a necessary (though not sufficient) condition to standardization. An important task for subsequent research is to collect samples of sufficient size to allow analysis of less commonly used provisions.

Testing the hypotheses set forth above also requires a method for comparing the extracted provisions to one another in order to measure the extent of standardization. Of course, deal lawyers do this all the time when they run a blackline, which identifies how different Provision A<sub>1</sub> in Agreement X<sub>1</sub> is from Provision A<sub>2</sub> in Agreement X<sub>2</sub>. Comparing text at scale introduces some technical complications, however. Approaches for comparing large samples of text strings fall roughly into two categories—character-based string similarity functions and vector-space string similarity functions—discussed below.<sup>45</sup> For the reasons that follow, this study employs a vector-space approach.

Character-based similarity functions<sup>46</sup> view strings of text as contiguous sequences differing at the level of individual characters.<sup>47</sup> Perhaps the most well-known character-based method for testing the similarity of different text strings is edit, or Levenshtein, distance, which calculates the difference between two strings as the minimum number of character changes, insertions, or deletions that would be required to render one string identical to another.<sup>48</sup> So, for example, the edit distance between the string, “the cat is black,” and the string, “the hat is black,” is 1, because changing one character—the “c” in “cat” to an “h”—transforms the first string into the second. Edit distance typically relies upon word sequencing remaining stable between strings and is therefore often applied to identify typographical errors or abbreviations in strings of text.<sup>49</sup> Edit distance also becomes “computationally expensive” and tends to be inaccurate as the size of text strings increases.<sup>50</sup>

A vector-space approach differs in that it does not view strings as ordered sequences of words, but rather as unordered collections of

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45. Mikhail Bilenko & Raymond J. Mooney, *Adaptive Duplicate Detection Using Learnable String Similarity Measures*, 9 ACM SIGKDD INT’L CONF. ON KNOWLEDGE DISC. & DATA MINING PROC. 39 (2003).

46. For an application of character-based similarity functions, see Anderson & Manns, *supra* note 14, at 107, 113–14.

47. Bilenko & Mooney, *supra* note 45, at 40.

48. See generally V. I. Levenshtein, *Binary Codes Capable of Correcting Deletions, Insertions, and Reversals*, 10 SOVIET PHYSICS–DOKLADY 707 (1966).

49. Bilenko & Mooney, *supra* note 45, at 40.

50. *Id.*

“tokens”—or “bags of words” in the vernacular of the field.<sup>51</sup> In a corpus with  $n$  tokens, each string is then represented as a vector of real numbers with  $n$ -dimensions, where every non-zero component indicates a token present in the given string.<sup>52</sup> Tokens represented in the vector are commonly weighted according to their uniqueness by deleting a list of common “stop-words” or applying a “term frequency-inverse document frequency” measure.<sup>53</sup> The upshot of transforming written text strings into numerical vectors is that similarity between strings can be measured by reference to the comparative positions of the vectors, using measures such as cosine or Euclidean distance, which has proven to be a robust approach for analyzing similarity in a wide range of corpora.<sup>54</sup>

A vector-space approach to analyzing the differences between provisions in merger agreements appears to be the most appropriate for two reasons. First, it is not uncommon for words and phrases in different instances of the same provision type to be arranged in unique orders. To the human reader, it is readily apparent that, although the words are ordered somewhat differently, the provisions are quite similar. A character-based similarity measure such as edit distance, however, may incorrectly compare such strings, if the different word sequences are read as qualitative differences. Second, comparing merger agreements requires a method that can effectively analyze both relatively short strings—such as a severability provision—and fairly long strings—such as material adverse effect definition with multiple provisos. A string similarity function focused upon individual characters may struggle to accurately assess the latter type of provision.

Pursuing a vector-space approach here involved the following process:

- Individual text files for the provision types of interest were hand-collected from the sampled agreements and separated into respective corpora;<sup>55</sup>
- Each corpus file was then cleaned by:
  - o Removing punctuation,

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51. See generally GERARD SALTON & MICHAEL J. MCGILL, INTRODUCTION TO MODERN INFORMATION RETRIEVAL (1983). For an excellent example of a vector-space approach applied in the legal context, see generally Rauterberg & Talley’s analysis of corporate opportunity waivers. Rauterberg & Talley, *supra* note 43. Note that the unsupervised approach pursued here draws upon the same fundamental concepts but is different in a number of technical details to Rauterberg & Talley’s supervised method.

