Varieties *in* Capitalism, Varieties *of* Association: Collaborative Learning in American Industry, 1900 to 1925

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Between 1900 and 1925, the American economy witnessed a remarkably successful effort to upgrade competition through associations. Unlike the prevailing interpretation of American industrialization, in which associations fell prey to antitrust and collective action problems, we find many associations that reinvented themselves from cartels to developmental associations*. This transition marked two previously unrecognized varieties in economic institutions. In the first, associations joined markets and corporate hierarchies to create variety in American capitalism. In the second, associations used deliberation, cost accounting, and benchmarking to enhance productivity and create varieties of collective governance. This article explains the origins of developmental associations, outlines their principles, traces their implementation in the commercial printing industry, and surveys their distribution and performance effects across 344 industries. Based on these findings, we revise conventional institutionalist assumptions about order and agency to make room for institutional diversity and actors' capacities for reflexivity and learning.*

Keywords: *associations; economic governance; reflexivity; learning; benchmarking; institutionalism*

Between 1900 and 1925, the American economy witnessed a remarkably successful effort to restructure and upgrade competition through associations. This effort began in craft and specialty sectors. But it quickly captured the imagination

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of a broader coalition of businesses, professionals, and policy makers, who carried this project into national arenas and into batch and continuous process industries. Furthermore, in reviving associations, institution builders surpassed late-nineteenth-century cartels to create something new. These were collaborative learning systems, which used deliberation, cost accounting, and benchmarking to shift competition from volume and cutthroat pricing to innovation and improvement.

In this article, we analyze the rise, spread, and effects of these collaborative learning associations. Empirically, we discover new forms of association, and we find them where conventional accounts would least expect—in a hostile institutional setting, in industries with many firms and diverse interests, and even in continuous process sectors. Such findings represent important new anomalies for uniform institutional images of national economies and American industrial development.[1] Moreover, in explaining these anomalies, we revise both conventional images of institutional order and economic agency. Like Thelen, Streeck, Crouch, and Farell, and Orren and Skowronek, we add to the growing unease with "excessive determinism" and the inability of a first generation of neo-institutionalist theories to cope with novelty, diversity, and change.[2] Our analysis affirms the heterogeneous and layered character of institutions, and the ongoing availability of alternative or abandoned paths. And building on Zeitlin, Sabel, Stark, and others, we see the relationship between institutions and behavior as inescapably reflexive—grounded, that is, in experimentation, deliberation, and learning, rather than calculation within constraints or enactment of taken-for-granted understandings.[3]

In conventional institutionalist accounts, American economic development from 1870 through 1970 is first and foremost the story of the rise of the large, mass production corporation.[4] Here, associations are a lost alternative, proving virtually impossible to sustain.[5] First, they faced insurmountable barriers to collective action, monitoring, and enforcement. In mass production sectors, high fixed costs yielded "high powered incentives" for free riding, defection, and cheating; in specialty sectors, firms were too numerous, dispersed, and heterogeneous to cooperate.[6] To complicate matters, the state not only refused to enforce interfirm compacts, but also made them positively unlawful through antitrust. As a result, American business abandoned "loose combinations" for consolidation in the great merger wave at the turn of the century.[7]

To be sure, associations reemerged during World War I, the 1920s, and the early New Deal, experimenting with information sharing and third party enforcement. But like premerger cartels, they are cast as efforts to solve overcapacity

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problems associated with mass production, legitimate only temporarily as expedients for managing war, depression, and decline in stagnant sectors. Here, too, associations fell prey to opportunism and antitrust. And in the exceptional cases they succeeded as governance forms, such as in infrastructure, associations are commonly seen as monopolies, which undermined incentives for efficiency, innovation, and price reduction.[8]

While accurate for some sectors, this account mistakes the part for the whole: it neglects the large portions of American industry that fell outside the orbit of the corporate consolidations engineered by finance capital at the turn of the twentieth century. Drawing upon extensive archival research and a data set of 344 industries, we generate two findings about diversity in American industrialization. We show first that firms, professionals, and policy makers instituted a viable associational alternative to mass production in a broad array of industries. As we know, specialty and batch sectors experienced repeated failures to enforce cartels. But failure did not always result in open markets. Instead, a number of sectors tried something different: Printers, bridge builders, and foundrymen, among others, turned from cooperative price controls to collaborative efforts to enhance productivity. They used associations to channel rivalry from cutthroat pricing to product quality, improvement, and nonvolume cost and price reductions. And as associations in batch and continuous processing sectors learned from craft innovations, American business forged a new institutional path, producing previously unrecognized *variety in American capitalism*. By 1925, 30 percent of American manufacturing industries had participated in crafting this path, with 13 percent of American industries institutionalizing its core forms in whole or in part.

Nor were these associations as conventionally understood. To the contrary, industries and reformers designed associations to elevate, rather than suppress, competition through deliberation, benchmarking, and learning. In doing so, they created qualitatively new *varieties of governance* within associationalism. Unlike corporatist systems, market stabilization schemes, or rent-seeking cartels, these associations rejected redistribution and age-old efforts to suppress competition. Moreover, when they turned to information sharing, it was not merely to coordinate prices or production via tacit pricing cues, as applied game theorists like Bowman, Culpepper, and Gordon suggest.[9] Rather, when printers and other sectors crafted accounting systems, benchmarking schemes, and deliberative forums, they abandoned monitoring for enforcement or cooperative pricing for what Sabel calls "learning by monitoring" and Stark and Bruszt refer to as "deliberative association."[10] And in making that transition, they retheorized and redeployed associations from cartels to what we call *developmental associations*. By this we mean governance structures that enhanced members' capacities to experiment, learn, and improve productivity and product quality. Developmental associations had three unique features. They crafted standard accounting systems, which provided firms with tools to enhance productivity in ways that

avoided volume and cutthroat pricing. They calculated and disseminated industry cost averages, or benchmarks, providing firms with a comparative basis for deliberation, experimentation, and collaborative learning. And by organizing benchmarking collectively, developmental associations provided firms with nonprice incentives to improve productivity and outperform progressively more demanding industry averages. By 1925, at least 25 percent of all American trade associations had participated in crafting this alternative, with up to half that number instituting the logic of developmental association in whole or in part.

We find it difficult to make sense of these varieties in American capitalism and varieties of association with conventional institutionalist assumptions about order and agency. Developmental associationalism was not an isolated effort. It was a sustained, multi-industry project, pursued in public, private, and professional arenas, which self-consciously distinguished itself from mass production. This evidence represents an anomaly for theories of isomorphism, institutional complementarity, or the interlocking of parts into national systems.[11] Instead, its leads us to hypothesize a different understanding of order, which stresses the partial and ambiguous character of institutions, and to a view of American capitalism as a heterogeneous and loosely coupled set of institutional projects, paths, and systems.

Equally important, our discovery of varieties causes us to rethink the relationship between institutions and agency. Economic actors, we hypothesize, have the capacity to reflect collectively on background conditions, discover and experiment with alternatives, deliberate about their consequences, and then revise those conditions. Such reflexivity is always partial: actors never have access to or revise all background conditions at once. But the capacity for reflexivity is as integral to economic agency within institutions as calculation within constraints and the enactment of taken-for-granted principles.

In this, we depart from conventional views of constraint and institutionally situated rational choice accounts of associations. Game theorists have made great strides in explaining cartel behavior and the early experiments with information sharing in the context of American antitrust. But these accounts provide little purchase on how associations exploited reflexivity, improved productivity, or helped firms reconfigure background conditions so that collective action problems receded from significance. They likewise provide little purchase on how the architects of developmental associations made the transition from cartelization to collaborative learning in the first place, self-consciously creating new paths for American industry. Here, too, the data require a revision of institutionalism. Indeed, by emphasizing agents' capacities to reflect on unexamined assumptions, deliberate about background conditions, and experiment with new practices, we not only make sense of how actors reinvented an associational alternative to mass production in the U.S. economy. We also show how these actors built the capacity for reflexivity in organizational design.

We proceed in four steps. Parts I and II trace how manufacturers, accountants, and the Federal Trade Commission (FTC) reconfigured associations in response to the great merger wave and the failures of cartels. We show, first, that this coalition created variety in American capitalism through experimentation, conference discussion, and institutional innovation; and, second, how they created varieties of governance by designing new associational forms that promoted deliberation, reflexivity, and collaborative learning. Part III adds depth to our understanding of both varieties by analyzing developmental associations in commercial printing. Part IV adds breadth by mapping the distribution of these forms across industries in the mid-1920s. As we shall see, actors working in a range of industries made associations a thriving, viable, and high-performance element of the early twentieth-century American economy. And in so doing, they pose new challenges to existing institutional analyses of order and agency.