52. Bilenko & Mooney, *supra* note 45, at 40.

53. Gerard Salton & Christopher Buckley, *Term-Weighting Approaches in Automatic Text Retrieval*, 24 INFO. PROCESSING & MGMT. 513, 516 (1988).

54. Bilenko & Mooney, *supra* note 45, at 39.

55. Hand collection involved a two-step process in which (1) two teams of research assistants extracted the same targeted data, and their results were compared for inconsistencies; and (2) those results were then subjected to an independent quality control process, where initial coding decisions were compared to the source materials.

- Removing numbers and dates, and
- Eliminating resulting excess spaces in the text resulting from those first two steps;
- Each corpus was converted into tokens, the corpus was organized into a matrix, and then tokens were weighted for novelty through a term frequency-inverse document frequency transformation; and
- The extent of standardization within each corpus was estimated by calculating the cosine similarity for the documents in each corpus and by analyzing clustering using a k-medoids approach.<sup>56</sup>

## 2. EXPLANATORY AND CONTROL VARIABLES

Data with respect to the three explanatory variables were also hand-collected from the publicly available agreements. Deal type (H1) was coded for each contract by reference to the agreements' titles and recitals. The choice of law selection (H2) in each agreement was also hand collected. The attorneys advising on the transaction (H3) were hand-collected from Bloomberg and verified against each merger agreement's notice provisions. Control variables for the date of the agreement's execution and the deal value were also hand-collected from the agreements and from meta-data reported by Bloomberg.

### *C. Methods*

Because the dependent variables are continuous, this study specifies an ordinary least squares model to analyze the correlations between the provisions of interest and a number of potential determinants of standardization. As an observational study, the analysis here cannot identify causal relationships. However, statistically significant correlations identified through this approach can frame our debate over what is driving contractual standardization, and they can set the stage for subsequent studies with more precise identification strategies.

### *D. Results*

#### 1. STANDARDIZATION PATTERNS IN THE SAMPLE

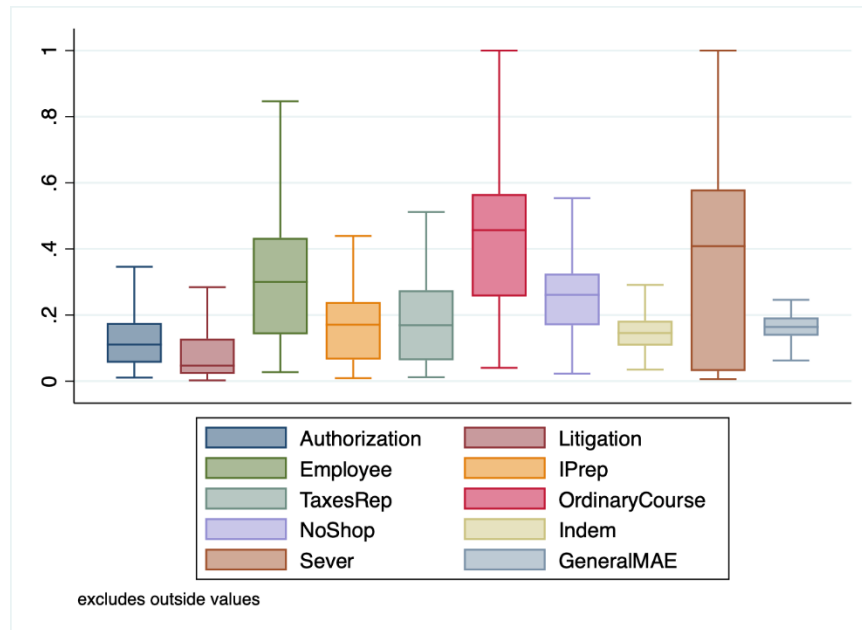
Analysis of the provisions extracted from the sampled agreements illustrates that standardization is asymmetric across contract terms. Consider, for instance, the results of the cosine similarity analysis. Figure

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56. LEONARD KAUFMANN & PETER J. ROUSSEEUW, FINDING GROUPS IN DATA: AN INTRODUCTION TO CLUSTER ANALYSIS (2005).