I. FROM COLLECTIVE ACTION TO COLLABORATIVE LEARNING: THE ORIGINS OF DEVELOPMENTAL ASSOCIATION

In 1910, just five years after the close of the great merger wave, Arthur Jerome Eddy assembled the members of the Structural Bridge Builders' Society. The industry, he told them, had long suffered from an asymmetry of information between buyers and sellers. Clients secured bids, "peddled" them to contractors, and, in their ignorance, the bridge builders chipped away at their prices until every profit disappeared. Suppose, instead, "instead of acting as jealous and independent units," contractors disclosed and freely discussed their costs, work in hand, prospective work, all bids actually made, and the general conditions in the industry, Eddy said.[12]

> Competing in the open with knowledge of all the conditions influencing others, no man would make a ruinously low price or an arbitrarily high one. The competition would be real, keen, and healthful. Prices would vary but they would not vary widely; in dull times prices would approach costs, but the educational value of the association would tend to deter ruinous bidding; open criticism of work inefficiently done would expose the tricky bidder.[13]

In conventional accounts, associations following Eddy turned to tacit price coordination by information after repeated failures to enforce cartels and price-fixing agreements under the watchful eye of antitrust authorities.[14] These were, in effect, simply new ways to coordinate preferences or solve prisoners' dilemmas associated with overcapacity problems. And information cartels, in this view, did little better than their parents at stabilizing prices. They fostered cooperation only under restrictive conditions: small numbers of firms, homogenous products, and high entry barriers. But Eddy's "open price associations" were in precisely the wrong industries. Construction, cotton printing, and hardware were custom or batch sectors, where firms were small and numerous and entry was easy. More-

over, contrary to conventional accounts, these associations did not collapse at the first sign of opportunism. Instead open price associations learned a new game.

As Eddy explained, information sharing was controversial. Everyone mistrusted one another and no one trusted him. So he tried an experiment to draw participants in. Eddy asked the bridge builders to submit prices to the Society during the bidding process and then discuss outcomes afterward. "The open price policy means not only open prices," Eddy wrote, "but open discussions." Once bids were revealed, the bridge builders inevitably raised questions about the circumstances under which winners secured contracts. Did they have the genuinely lowest costs? Or did they use shoddy materials, sweat their workers, or make false promises? None of these questions could be answered without better knowledge of costs and sufficient uniformity to compare across firms.

Discussion of prices, in other words, inevitably led to discussion of costs.[15] And when firms meet to discuss costs, Eddy reported, debate became heated:

> *No two agree upon all the items that should be charged against a given piece of work. . . .* Differences in opinion and practices developed in the discussion were so surprising that a competition committee was appointed to work out a cost system applicable to the industry.

This standing committee's "comprehensive and scientific cost system" accomplished three goals. First, it provided small and medium-sized firms with access to expertise only the largest corporations could afford. Second, in a custom goods industry, like construction, it developed a uniform "cost blank" for the purposes of bidding. Once "every item of cost entering into a piece of work" was included, Eddy thought, prices would stabilize without agreement. Finally, once a uniform system of cost accounting was joined with open cost reporting, industry members had a yardstick to compare their own progress in cost reduction with others in their industry.[16] Thus, *what began as monitoring for tacit price coordination became information sharing for deliberation and collaborative learning*. Open price cartels became developmental associations.

Other industries came to collaborative learning more directly. Caught in the profit squeeze of rising wage costs and cutthroat price competition, associations in printing, tanning, paint and varnish, drugs, silk, malleable castings, biscuits, stoves and furnaces, plywood, and millwork also experimented with open cost work. Like Eddy, association officials in these industries learned how deliberation aroused interest. Many attempted to mobilize membership with a cost experiment. Each firm was asked to estimate the cost of a standard product, such as business cards, soda crackers, a "16-inch taffeta," or a simple steel casting. The variations were dramatic, ranging from 15 percent in steam-fitting products to 60 percent in metal casting, 125 percent in silk, 139 percent in printing, and 250 percent in drug manufacture.[17] It took little reflection to realize the differences flowed from differences in cost accounting methods, not productivity. In fact, participants were often startled by the results, and opened broader discussions about

the relationship between cost accounting and productivity. These experiments, in short, taught firms to turn cost assumptions into hypotheses and open new lines of inquiry. At a minimum, everyone learned "the great need for us to speak the same language," said Harry Green of the Biscuit and Cracker Association. "If we were all to get down to . . . calling the same things by the same names, about seventy-five per cent of our troubles would be eliminated."[18] Or, as the commissioner of the Plywood Manufacturers' Association put it, the key task for associations in the new century was to develop a common "cost lexicon."[19]

Trade associations were not alone in turning to collaborative learning. The FTC and the cost accounting profession also joined this project. The FTC turned to cost accounting as a key ingredient in its plan to implement antitrust. Indeed, like costs, antitrust did not remain a fixed constraint on associations. Eddy, for example, was actively involved in antitrust reform—lecturing, writing, and testifying before congress. Moreover, because the FTC was created in 1914 with the ambiguous mandate to regulate "unfair methods of competition," it had little choice but to interpret its mission creatively.[20] As the commission saw it, implementation necessitated both punitive and positive action. The former involved checking predatory actions before they hardened into market power, the latter, cultivating business capacities to compete over productivity, service, and product quality.

From the outset, the FTC made cost accounting through associations central to its positive agenda. The commission's first chair, Edward Hurley, had encountered uniform cost accounting when he was president of the Illinois Manufacturers' Association. Like Eddy, he learned many small and medium-sized firms had only the most rudimentary knowledge of costs. Failure to include charges for overhead and depreciation, especially, had a depressing effect on prices. It also placed real limits on firms' capacities to boost productivity. At an individual level, Hurley thought, better accounting would improve decision making from the shop floor to the front office. However, there were limits to what could be learned from internal data; so Hurley advocated uniform cost accounting and interfirm benchmarking. "The main purpose of [such] statistics," he wrote, "is to enable every member to compare the conditions in his business with the average for the industry and thereby keep his plant at a high state of efficiency at the lowest possible cost."[21] Benchmarking lets

> companies in the industry compare their costs readily and ascertain on what items such costs are excessive and where economies may be effected. One manufacturer with a lower power cost passes on his knowledge to other manufacturers in the same line; while another manufacturer gives to his competitor the results of his study of electric truck or conveyor costs for intra-factory hauling.

This has the inevitable effect, Hurley concluded, of producing "more intelligent competition."[22]

Hurley's successor, Nelson Gaskill, also saw associational cost accounting as central to the commission's mandate. No business practice so sparked unfair competition and drove firms into unlawful price-fixing arrangements than pricing below cost. Although Gaskill thought the FTC ought to monitor and control pricing practices more closely, he believed the commission could make its biggest impact through cost accounting. The more manufacturers were aware of their costs, he said, the less likely they were to price below them and the better could the FTC realize its prophylactic goal.[23] Under Hurley's and Gaskill's leadership the commission conducted a nationwide questionnaire on cost accounting and enlisted the American Association of Public Accountants to help prepare two cost accounting pamphlets, one for manufacturing, a second for distribution.[24]

Like the trade associations, cost accountants came to collaborative learning from collective reflection on past failures. In 1919, after a protracted fight with financial accountants over whether it was legitimate to measure interest as a cost, they bolted the American Institute of Accountants to form their own association, the National Association of Cost Accountants (NACA). Unlike financial accountants, who saw themselves as independent auditors, cost accountants imagined themselves management engineers, with roots in Frederick Taylor's scientific management movement.[25] More often than not, however, they learned that Taylor's approach failed. Efficiency engineers repeatedly complained how they had designed cost systems that sat on the shelf. As a result, cost accountants learned to build systems from the bottom up, consulting regularly with practitioners.[26] They discovered no better forum for this process than trade associations. Working with cost committees in industries from printing and milk to metal casting and machine tools, they turned cost accounting into a deliberative project. Frequently, the cost accountants themselves became association secretaries or the heads of industry-specific cost associations. NACA also provided a deliberative forum for collaborative learning, inviting representatives from developmental associations to present their work at its annual meetings. Many pages of the *NACA Bulletin* were devoted to industry-specific cost systems.[27]

In addition to NACA and the FTC, the American Trade Association Executives (ATAE) and the U.S. Chamber of Commerce took up the cause of developmental associations. Formed in 1914, the Chamber worked closely with the newly created Federal Trade Commission on trade regulation. In 1919, it also formed a Fabricated Production Department, devoted to advancing productivity and quality in American manufacturing. The Department's first project was uniform cost accounting. Between 1922 and 1924, it held three national meetings on the subject. Attended by more than 400 participants from associations, government, industry, and the professions, the Chamber meetings became key forums for further theorizing collaborative learning. Among other questions, their participants asked What were the defining characteristics of uniform cost accounting? How

did successful associations mobilize participants, structure the deliberative process, and get members to adopt a uniform system and participate in benchmarking? And what was the relationship between developmental associations and the state? In 1925, the Fabricated Production Department published two pamphlets with answers to these and other questions.[28] The transcripts and documents produced in these and other forums provide a rich and detailed view of the crystallization and content of this associational project.[29]

II. DEVELOPMENTAL ASSOCATIONS BY DESIGN

Associationalists, cost accountants, and trade commissioners came together at the annual meetings of NACA and the ATAE, and the Chamber's ad hoc meetings, to share their experiences, cull success from failure, and generalize. In doing so, they hoped to make the principles of uniform cost accounting available for imitation, adaptation, and refinement. Through these meetings, the coalition generated a model of association as collaborative learning. Its goal was to provoke individual inquiry through interfirm comparison and deliberation and collective inquiry through information about the range of individual performance and practice. The means to collaborative learning was uniform cost accounting.

This was not, as game theoretic interpretations suppose, a system to monitor compliance, coordinate preferences, or solve prisoners' dilemmas. In that view, cost and price information allowed firms to monitor one another's preferences and behavior, and decide whether to cooperate with tacit pricing norms in the next round of play.[30] Indeed, such a view treats information sharing as merely an elaboration of earlier price-fixing agendas and their preoccupation with mass production's overcapacity problems. But viewing developmental associations in these terms misses crucial features of their design, operation, and performance consequences. It is true that their architects hoped to foster price stability. Yet their goals were both more and less ambitious than game theorists suggest. They were less ambitious as they neither expected compliance nor sought to eliminate competition. They were more ambitious as they hoped to foster dynamic efficiency and new forms of competition through reflexivity, deliberation, benchmarking, and collaborative learning. In the end, the architects of developmental association were less concerned about a member's temptation to cheat than about showing him *where* he needed to improve and providing information unavailable from the market or the firm about *how* to improve. And while they sought price restraint, it was their careful coupling of stability with learning, improvement, and productivity enhancement that constituted the distinctive and qualitatively new logic of this associational form.

Collaborative learning had four defining features: a common language, deliberation, benchmarking, and the coupling of price stabilization and improvement.

A Common Language

As Arthur Eddy learned, there was a seamless web between mobilization and the first feature of collaborative learning. Discussions of fair competition inevitably provoked productivity comparisons, which were impossible without a common "cost lexicon." Many associationalists came to see their member's "natural curiosity" for comparison as the means to and end of uniform cost accounting. When associations initiated cost experiments in printing, milk distribution, drug manufacturing, silk, and metal casting, they reported "great consternation" among members. "Everyone knew that actual differences in production costs could only account for a small part of the range in estimates."[31] They were equally surprised at how few members spoke with "a uniform tongue."[32] Simple comparisons in metal casting "proved remarkably successful in convincing . . . skeptical [manufacturers] of the need for and benefits from uniform cost accounting."[33]

The cost accountants captured the language problem more abstractly, but no less cogently. NACA's second vice president, Eric Camman, noted how his profession accorded the term "standard costs" with two meanings: ideals and yardsticks. The former were "objects of attainment," set centrally by management, associations, or the state. As such, they were used as targets against which to monitor and discipline performance. Among associations, cost ideals were useful to measure member compliance with collective rules. In the second meaning—yardsticks—costs were units of measurement. Their goal was to make self-reflection and comparison over time or across diverse circumstances possible. Yardsticks were no more than "point[s] of departure, a place to start from." As such, they were more or less arbitrary—conventions, that is, whose effectiveness depended mostly upon agreement among practitioners. Yardsticks, in essence, were a common or uniform cost language—a basis for examining, discussing, and comparing background cost conditions. And to forge these conventions, it was necessary to design deliberative forums to build consensus on their meaning.[34]

Deliberation

Like the cost accountants, associationalists discovered that professionally designed systems were too complex, cumbersome, and abstract for most practitioners. Foundry, photoengraving, cotton finishing, tent and awning, refractory, and Portland cement associations devoted substantial resources to such systems, only to see them languish on a shelf. In these and other sectors, associations learned how cost accounting systems had to be built from the bottom up through deliberation among practitioners. To be sure, many hired professional consultants and full-time association accountants. But, as Camman predicted, the bulk of their

work involved arbitrating conflicts and forging agreements over common standards. Moreover, it was typical to devise a simple system and then send it out into the field for testing and refinement.[35] As NACA President and Trade Association Secretary Charles Stevenson put it, the goal of deliberation was to create cost systems "as perfect as possible, working right and as nearly standard as we can, but the most important thing . . . is the *use* made of that machine." It is better to install imperfect systems, "see the differences in the work . . . being done in various plants," and revise accordingly.[36] Nor did deliberation end with system formation. Cost committees became permanent, and in recognition of the constant learning process associated with uniform cost accounting, many associations placed their systems in loose-leaf binders, so they could be readily reformed with new learning.[37]

Benchmarking

Once members learned to speak the same language, it became possible to submit data to associations, which would calculate and disseminate useful industry benchmarks. The goal of benchmarking was not imitating best practice. It was to disconcert, to shake firms loose from habits born of narrow vision, that is, to foster reflexivity. No matter how good an internal cost system, there were limits to self-reflection. Comparison inevitably raised questions unthinkable from internal monitoring alone.

In their efforts to mobilize, associations benchmarked modestly and early. The photo-engravers, for example, began with a "batting average," which ranked concerns "in order of [operating] efficiency."[38] Others conducted simple comparisons of aggregate manufacturing and commercial expenses. Once in place, however, benchmarking became more frequent and complex. Monthly statistical reports might show "average cost per hour in different departments, average costs of the different kinds of products, and average costs of different kinds of operations."[39] The more detailed the benchmarks, noted G. A. Ware of the Newsprint Bureau, the more it "stirs up inquiry . . . stirs up curiosity."[40] And, added Charles Stevenson, when

> you work against figures and facts that other people have developed, finding out what the best performance in the industry is and use that as your standard to compete against, it gives you something to shoot at and is bound to have a tremendous effect on your own operations.[41]

Or as NACA's first president, J. Lee Nicholson, wrote,

> If a manufacturer can not make money in competition with other concerns when using the same methods of figuring costs, he can only conclude that his goods or his marketing, or both of them, are costing him too much. His next step, naturally, is to analyze closely the

methods and conditions under which he is manufacturing and marketing his product, until he finds and corrects the inefficiencies which are handicapping him so seriously.[42]

Price Stabilization and Improvement

Although many associations had abandoned price fixing for collaborative learning by the 1920s, price stabilization remained an important goal. Many association secretaries agreed with FTC Chair Edward Hurley when he said those who knew their costs were unlikely to price below them. If everyone were to track overhead, depreciation, and product costs, cutthroat pricing would fade away. Cost accounting taught others, like the printers, how they poached one another's markets, because they overvalued volume. As we will show, the printers succeeding in dampening cutthroat pricing by tracking product costs and diversifying production.

Still other associationalists believed more direct pricing rules remained necessary, despite the salutary effects of cost accounting. In 1927, Charles Stevenson called for affirmative rules against pricing below cost and for individual firms to price off of their own running averages, or "normal costs."[43] Four years later, the economy in depression, Stevenson argued that progress in cost benchmarking made it possible for manufacturers to price off of industry average costs. Unlike price or information cartels, however, stabilization of prices or market shares was not an end it itself; rather, developmental association coupled price stability with systematic improvement. Although it might raise prices in the short run, Stevenson thought prices would come down over the long run, as firms responded to nonprice incentives to improve. As he put it,

> It is evident that if an average industry price were established, certain companies would make more than normal profit and certain companies would make less. . . . In a desire to make more than normal profit, constant efforts to increase the efficiency of the industry would be made. Individual initiative would be preserved, and fair industry price would be gradually reduced so that the public would be able to buy more of the products or secure them at a lower price. . . . Inefficient companies would be gradually forced out of business or compelled to modernize and improve their own efficiency, which, in turn would further reduce the industry price level.[44]

Thus, in Stevenson's view, benchmarking average costs not only provided firms with an incentive to improve, but also provided them with information unavailable from the market or from the firm about how to improve, effectively upgrading interfirm competition.

III. DEVELOPMENTAL ASSOCIATIONS IN COMMERCIAL PRINTING

In 1909, commercial printers formed the American Printers Cost Commission. After repeated failures to enforce cartels, they turned their attention from prices to

costs and productivity. Once they broached costs, printers began to rethink the cause of cutthroat pricing. Perhaps it was an artifact of accounting customs that overvalued volume, and not the immutable result of technology, markets, or human greed, the commission conjectured. Enamored as so many Americans had become with mass production, commercial printers had fallen prey to the "volume illusion." Alter the cost system, the commission said, and printers will find alternatives to volume and price wars. Moreover, once printers learned to speak the same language, the commission could begin to benchmark their differences and provide information about how to improve productivity without chasing volume.

The printers were reflexive pioneers in two senses. First, by reconfiguring costs from background constraints to objects of experimentation and discussion, they created new possibilities for competition and profit seeking, ensuring variety in American capitalism. The commission's standard cost system taught printers how to rationalize flexible rather than mass production. As a result, they tripled the rate of productivity growth by increasing, rather than decreasing, labor skill, product diversity, and industrial decentralization. But reflexive action was not a one-shot deal. The printers' peak association, the United Typothetae of America (UTA), also attempted to narrow the distinction between routine and reflexive action, through benchmarking and building institutions that supported learning. Providing printers with productivity information unavailable from within the firm, it hoped to provoke inquiry, experimentation, and discussion. In doing so, the UTA succeeded in reinventing itself from price cartel to developmental association, producing new varieties of association.

We study printing because it implemented one of the most fully realized forms of developmental associations in the United States. Thus, contemporaries took notice of the cost commission's work, monitored its progress, and debated its consequences. Equally important, associations in printing further confound conventional institutional and game-theoretic accounts of these forms. They succeeded despite the absence of the features game theorists attribute to a successful coordination game, namely, small numbers, homogenous products, and high entry barriers. (In 1909, there were more than 12,000 commercial printers in the United States, and this was largely a custom products industry. There was also a large market for used machines and plenty of skilled workers to open "basement shops" during recessions.[45]) Moreover, developmental associations dramatically improved industry performance. Far from merely stabilizing markets, restricting output, or discouraging innovation, they fueled a dynamic of reflexivity, benchmarking, and improvement that enhanced growth and productivity.

This section recounts the printers' story in two parts. The first describes the development of the printer associations' cost and benchmarking system; the second recounts the effects of those systems on industry organization and performance.