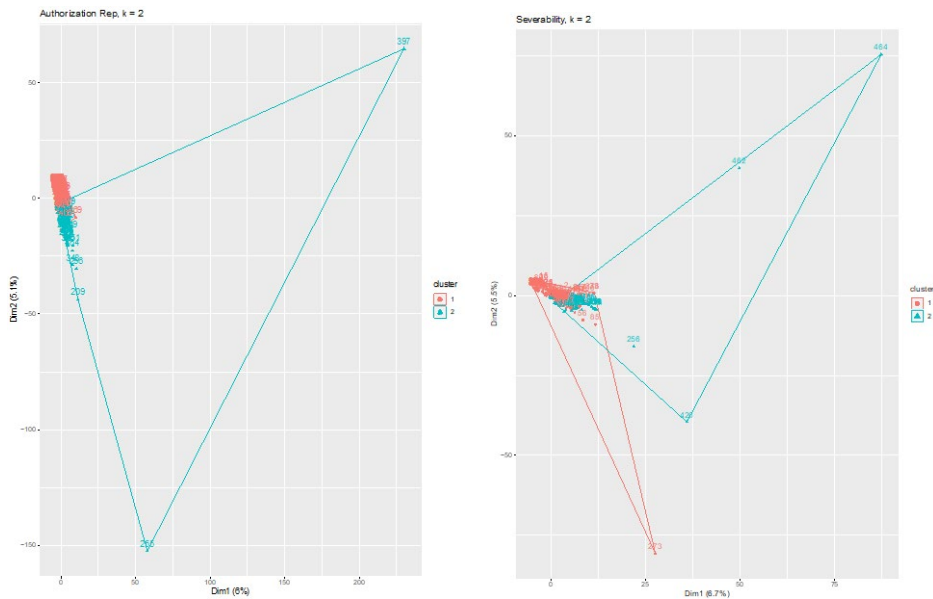
1 below depicts box plots for all extracted provision types, the average cosine similarity of the documents in each provision type plotted along the Y-axis on a scale of 0 (less similar) to 1 (more similar). Employee representations conduct of business covenants, and severability provisions appear more standardized across all agreements. All other provisions appear less standardized.

**Figure 1: Results of Cosine Similarity Analysis Across All Provision Types**



As mentioned before, the cosine similarity analysis cannot tell us much about the middle ground between complete standardization and total customization—*i.e.*, where two or more standards compete with one another. To achieve that level of visibility, k-medoids clustering is analyzed, and selected results are depicted graphically below. For some provision types, the documents are very similar to one another so that a single cluster is tight, and the emergence of discrete different clusters is minimal. See, for instance, the results for authorization representations and severability provisions in Figure 2a and 2b below. Both of those sub-figures show dense clustering of the vast majority of documents with a few distant outlier provisions, suggesting that these documents are highly standardized.

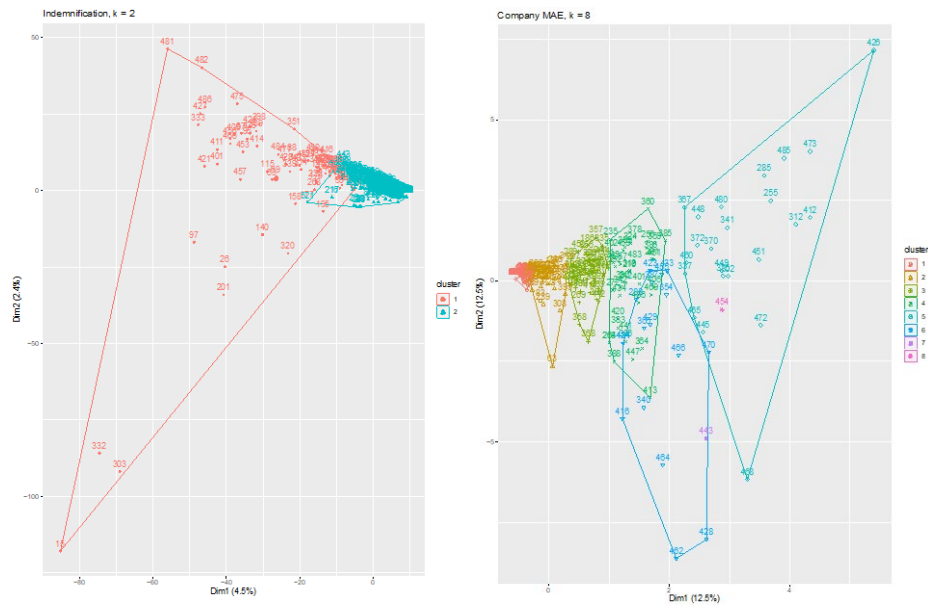
**Figure 2a and 2b: K-Medoids of Authorization Representations and Severability Provisions**



For other provisions, documents are more dispersed, but identifying discrete clusters is possible. Consider, for instance, the results for the sampled indemnification provisions in figure 3a below. In that case, there is one dense cluster of documents, and then a few dozen documents with more dispersed results. Interestingly, though not surprisingly, the documents with the more dispersed clustering are the more customized indemnification provisions in asset purchase agreements. Figure 3b depicts the clustering results for MAE definitions, and here too we see several discrete clusters of documents, suggesting some patterns of similarity among documents, though nowhere near complete standardization.



**Figure 3a and 3b: K-Medoids of Indemnification Provisions and Material Adverse Effect Definitions**



Both the results of the cosine similarity and the k-medoids analysis suggest that standardization is asymmetric across provision types. Some provisions are highly standardized, such as authorization representations, ordinary course operating covenants, or severability provisions. Others, such as no-shop provisions, indemnification provisions, or MAE definitions, appear to have multiple standards or are entirely customized.

## 2. PREDICTING WHETHER TERMS WILL BE CUSTOMIZED OR STANDARDIZED

An important question is whether we can identify what may cause (or prevent) the patterns of similarity reported above. This part of the Essay takes a preliminary step toward identifying causal relationships by reporting the results of correlations between the extent of a sampled provisions level of standardization and certain potential sources of conformity. These results cannot, of course, actually provide us with the answer we are seeking: Whether a certain phenomenon causes standardization in certain contract provisions. A more precise identification strategy, which will likely combine both quantitative and qualitative methods, is required for that. The results here, however, can provide suggestive evidence of causal relationships and, in that respect, inform subsequent research.

Correlations between the five right-hand side variables—deal type, choice of governing law, relationship partner, deal value, and document date—and both methods for measuring standardization—cosine similarity and k-medoids clustering—were analyzed. To economize on space, results for models including the relationship partner variable are unreported but discussed here, and only the results where the cosine similarity of the sampled provisions serves as the dependent variable are reported here. Results of the k-medoids analysis are unreported but discussed.

The results of the regression analyses, reported below in Table 1 and in unreported results, provide evidence supporting H1 but minimal evidence supporting H2 and H3. Consider, first, the results for predictions of term standardization as measured by cosine similarity. A key finding is that standardization patterns for some terms correlate significantly with different deal structures. Litigation representations, employee representations, intellectual property representations, and indemnifications provisions are more similar when they are from asset purchase agreements. Choice of law, however, does not correlate significantly with the level of standardization. Furthermore, in unreported results, patterns of standardization in the dependent variables do not correlate significantly with the identity of the relationship partners advising on the transactions. It is also worth noting that the passage of time, one of the control variables, correlates significantly with the level of similarity for every provision type in the dataset, although the magnitude of the effect is very small. This provides modest support for the idea that lawyers are copying language from deals done in the recent past.

The unreported results analyzing the similarity of provisions using k-medoids as the measure of standardization largely corroborate the results analyzing the cosine similarity. Again, certain clustering patterns correlate significantly with the asset purchase deal type. The k-medoids analysis does differ a bit from the cosine similarity analysis in that it finds evidence that one provision type, intellectual property representations, correlate significantly with a certain choice of law. Evidence of attorney effects is minimal, with the exception of a cluster of severability provisions in the dataset that correlate significantly with one particular relationship partner at Wilson Sonsini. Overall, the k-medoids results are consistent with the results of the cosine similarity analysis.