Printers' Associations and the Standard Cost System

In 1908, after a bitter and protracted struggle, the International Typographers' Union won the eight-hour day, dealing the UTA a major defeat. If this were not enough, New York City printers watched their lucrative market for periodicals migrate from the district. Add a nationwide recession, and competition turned cutthroat. Between 1904 and 1908, the UTA looked on helplessly as its membership fell by nearly one half.[46]

For many printers, the only option seemed cartelization. As recently as the 1890s depression, printers tried to implement price agreements by bonding members and forcing defectors to forfeit cash. Some of these arrangements succeeded, but were dissolved by state antitrust authorities. So far the printers' story is typical. In America, antitrust made associations unenforceable, so only consolidation or voluntary coordination seemed possible. In 1908, magazine and periodical printers began to consolidate. For the rest of commercial printing, competition seemed the only option.

A year later, associations in New York, Boston, and Baltimore regrouped. This time they abandoned price fixing for developmental association. In Chicago, "Ben Franklin" associations took a similar turn. In 1910, printers from across the country met on Lake Michigan in the first International Cost Conference. Under the auspices of the American Printers' Cost Commission, they met annually for the next three years. In 1912, the Cost Commission published its first uniform cost manual and a year later the UTA took over the commission's work.

No sooner had printers assembled than they began to complain about what FTC Chair Nelson Gaskill called the "volume illusion."[47] The trade, they conjectured, was demoralized not because of greedy workers, the high cost of presses, or opportunism, but because faulty cost accounting—or none at all—led to the illusion that success was best measured in volume. As a result, competition took the form of zero-sum rivalry over market share and printers fell into a destructive vortex. The more success was measured in volume, the more printers adopted technology to increase speed and throughput; and the more they perceived capital this way, the more they rushed off in pursuit of volume. Competition turned cutthroat and firm performance foundered.

The cost manager of the New York Employing Printers Association, W. R. Ashe, articulated the growing sentiment against the volume illusion well.

> Nearly all printers have put the cart before the horse by trying to adjust volume to equipment, instead of equipment to volume. The average printer is prone to hang a millstone around his neck. He puts in every machine his competitor happens to have, before sufficient profitable volume has been acquired for running machinery the necessary productive hours at which its maintenance cost is absorbed. Intermediate losses arising from an unbalanced relationship of fixed investment to sales, cramp financials to a position of dependence and helplessness. There appears but one alternative, and the result is an *affliction of*

the volume bug, and bang goes the price in an effort to get business. . . . The printer has an economically occupied plant but a sales price that is in unbalanced relation to plant cost. In final analysis, he overcomes a financial loss faced in unoccupied equipment to confront an equal of greater selling loss and no progress is made. His position is the same as a dog chasing its tail—the tail is always ahead of the dog, because lower than cost rates are used in attracting sales, with no attempt to conform actual costs to these rates. This conformation obviously can not be made without the intelligent guidance of a cost system by which adjustments are effected of equipment to production, and correlation made between production and cost and sales.[48]

Two aspects of the printers' cost system were designed to rid firms of the volume bug: departmental costs and product costs. The heart of the UTA Standard Cost System was a monthly worksheet called "Form 9-H." Like today's spreadsheet, the columns on Form 9-H broke printing into departments or "cost centers," including composition, typesetting, presswork, binding, and proofreading. The rows provided space to enter expenses within each department, from rent and wages to overhead and administrative costs. In a small plant, specializing in a single process, one department might be sufficient.[49] The majority of printing establishments, however, had two or more departments (columns). A typical large plant might begin by identifying five production cost centers like those listed above. But departmentalization was meant to be flexible: a single machine, such as a small platen press, or labor category, such as binder, could also be defined as a cost center. It all depended upon what a printer wanted to learn. Moreover, printers were encouraged to departmentalize as large a proportion of overhead costs as possible. In this way the Cost Commission encouraged printers to subject all "fixed costs" to scrutiny: could they be isolated, distributed, and diminished? Where it was impossible to distribute overheads to particular cost centers, printers were encouraged to calculate the annual percentage of costs incurred by each department and distribute overheads on that basis. Departmental costs, in short, were necessary to track costs more carefully to their source.[50]

The second aspect of the UTA cost system intended to overcome the volume illusion was "product costing," or tracing *job* costs back to their origins within departments. The cost commission hypothesized that many printers chased volume because they were unable to distinguish profitable from unprofitable work. Instead, they often assumed it was cost effective to cross subsidize jobs or take on additional work to amortize debt and keep workers busy. The Standard Cost System tutored printers to distinguish between costs "chargeable" directly to a job and "unchargeable" costs, incurred in debt service, administration, maintenance, or idle time. In this way they could begin to develop categories and information for distinguishing more carefully profitable from unprofitable work, and make more informed decisions about volume.[51] As one printer put it, the Standard Cost System allowed his firm for the first time to "find out which branch of our business paid us the most money. With that end in view . . . we . . . analyzed our sales and costs; that is, we . . . divided into eight different divisions, our total sales:" law

books, express printing, job printing, and so on. At the end of each month, they subtracted cost from sales in each division. Now, "each class of printing . . . stands for itself and it can be easily determined which is the most advantageous to the company's interests."[52]

At first blush, the UTA Cost System appears designed to improve managerial capacity within individual firms, not to foster collaborative learning or dampen destructive rivalry between them. It is true that cost accounting allowed printers to better diagnose bottlenecks in production, assess worker productivity, and improve investment decisions. But it also helped problematize the volume illusion by turning taken-for-granted assumptions about product markets and costs into testable hypotheses. For example, it was customary to take "fillers" at low prices during slack times in order to keep a plant running close to full capacity.[53] Or many printers took on work for which they were unprepared in order to ensure higher volume in their specialty. Others sold complementary products, like stationery, in order to increase the volume of trade flowing through their shop. Finally, printers were notorious for scrapping old machinery in unreflective response to competition and the inflated claims of machine vendors. Tracking product and departmental costs made it possible to question these and other customs. Alone, individual printers might learn to adjust quantity and product mix to improve performance. Together, they would improve competitive conditions by reconfiguring performance criteria from volume and market share to chargeable hours and product earnings.

If better individual costs were to have salutary effects upon interfirm competition, collective benchmarks were designed to improve individual decision making. Printers noted how cost accounting inevitably provoked comparative questions. As Detroit printer F. A. Chantery put it,

> You may have the finest set of . . . production records in existence. You may be maintaining, day in and day out, the average of your plant, but are you sure that the average of your plant is equal to the average of your city or the average of the country as a whole? There is only one way for you to determine this, and that is by comparison of your averages with averages obtained from other sources. . . . By compiling average records you have the means by which the efficiency of your plant may be brought before your eyes.

Or as Mabel Dwyer, secretary of the Typothetae Cost Accountants Association, put it, "There is considerable satisfaction in knowing just where your business stands in relationship to others in the same industry, and if your statement is below average this knowledge acts as an incentive for you to try to improve it."[54]

In 1915, the UTA published its first *Composite Statement*, a compilation of industry cost averages broken down by department and the average costs of a variety of standard products.[55] Four years later, the association replaced the *Composite Statement* with the *Typothetae Standard Guide*. In addition to a more complete account of departmental average costs, the *Standard Guide* introduced

physical data, that is, a detailed list of machine time averages for many specific operations.[56]

These industry benchmarks, Chantery indicated, were intended to disconcert, that is, to raise questions unthinkable from firm level data alone. As such, they were useful for evaluating volume, diagnosing bottlenecks, and identifying excess labor, make-ready, or administrative costs. Benchmarking, as Dwyer pointed out, also provided a nonprice incentive to improvement. But UTA officials thought benchmarks were useful for pricing, as well. Commercial printing was a custom and batch product industry, where prices were typically set or "estimated" prior to production. By the First World War, UTA accountants began to tutor members in estimating prices by benchmarking. Industry averages, they said, promised to improve prices in three ways.

First, estimating by benchmarking would reveal consequential errors. Since UTA benchmarks were quite fine-grained, estimators could compare the costs of many distinct operations to industry averages. Large deviations would indicate the need for further inquiry and, perhaps, price adjustment. Second, estimating by benchmarking promised to raise novel questions about layout and production. For example, were high estimates the result of genuine productivity differences or inappropriate machinery, labor, or materials? In some cases, Voorhees told his colleagues, estimating by benchmarking revealed "ways of increasing production by seemingly illogical means. For illustration, production work and production records in some plants have shown that greater production on hand-operated machines can be obtained by running the machines slower. It would be hard to believe this as a fact without the use of average production records."[57] Finally, estimating by benchmarking provided another technique to test the volume illusion. Suppose, one printer said, you felt compelled to take on fillers during a slack time. By comparing your cut-rate estimate to the industry average, you might find it doesn't pay.[58] In sum, estimating by benchmarking was another technique to foster collaborative learning, not to coordinate price fixing. By improving the estimating process, benchmarking helped channel competition from market share to product quality and diversity, service, and nonvolume cost reductions.

Organizational and Performance Consequences

Cost accounting had a salutary effect on the UTA. From the first cost congress in 1909 to 1916, UTA membership grew from 729 to 1,815, as new locals were organized and the number of firms submitting data for UTA benchmarks rose dramatically. The first *Composite Statement* in 1913 represented business showing a total cost of approximately $1.6 million; three years later that figure had grown to over $15.6 million, 68 percent of which was from small firms.[59] UTA growth stalled in 1916, but buoyed by the FTC's enthusiasm for cost accounting, leaders turned to organizing.