It is also worth noting that, of the controls, deal value nearly never has a significant correlation with the extent of standardization. That is, we do not find evidence of, say, large deals getting unusually high levels of customization and smaller deals subject to “cookie-cutter” drafting.

**Table 1: OLS Regression Results of Standardization of Ten Provision Types,  
Measured by Cosine Similarity**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Authorization	Litigation	Employee	IP Rep	Taxes Rep	Ordinary Course	No Shop	Indemnification	Severability	MAE
Asset Purchase	0.0397 (1.65)	0.0614** (2.63)	0.0848** (2.85)	0.0765*** (3.50)	0.0394 (1.75)	0.0593 (1.73)	0.0257 (0.83)	0.0533** (2.69)	0.0545 (1.28)	0.0495 (1.20)
Stock Purchase	-0.0181 (-0.72)	-0.00930 (-0.39)	-0.0108 (-0.34)	-0.00961 (-0.42)	-0.00236 (-0.10)	-0.00582 (-0.16)	-0.00589 (-0.17)	-0.0265 (-1.21)	-0.0375 (-0.83)	-0.00431 (-0.10)
Delaware	-0.0545 (-1.61)	-0.0187 (-0.55)	0.00150 (0.03)	0.00472 (0.15)	0.00181 (0.05)	-0.00441 (-0.10)	-0.0338 (-0.77)	0.00452 (0.16)	-0.0962 (-1.59)	0.0150 (0.30)
New York	-0.0469 (-1.10)	-0.0360 (-0.85)	0.00458 (0.09)	-0.00913 (-0.23)	0.0124 (0.29)	-0.00136 (-0.02)	-0.105 (-1.86)	-0.0291 (-0.80)	-0.0821 (-1.08)	-0.0394 (-0.66)
California	-0.0547 (-1.55)	-0.0171 (-0.49)	-0.0290 (-0.64)	-0.00596 (-0.18)	0.0179 (0.50)	-0.0141 (-0.29)	-0.00692 (-0.15)	0.00780 (0.27)	-0.0901 (-1.43)	0.0409 (0.78)
Deal Value	1.40e-11 (1.37)	2.60e-12 (0.53)	-3.72e-12 (-0.62)	1.45e-12 (0.31)	1.31e-12 (0.28)	-1.06e-11 (-0.73)	-1.56e-12 (-0.11)	7.96e-12* (2.01)	-1.55e-12 (-0.17)	2.80e-12 (0.54)
Doc Date	0.00000801* (2.03)	0.0000244*** (6.11)	0.0000126* (2.48)	0.0000162*** (4.30)	0.0000245*** (6.39)	0.0000127* (2.19)	0.0000378*** (6.82)	0.00000699* (2.02)	0.0000362*** (5.08)	0.0000299*** (4.31)
Constant	0.0564 (0.77)	-0.294*** (-3.95)	0.0980 (1.02)	-0.0970 (-1.38)	-0.225** (-3.07)	0.226* (2.11)	-0.316** (-3.05)	0.0325 (0.51)	-0.182 (-1.37)	-0.340** (-2.75)
Observations	313	318	295	316	317	265	255	278	324	113
R-squared	0.04	0.14	0.07	0.11	0.13	0.01	0.18	0.07	0.1	0.001

*t* statistics in parentheses

\*  $p < 0.05$     \*\*  $p < 0.01$     \*\*\*  $p < 0.001$

## III. CONTRACT DESIGN AND THE AMBIDEXTROUS LAW FIRM

The analysis above outlines a preliminary case that complex contracts, such as the M&A agreements studied here, experience asymmetric standardization. Contract terms from deal to deal are not wholly unrelated to one another, but they are also not designed in lock-step. Rather, they are subject to different incentives to standardize of varying intensity. Distinct patterns of continuity and change are observable in the agreements—some terms appear to gravitate towards one standard, and other terms towards another. In a sense, transaction designers are “multi-homing” to more than one standard, in that their product—the M&A agreement—is compatible with a number of different standards. Path dependencies work subtly on the design of these complex contracts, and their persistent presence arguably creates the tension that prevents the meaning of M&A agreement terms from ossifying.