In 1917, the Typothetae launched a three-year plan to diffuse the Standard Cost System. With financial help from allies in the printing machinery, paper, and ink industries, the UTA raised over $200,000, and sent fifty organizers into the field. Though the Typothetae was not a cartel, with rules and sanctions, participation in the Three Year Plan was contractual. Printers were obliged to attend courses in cost accounting, estimating, and salesmanship; pay dues; adopt the Standard Cost System; and submit data to the association. In return, they received UTA services at no additional expense, including regular advice on accounting and estimating. Each local was obliged to develop its own budget to finance education, and the national was bound to finance surveys, organizing, and teacher training. Thus, although the Three Year Plan was contractual, it made no claims upon pricing, wage setting, or output behavior. Instead, the contract's goal was to ensure that printers committed sufficient time and resources to learn how, in practice, the standard cost system opened new possibilities in production, pricing, and marketing.[60]

The Three Year Plan was quite successful. By the end of the second year, it was underway in fifty cities and involved printers representing over $100 million in business. By the third year, the number of participating cities grew to 64, UTA membership doubled to over 4,000, 5,540 students attended educational classes, 8,000 copies of the *Standard Guide* were in use, and 21 local associations were benchmarking local costs.[61] Looking back on the Three Year Plan, UTA Secretary E. T. Miller estimated that there had been no more than 25 or 30 truly active locals nationwide when it was launched in 1918. In three years, that number had grown to 130, and membership increased from 1,600 to 5,150.[62] By the mid-1920s, Miller estimated that 80 percent of UTA membership had adopted the system.

Collaborative learning also succeeded in improving printing performance in the 1920s. It helped individual printers escape the volume bug; local markets dampen cutthroat competition; and the industry, as a whole, make technological innovations that tripled the rate of productivity growth.

UTA national headquarters received many testimonies of cost accounting's benefits. Printers described how they had shed unprofitable work and useless machinery, improved labor and capital deployment, and stiffened their backbones in pricing. For some, the UTA cost system reconfigured the volume illusion directly. It "will immediately . . . impel the printer to . . . throw out a lot of unprofitable work, or to advance his prices," an Atlanta printer told the Second Cost Congress. Of course, there are still plenty of "fool printers," he complained, willing to work for nothing. But if the UTA accounting system taught him anything, it was that "the matter of losing business and losing money are two separate propositions. Frequently . . . the loss of business will result in increased profits."[63]

As a Lake George, New York, printer testified,

> I have for the past three years been using your cost system. . . . It works . . . I have raised all my prices and still the cost system keeps telling me that I am losing every now and then on a

job. I have lost a third of my business to my competitors, none of whom keep adequate cost records, but I seem to have as much money at the end of the year as ever.[64]

Another printer explained how product costing led him to rethink his production strategy. To his surprise, it revealed a "considerable volume of business at the end of the year, with a very small profit margin." In fact, he learned that "a great deal of [work] was being done at a loss." So, a "definite policy was laid out to be followed for several years of reducing volume and endeavoring to increase profit." By tracking product costs, he was able to drop unprofitable work and concentrate on his best products. As a result, his overall profit rate increased from 7.4 to 21 percent in five years.[65]

Other printers testified to improvements as a result of learning by benchmarking. A leading Detroit printer succeeded in reducing labor, rental, and shipping costs by comparing his performance to *Typothetae Average Production Records*. A comparison of the firm's "chargeable hours per hour of wages" to the national average, for example, revealed two sorts of excess—supervisory and skilled labor costs. In neither case were nominal wages or salaries the problem. Instead, the careful investigation revealed "too many executives for the volume of business he [was] doing" and "first class compositors" routinely deployed for work more appropriately handled by apprentices. Another benchmark indicated above-average rental charges. Further investigation revealed how excess idle space, not a high nominal rate, was the cause. Finally benchmarking shipping expenses led to an investigation, which revealed it was cheaper to outsource to a subcontractor.[66]

Another printer explained how he had used UTA *Average Production Records* to improve investment decisions. Faced with inflated claims on the productivity of a folding machine, Irving Partridge explained how, estimating from UTA averages, he learned it would cost 14 cents more per hour than his current equipment. Moreover, benchmarking performance on one machine raised questions about others, and "was instrumental in getting rid of . . . over-equipment as well as obsolete machinery."[67]

Like individual performance, competitive conditions in local markets also improved. UTA secretaries across the country reported improved prices and profits with the implementation of the Three Year Plan.[68] A 1921 UTA study of profit rates in 321 cities found that printers earned on average 3.4 percent (total sales minus total cost). For firms participating who had adopted the standard cost system and were actively benchmarking under the Three Year Plan, that figure was 10 percent.[69] A study of Grand Rapids, Michigan, found the total profit rate for all printers had leapt from a loss of 1 percent before the Three Year Plan to a 12 percent profit at the end of the plan.[70]

Printers also reported dramatic improvements in credit conditions as a result of uniform cost accounting.[71] But perhaps the most telling indication of improved performance lies in the technological improvements that followed closely on the

heels of the Three Year Plan. Once their managerial house was in order, commercial printers embarked on an ambitious program of electrification and technical change. It is telling that most of these innovations had been available since the turn of the century. Newspaper printers had led American manufacturing in electrification, beginning their work as early as the 1890s. They also automated paper feeding and increased the speed, size, and capacity of printing presses during the first two decades of the twentieth century. It was not until the Three Year Plan, however, that commercial printers began to catch up with their brothers in the newspaper trade. Sales of commercial printing presses, for example, nearly doubled with the introduction of the Three Year Plan, from an average of 2,075 presses per year before 1916 to 3,916 presses per year between 1917 and 1929. Technical change was not limited to New York and Chicago. More than two thirds of all cylinder presses purchased were installed outside of the large printing centers. Moreover, commercial printers increased the flexibility and quality of presses during the Three Year Plan. The 1920s saw the widespread adoption of small, high-speed presses and presses capable of multicolor and two-sided printing.[72]

Coupled with improvements in managerial capacity fostered by the standard cost system, these technical improvements yielded substantial productivity increases. Value added per worker in book and job printing leapt from an annual average increase of 0.7 percent before the Three Year Plan to 3.2 percent after, and doubled the already striking productivity advantage printers enjoyed over U.S. manufacturing industries overall.[73]

To be sure, World War I witnessed growing electrification, yielding across-the-board productivity increases in manufacturing. But as Chandler shows for managerial hierarchies, technological change never translates directly into productivity gains. It must be accompanied by organizational innovation. Indeed, the previous round of innovation in printing—mechanized typesetting in the 1880s and 1890s—yielded labor strife, cutthroat competition, and only modest productivity growth. It was not until commercial printers began to track departmental and product costs, benchmark, and price with reference to cost that they began to catch up to newspaper printers in technology and productivity—and widened their advantage over American manufacturers overall.

Furthermore, printers succeeded in improving productivity by a markedly different route than did the managerial enterprise. Where electrification and automation increased concentration and decreased skill levels in managerial hierarchies, fragmentation and skill increased in printing. For example, as printers automated paper feeding on presses in the 1920s, they shed thousands of unskilled feeders. But as productivity increased and markets grew, printers hired more skilled pressmen, and the ratio of skilled to unskilled workers increased. In addition, printing became less, not more, concentrated over time. Printing plants remained small. In 1889, the average number of employees per establishment in book and job printing was 14.2. Forty years later, in 1929, that number had grown to 16.1. And when

ranked with other industries by the percentage of total industry sales made by the four largest sellers (the four firm concentration ratio), printing placed second to last in 1901, with a figure of 1.0, falling to last place in 1947, its four firm concentration ratio virtually at zero.[74]

For two decades after the ITU won the eight-hour day in 1908, the architects of printers' standard costs guided the United Typothetae from cartel to developmental association, from failed efforts at coercion to collaboration, and from monitoring for compliance to monitoring for learning. The association fostered learning in three ways. First, as printers came together to discuss costs, they began to problematize background constraints. They asked whether cutthroat competition over market share was the inevitable result of greed, capital costs, and the short life of printing technology; or was it a contingent artifact of a cost system that failed to distinguish departmental and product costs? Second, associations and cost accounting fostered reflexivity and routine collaborative learning through benchmarking. Third, everyone thought the cost commission's work was a fine beginning to a process of regular evaluation, deliberation, and revision. The more printers learned from experience, the better, they hoped, would be the UTA cost system. Developmental associations, in short, provided a distinctive path to improvement. Instead of cartelization, coordination, or concentration, commercial printers did better by increasing product diversity, labor skills, and industrial fragmentation. This was no mean feat for an industry of 15,000 establishments.

IV. THE DEMOGRAPHY OF DEVELOPMENTAL ASSOCIATIONS

We turn now to the overall salience of developmental associations in the U.S. economy and their distribution across American industries. To conduct these analyses, we created a cross-sectional data set of associations and their activities between 1920 and 1925 in 344 industries. We created this data set in three steps. First, we used documents from the Chamber of Commerce conferences between 1920 and 1924 and a 1925 FTC investigation of open price associations to compile a list of all associations and firms who discussed, participated in, or operated cost accounting systems, information pooling, or benchmarking schemes.[75]

Second, we used the conference and investigation documents to code associations according to their level of involvement in accounting and benchmarking activities. We assigned a code of *any involvement* to all associations who participated in any conference or were identified by the FTC report as either having uniform systems or being engaged in cost accounting, deliberations over costs, or information sharing. This category is designed to capture all associations that were *at least* demonstrably interested in developmental associationalism. It is the broadest, most inclusive category. Although many associations in this group did more, all were sufficiently interested in developmental associationalism to pay attention to cost accounting and monitor its adoption elsewhere. We assigned a code of *substantial involvement* to associations actively engaged in institutional-

izing uniform cost accounting systems within their industries. Associations were coded into this category if they convened meetings among their members to discuss cost, product standards, and categories; formed a dedicated committee or cost accounting department; developed or distributed cost manuals; helped members install accounting systems; or collected or pooled cost data. Finally, we assigned a code of *benchmarking* to those associations who used manuals, uniform cost plans, and accounting systems to generate and disseminate cost averages broken down by department, product, or specific operation. This category denotes full-fledged developmental associationalism and includes only those associations who provided firms with the capacity and information for systematic interfirm comparisons.[76]

Third, we coded associations (and their level of involvement) to industry classifications in the 1919 U.S. *Census of Manufacturing*. In so doing, we generated a data set of 344 *Census* industries in 14 *Census* industry groups. This data set let us (1) map the distribution of developmental associations across manufacturing industries, and (2) link information on associations to the data provided by the *Census* on industry characteristics, organization, and performance.[77]

Overall Salience

Developmental associations diffused extensively in the American economy. Figure 1 summarizes the distribution of associations and industries by levels of participation in collaborative learning or benchmarking systems. Between 1920 and 1925, 246 associations in 95 industries expressed clear interests in these systems (*any involvement*), and were joined in the Chamber conferences by 30 individual corporations from at least 8 additional industries.[78] In other words, roughly 30 percent of American manufacturing industries, and between 25 percent and 41 percent of the national and regional business associations in the United States, devoted resources in this period to at least participate in discussions about developmental association and benchmarking and to monitor their development.[79] Smaller numbers of associations and industries went beyond deliberation and monitoring to implement these systems. But, 74 associations in 46 industries took substantial steps toward instituting collaborative benchmarking, by pooling information, creating cost manuals or departments, or collecting cost data (*substantial involvement*). That is, over 13 percent of American manufacturing industries and somewhere between 7.4 percent to 12.3 percent of all national and regional business associations in existence implemented collaborative learning or benchmarking systems in whole or in part. And 34 associations (or from 3.4 percent to 5.7 percent of all associations) in 21 industries (over 6 percent of all manufacturing sectors) institutionalized fully developed versions of this organizational form (*full involvement*).

To be sure, these figures hardly suggest a manufacturing economy that was organized first and foremost around developmental associations. Yet, when con-

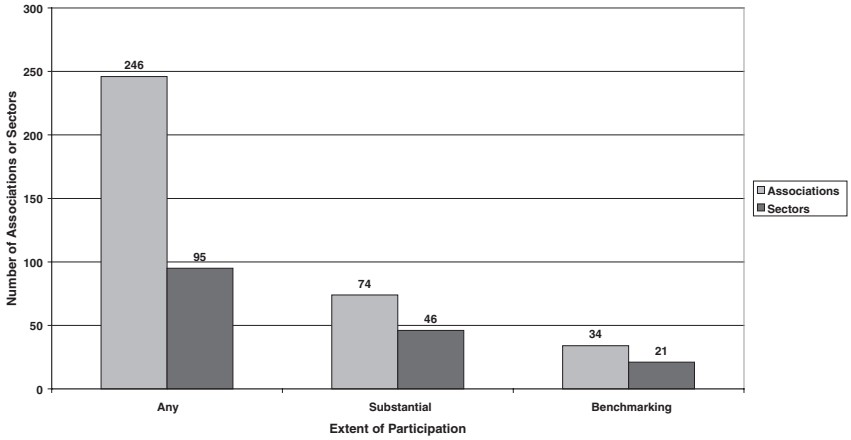

Figure 1. Participation in collective benchmarking by associations and sectors.

sidered in context, these numbers indicate that a significant proportion of the American economy participated in this project: nearly as many *industries* institutionalized developmental associations in whole or in part as experienced corporation consolidation during the great merger wave.[80] Moreover, at least one fourth of all business *associations* in existence in the United States participated in some fashion in the construction of this collaborative alternative to mass production corporation, with up to half that number institutionalizing some or all of its core features. Contrary to conventional accounts, associations were neither eliminated as governance forms in the great merger wave, nor reduced to a handmaiden of mass production, nor confined to variations on cartels.

Distribution across Industries

Looking across industries likewise reveals patterns of organization unanticipated by conventional narratives about American capitalism. Figure 2 maps the distribution of developmental associations across the fourteen *Census of Manufacturing* industry groups, showing the number of *associations* within each industry group for each level of involvement. The broadest measure of involvement, *any*, denoted by the light gray bars, reveals two results. First, developmental associations captured the attention of a broad cross-section of American industries. With the exception of tobacco manufacturers, associations and industries from every *Census* industry group participated in discussions about benchmarking and actively monitored its development. Second, industry groups varied significantly in the number of associations and industries involved. Three groups stand out: paper and printing, lumber, and iron and steel. Over twenty-five associations in 9 to 13 industries in each group participated in developing benchmarking. Four other groups occupied the middle range: food and food products;

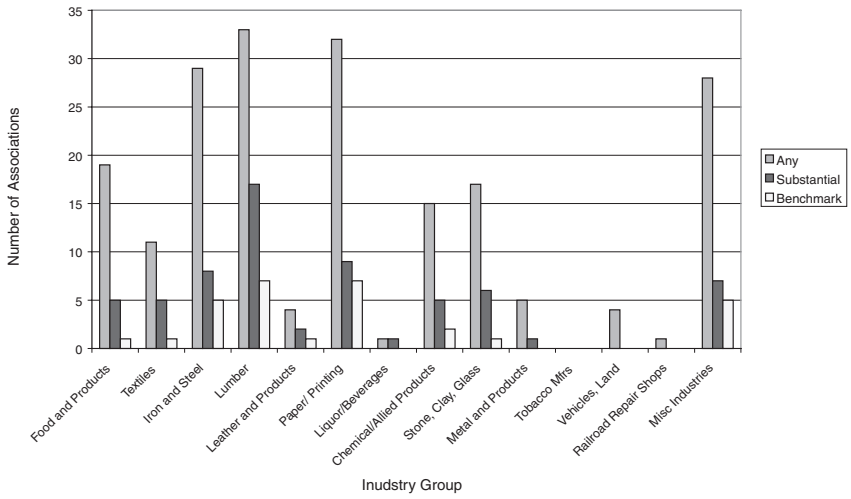

Figure 2. Extent of associational participation in collaborative learning systems, by industry group.

stone, clay, and glass; chemicals; and textiles. Over ten associations and 8 to 10 industries in each group participated in developing benchmarking. Finally, four groups had strikingly fewer numbers of interested associations and industries: land vehicles, leather, liquor, and railroad repairs.

At higher levels of involvement, participation becomes more focused (see the dark and light bars in Figure 2 and the appendix). Three points are noteworthy. First, four industry groups drop out at higher levels of involvement. Associations in land vehicles and railroad repair were only monitoring developmental associations; and while some associations in liquor and metal products took substantial steps toward benchmarking, none fully implemented it. Second, despite this winnowing, a wide array of groups surpassed simple monitoring to implement benchmarking systems in whole or in part: associations and industries in 11 of the 14 *Census* industry groups displayed substantial involvement; those in 9 of the 14 groups implemented full-fledged benchmarking systems. Third, the three leading groups retain their vanguard status. Eight associations in iron and steel industries were substantially involved in collective benchmarking, with five instituting full-fledged benchmarking systems. Nine paper and printing associations and seventeen lumber associations were substantially involved, with seven in each group operating fully developed systems.

It appears, then, that developmental associations were instituted in a particular constellation of industry groups. Thus a sectoral analysis is in order. While valid inference must await multivariate analysis, several patterns emerge from the data. Table 1 and the appendix provide a detailed industry breakdown of developmental associations.