This account of contract design, which emphasizes the importance of scope economies, elevates the role of the deal attorney and, to the extent the boilerplate literature has questioned the value added by transactional lawyering, perhaps returns her to the prominence implied in Gilson’s original conception of the “transaction cost engineer.”<sup>57</sup> In doing so, however, it raises the follow-on question of how corporate lawyers are able to recombine contractual governance systems across deals with such alacrity. That is, the combination of economies of both scale and scope in the design of M&A transactions places law firms’ internal organizational structures and routines at the center of our understanding of contract innovation.

Strategy theorists have developed the concept of “organizational ambidexterity” in an effort to solve the riddle of how some mature companies are able to recombine assets in ways that sustain competitive advantage over time.<sup>58</sup> How companies achieve such recombination is puzzling because the capacities for effective *exploitation* of assets—*i.e.*, resolving uncertainties, reducing variances, and increasing productivity—are different from those necessary for *exploration*, which requires capabilities of search, exploring ambiguities, and embracing variation.<sup>59</sup> Ambidexterity refers to those organizations that can deploy both suites of capabilities, even simultaneously.<sup>60</sup>

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57. Gilson, *supra* note 2, at 243–44.

58. Sebastian Raisch et al., *Organizational Ambidexterity: Balancing Exploitation and Exploration for Sustained Performance*, 20 *ORG. SCI.* 685 (2009); O’Reilly & Tushman, *Past, Present, and Future*, *supra* note 21, at 325.

59. James G. March, *Exploration and Exploitation in Organizational Learning*, 2 *ORG. SCI.* 71, 71 (1991).

60. Raisch et al., *supra* note 58, at 685–86; O’Reilly & Tushman, *Past, Present, and Future*, *supra* note 21, at 328; O’Reilly et al., *supra* note 21, at 84.

Interestingly, organizational ambidexterity in corporate law firms may be somewhat unique when compared to standard models of corporate organization. Strategy research has found that senior management teams, who can appropriately direct resources toward exploitative and explorative efforts, are the key to effective organizational ambidexterity.<sup>61</sup> The organization of transaction design in law firms is intriguing in this respect because it is a highly collaborative effort that is often undertaken without the sort of managerial hierarchy commonly employed in a traditional company. The design of an M&A agreement typically involves collaboration between at least two organizations—the client’s in-house legal team and external counsel. Furthermore, particularly in cross-border deals, it is not uncommon for multiple law firms to act as external counsel, increasing the number of organizations collaborating on the transaction. The partnership structure within major law firms, particularly those that follow (more or less) lock-step compensation that encourages task force staffing on matters, also encourages the recombination of teams over time,<sup>62</sup> which undercuts a hierarchical management approach. A project for future research is unpacking deal team routines in order to identify how ambidexterity is achieved in the legal industry without strong hierarchy.

#### CONCLUSION

This Essay addresses the question of why transactions in some thick markets are not completely standardized and, as such, do not slip into a contractual “black hole.” In the context of M&A transactions, it explores the possibility of a structural explanation: that the complexity of M&A agreements creates space for multiple sources of path dependency to shape parts of the contract asymmetrically, and this crisscrossing path dependencies undercut incentives to completely standardize the contracts. Using novel natural language processing techniques and simple regression analyses, it finds suggestive evidence that exemplary portions of M&A agreements correlate differently with three sources of path dependency. Standardization in M&A agreements does indeed appear asymmetric. That finding’s primary theoretical implication is to underscore the need for including economies of scope, not only economies of scale, in theories of contractual innovation. The importance of scope economies also brings organizational routines to the fore, and this Essay calls for further investigation of how corporate law firms effectively combine economies of scope and scale in the design of complex transactions.

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61. O’Reilly & Tushman, *Organizational Ambidexterity in Action*, *supra* note 21, at 6, 19–20.

62. Jennejohn, *supra* note 11, at 121–22.