At first blush, sector characteristics, conventionally understood, predict involvement. For example, developmental associations do not appear in classic mass pro-

Table 1
Benchmarking Sectors and Associations by Industry Group

Food and Kindred Products

Food preparation
- National Cooperative Milk Producers Federation

Textiles and Their Products

Awnings, tents, and sails
- National Tent and Awning Manufacturers Association

Dyeing and finishing textiles
- National Association of Finishers of Cotton Fabric

Iron and Steel and Their Products

Foundry and machine-shop products
- American Malleable Casting
- Steel Founders Society

Stoves and hot air furnaces
- Stove and Furnace Mfs Association

Tin plate and terneplate
- National Association of Sheet and Tin Plate Manufacturers

Typewriters and supplies
- Carbon and Ribbon Exchange

Lumber and Its Remanufactures

Lumber and timber products
- North Carolina Pine Association
- Hardwood Manufacturers Institute
- West Coast Lumbermen's Association
- Western Pine Mfs Association

Lumber, planing-mill products
- Millwork Cost Information Bureau
- Plywood Manufacturers Association
- Maple Flooring Manufacturers Association

Leather and Its Finished Products

Leather, tanned, curried, and finished
- Tanners Council/Leather Accts Assn

Paper and Printing

Boxes, paper and other, not elsewhere specified
- National Container Association

Cardboard, not made in paper mills
- Binders Board Manufacturing Association

Paper and wood pulp
- News Print Service Bureau
- Cost Accounting Assn, Paper Industry

Photoengraving
- American Photo-Engravers Association

Printing and publishing, book and job
- United Typothetae of America
- NY Employing Printers Bureau

Chemicals and Allied Products

Druggists' preparation
- Manufacturing Drug Industry Association

Paints
- Paint Association

Stone, Clay, and Glass Products

Brick and tile, terracotta, and fire clay products
- American Face Brick Association

Miscellaneous Industries

Roofing materials
- Asphalt Shingle and Roof Association
- Prepared Roofing Association

Rubber tires, tubes, and rubber goods
- Rubber Association of America

Washing machine and clothes wringers
- American Washing Machine Manufacturers Association

duction sectors with a small number of large firms making homogeneous products: steel rails, tobacco, oil, agricultural implements, and meatpacking. Moreover, they appear quite extensively in many producers' good industries. That is, they turn up in virtually all industries at least substantially involved in the lumber, leather, and iron and steel groups, and many industries in the paper and printing, textile, and stone, clay, and glass groups.

Yet closer examination reveals that developmental associations are not nearly as tied to sectors or their characteristics as conventional wisdom might suggest. First, they appeared in mass, as well as batch and specialty, sectors. High-volume or continuous process industries, such as rubber, newsprint, paint, flour, and distilled liquors, instituted developmental associations in whole or in part. Second, developmental associations also appeared in locations where rational choice accounts least expect cooperation, namely, in industries with large numbers of heterogeneous firms, like lumber and timber goods or book and job printing, both of which had in excess of 10,000 geographically dispersed establishments in 1919. Thus, sector characteristics like high fixed costs, large numbers, or heterogeneity do not appear to rule out these associations.

Instead, our data suggest that relational rather than sector characteristics predict participation. Developmental associations appeared and diffused in clusters of related industries, especially in sectors that produced key inputs for one another. The largest of these clusters is organized around wood and wood products: lumber; paper and printing, and related sectors like stationery, ink, carbon, and ribbons; or construction products like roofing materials, brick and tile, and paints. A second cluster centers on the iron and steel industries, plus related sectors like washing machines, electrical machinery, and copper smelting. Textiles and leather goods may constitute another cluster, as may chemical industries (paints, varnishes, and drugs), although neither cluster emerges as starkly from the data as the first two.

The presence of such clusters suggests some hypotheses for future research. First, developmental associations appear and diffuse along social lines defined by long-term buying and selling relationships. Second, they may emerge in sectors distant from the Justice Department and the federal courts, and less exposed to antitrust prosecution. Finally, and perhaps most promising, developmental associations are most likely to emerge in sectors operating at a distance from financial accounting, investment banking, and other professions pursuing the modernizing project of corporate consolidation.

Performance Correlates

Like sectoral analysis, a conclusive assessment of the performance correlates of developmental associations awaits multivariate investigation. Nonetheless, three preliminary inferences emerge from Table 2, which presents standard

Table 2
Productivity, Employment and Growth by Level of Involvement in Developmental Association

	No Involvement	Conferences, Monitoring Only	Substantial, but Not Full Involvement	Full Benchmarking
Productivity				
Average value added per worker in 1919	$3,169	$2,803	$3,426	$3,306
Average increase in value added per worker, 1919-1929	$270	$494	$298	$390
Growth				
Average workers employed in 1919	15,030	42,187	58,312	86,316
Average increase in employment, 1919-1929	2,002	3,488	24,720	12,876

measures of industry productivity, employment, and growth in the 1919 to 1929 period, broken down by levels of involvement in developmental association.[81]

First, there is no positive monotonic relation between productivity improvement or growth and the level of participation in developmental associations. Value added per worker and employment rates do not grow at a progressively higher rate between 1919 and 1929 the more deeply industries commit to these forms.

Second, the data undermine a widely held conclusion about associations in the 1920s, namely, that they were a new form of cartels designed to rationalize or manage long-term decline in "sick" industries. The data for 1919 show that developmental associations emerged in some of the most productive, high-performance sectors of American manufacturing. The average value added per worker for substantially involved and full benchmarking sectors in 1919 were $3,426 and $3,306, respectively, exceeding the $3,169 and $2,803 average value added for industries with no or minimal involvement.

Third, there is no evidence whatsoever that developmental associations produced performance outcomes typically associated with cartelization—reduced productivity improvement and decreases in output or growth. To the contrary, industries with developmental associations performed as well, if not better, than industries without them. They were certainly no worse off in terms of productivity improvement than sectors without developmental associations. And industries with substantially or fully developed benchmarking systems enjoyed a striking advantage in employment growth over those with no or minimal involvement.

V. CONCLUSION

The foregoing analysis yields two new empirical findings regarding associations and American industrialization. First, we show that there was substantial

variety *in* American capitalism in the age of industry. To be sure, mass production and corporate hierarchy became central organizing principles in the early twentieth century. But neither the size of the American economy, nor antitrust, nor the great merger wave precluded associations. Instead, actors responded to those conditions by reinventing associations: They created an associational alternative to mass production, using collaboration to channel competition from volume and cutthroat pricing into quality and productivity improvement. Between 1900 and 1930, developmental associations attracted support from a robust coalition of manufacturers, professionals, and policy makers. And they were institutionalized, in whole or in part, in a surprisingly wide array of industries, forging new institutional pathways in the U.S. economy.

Second, we document qualitatively new varieties *of* association, elaborating the classic typologies of Streeck, Schmitter, and company.[82] Many scholars have recognized that associations perform multiple functions: bargaining, information sharing, price fixing, labor training, standard setting, product simplification, export promotion, and education. But these categories—and the research practice of simply adding functions to form—do not capture either the qualitatively new varieties involved in developmental associations or the extent to which they reconfigured the technical core of mass production. Nor do they capture the challenge developmental associations pose for institutionalism. Unlike cartels, developmental associations rejected strategies to suppress competition, either directly, by enforcing compacts, or indirectly, by coordinating prices tacitly through information. Moreover, unlike corporatist schemes, rationalization, or standard-setting bodies, they sought neither to coordinate bargaining, solve collective action problems, train workers, impose product standards, nor manage industrial decline. Instead, we find collaborative learning systems operating according to different principles: developmental associations perturbed habits, invited firms to reflect upon background cost conditions, and used information, deliberation, and benchmarking to foster discovery, experimentation, and productivity improvement. They mobilized firms incrementally, via discussion and thought experiments, rather than by manipulating payoffs or turning to third party enforcement. They enabled firms to confront and transform their costs and competitive strategies, rather than treat them as exogenous pressures or taken-for-granted constraints. And they were adopted most extensively in productive, not sick or declining, sectors, enabling American manufacturers to equal or surpass the productivity rates of nonparticipating peers.

These findings fit uneasily within conventional approaches to institutional order and agency. Instead, they invite us to revise existing understandings on both fronts. Consider the prevailing iconographies of economic order. Drawing on images of divides, dominant logics, and path dependence, institutionalists commonly construe the history of American capitalism from 1870 to 1970 as the rise to dominance of a large-scale system of mass production corporations. Indeed, institutionalists have extensively theorized the mechanisms of closure, domi-

nance, and coherence, ranging from isomorphism, diffusion, and legitimacy, to lock-in, sunk costs, and institutional complementarities that help establish and reproduce national systems. Such work has made pivotal contributions to understanding cross-national differences in capitalism and the development of the mass production corporate sectors of the American economy. But its underlying images of order provide little leverage for making sense of developmental associationalism in the United States during the "age of corporate consolidation."

Twentieth-century American capitalism did not settle into a single national system, in which the parts reflected the whole according to a dominant logic or principle. On the contrary, at least one seventh of American manufacturing industries fell outside the orbit of corporate hierarchy, escaping the financial-industrial nexus described by Roy and others, and pursuing instead a developed associational alternative to mass production. At a minimum, this finding suggests that institutional constraints are far more partial, ambiguous, and incongruous than previously considered. It also suggests that even "settled" systems may prove rife with fragments of alternatives and abandoned or partly realized paths that remain available for subsequent use, assembly, and redeployment. In this conclusion, we join recent efforts by Orren and Skowronek, Crouch, Thelen, Streeck, Sabel, and Zeitlin to soften excessive determinism within institutional analyses of capitalism.[83] As we show, printers and other craft sectors were subject to antitrust, cartel failures, and the sway of the "volume illusion," as were large batch and continuous process manufacturers in lumber, rubber, and paint. Yet they were able to access, revive, and recombine earlier forms and practices, redeploying associations to new purposes and functions. And as they pursued, theorized, and transposed this project across industries and arenas, manufacturers, professionals, and policy makers forged new institutional pathways. In fact, our work suggests less an image of dominant logics, divides, or a coherent national economic order, than a view of American capitalism as a loosely coupled system composed of multiple—sometimes linked, sometimes autonomous, and sometimes conflicting—institutional projects, logics, or paths.

The discovery of developmental associations also challenges us to reconsider institutionalist assumptions that agency reflects background conditions. In this work, actors either calculate strategically within institutional and cost constraints, or they enact and elaborate taken-for-granted rules and understandings. Applied to associations, these assumptions frame interpretations of both institutional and individual action: On one hand, institutional architects reacted to antitrust, mass production, and the economic characteristics of industries by either abandoning associations for markets and hierarchies or reenacting cartels through information sharing. On the other hand, rational firms weighed their preferences within cost constraints, and decided whether to join associations and comply with their rules. In time, firms and institutional actors settled into equilibrium, wherein behavior became routine.

In our view, actors do not always capitulate passively to background conditions or constraints. Rather, as Sabel, Zeitlin, Stark, Joas, Sewell, and others note, agents can act reflexively.[84] That is, they exploit the irreducibly partial, incongruous, and ambiguous character of institutions, to test and revise limitations through experimentation, deliberation, and reinterpretation. Indeed, we cannot make sense of either the transition from price fixing to collaborative learning or the design of developmental associations without reconceptualizing agency as reflexive. Consider the transition to collaborative learning systems. After repeated failures to enforce price cartels, the printers and other businesses joined together to experiment with accounting conventions and principles of association. Suppose, they hypothesized, that cutthroat competition issued less from immutable industry conditions than from cost and accounting categories that prized volume over other forms of efficiency. If so, redesigning accounting principles might open alternative competitive strategies unthinkable with current conventions. In effect, the printers and their allies transformed background conditions and taken-for-granted logics into objects of discussion, revising accounting conventions to new ends. But this was only one part of a process of reflexivity and institutional redeployment. Following Eddy, associationalists turned monitoring for cheating into disciplined comparison, and factionalism and complaints over compliance into discovery and routine deliberation. And in the course of this work, the architects of developmental associations incorporated new accounting conventions into their revisions in organizational form. To be sure, reflexive agency was piecemeal and incremental. Yet by reassembling and combining innovations in accounting and association, institution builders bypassed the collective action problems associated with price cartels, forging alternatives to mass production in the American economy.

Consider, finally, the design and operation of developmental associations, which likewise only make sense in light of agents' capacity for reflexivity and collaborative learning. These associations worked not simply because they socialized members, enacted taken-for-granted categories, or enforced compliance to agreements. They were not mechanisms to solve prisoner's dilemmas or coordination games. Rather, they were *developmental* associations, which improved productivity by perturbing habits, sparking experimentation, and fostering collective reflection over the categories of economic action. Price experiments in tanning, paints, drugs, and plywood raised new questions about the relationships between production, costs, profits, and competitive strategy. Benchmarking made new cost and process comparisons possible, enabling firms to learn new lessons about improving products and production. And learning by benchmarking became the basis for periodically and collectively revising cost categories. In the end, it is only by appreciating both the ambiguities of institutional order and agents' capacities for reflexivity and learning that we can understand how developmental associations realized Eddy's hope for a new competition.

APPENDIX
INDUSTRIES AND NUMBER OF ASSOCIATIONS WITH AT LEAST SUBSTANTIAL INVOLVEMENT IN DEVELOPMENTAL ASSOCIATION, BY INDUSTRY GROUP

FOOD AND KINDRED PRODUCTS (5 ASSOCIATIONS TOTAL)
- Bread and other bakery products (1)
- Confectionery and ice cream (1)
- Flourmill and gristmill products (2)
- Food preparations, not elsewhere specified (1)

TEXTILES AND THEIR PRODUCTS (5)
- Awnings, tents, and sails (1)
- Clothing, men's (1)
- Clothing, women's (1 as above)
- Dyeing and finishing textiles, exclusive of that done in textile mills (1)
- Jute goods (1)
- Knit goods (1)

IRON AND STEEL AND THEIR PRODUCTS (8)
- Foundry and machine-shop products (3)
- Iron and steel, forgings, not made in steelworks or rolling mills (1)
- Stoves and hot air furnaces (1)
- Tin plate and terneplate (1)
- Typewriters and supplies (1)
- Wirework, including wire rope and cable, not elsewhere specified (1)

LUMBER AND ITS REMANUFACTURES (17)
- Boxes, wooden packing, except cigar boxes (2)
- Coffins, burial cases, and undertaker's goods (1)
- Furniture (4)
- Lumber and timber products (4)
- Lumber, planing-mill products, not planing mills connected with sawmills (4)
- Wood, turned and carved (1)
- Wooden goods, not elsewhere specified (1)

LEATHER AND ITS FINISHED PRODUCTS (2)
- Belting, leather (1)
- Leather, tanned, curried, and finished (1)

PAPER AND PRINTING (9)
- Boxes, paper and other, not elsewhere specified (2)
- Cardboards, not made in paper mills (1)
- Paper and wood pulp (2)
- Paper goods, not elsewhere specified (1)
- Photoengraving (1)
- Printing and publishing, book and job (2)

LIQUORS AND BEVERAGES (1)
- Liquors, distilled (1)

CHEMICALS AND ALLIED PRODUCTS (5)
- Druggists' preparation (1)
- Ink, printing (2)
- Paints (1)
- Varnishes (1)

STONE, CLAY, AND GLASS PRODUCTS (6)
- Brick and tile, terracotta, and fire clay products (3)
- Cement (1)
- Glass (1)
- Marble and stone work (1)

METALS AND METAL PRODUCTS, OTHER THAN IRON AND STEEL (1)
- Smelting and refining, copper (1)

TOBACCO MANUFACTURERS (0)

VEHICLES OF LAND TRANSPORTATION (0)

RAILROAD REPAIR SHOPS (0)

MISCELLANEOUS INDUSTRIES (7)
- Electrical machinery, apparatus, and supplies (2)
- Roofing materials (2)
- Rubber tires, tubes, and rubber goods, not elsewhere specified (1)
- Stationery goods (1)
- Washing machine and clothes wringers (1)

OTHER ASSOCIATIONS, NOT CATEGORIZED INTO INDUSTRY (8)

NOTES

1. In developing these findings, we add to a growing body of work that documents organizational diversity within national economies during the Fordist era. However, we go beyond work that often focuses on a single industry or case to add a form and a whole series of industries to the accumulating anomalies for uniform institutional images of national economies. See Phillip P. Scranton, *Endless Novelty: Specialty Production and American Industrialization, 1865-1925* (Princeton, N.J.: Princeton University Press, 1997); Phillip P. Scranton, "Diversity in Diversity: Flexible Production and American Industrialization, 1880-1930," *Business History Review* 65 (Spring 1991): 27-90; John K. Brown, *The Baldwin Locomotive Works, 1831-1915* (Baltimore: Johns Hopkins University Press, 1995); Howell J. Harris, "Getting It Together: The Metal Manufacturers' Association of Philadelphia," in Sanford M. Jacoby, ed., *Masters to Managers: Historical and Comparative Perspectives on American Employers* (New York: Columbia University Press, 1991); Gary Herrigel, *Industrial Constructions: The Sources of German Industrial Power* (Cambridge: Cambridge University Press, 1996); Charles F. Sabel and Jonathan Zeitlin, eds., *World of Possibilities: Flexibility and Mass Production in Western Industrialization* (Cambridge: Cambridge University Press, 1996); Gerald Berk, *Alternative Tracks: The Constitution of American Industrial Order, 1865-1917* (Baltimore: Johns Hopkins University Press, 1994); Gerald Berk, "Communities of Competitors: Open Price Associations and the American State, 1911-1929," *Social Science History* 3 (1996): 375-400; Marc Schneiberg, "Political and Institutional Conditions for Governance by Association: Private

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13. Arthur Jerome Eddy, *The New Competition* (New York: Appleton, 1912), 100-1.

14. See Bowman, "The Politics of the Market," 51, where he writes,

> When direct communication is impossible [because of antitrust], trade associations or similar institutions can perform a clearing house function and collect and disseminate "average" past prices or current prices, which, with very little imagination, can be transformed into current minimum prices. The same end can be achieved through the circulation of studies, which calculate "average" or "typical" costs. A more subtle method of communicating cost (and price) data among competing firms is through "cost education"—making sure that capitalists know all of their costs and circulating rules of thumb that tend to equalize costs (at a relatively high level) throughout an industry.

See also Bowman, *Capitalist Collective Action*; Gordon, *New Deals*; and Swenson, *Capitalists against Markets*. For a more general appeal to conceptualize business associations within an institutionally situated game theory approach as mechanisms to thicken expectations and otherwise solve coordination problems via information, see Hall and Soskice, "An Introduction to Varieties of Capitalism," 9-12; Culpepper, "Employers, Public Policy, and the Politics of Decentralized Cooperation in Germany and France"; and Culpepper, *Creating Cooperation*.

15. Eddy, *The New Competition*, 129-30.

16. Eddy, *The New Competition*, 148 (italics in original).

17. See J. H. Foy, *Uniform Cost Accounting Conference, Chamber of Commerce of the United States, New York City, March 25-26, 1924*, U.S. Chamber of Commerce Papers, Hagley Museum and Library, Acc. #1960, 84-87 (hereafter cited as CofC, March 1924); Robert Belt, *Uniform Cost Accounting Conference, Chicago, October 23, 1923*, U.S. Chamber of Commerce Papers, Acc. #1960, 4-5 (hereafter cited as CofC, October 1923); Austin Cheney, CofC, March 1924, 92; "7th International Cost Conference," National Association of Cost Accountants, *NACA Yearbook, 1926* (New York: National Association of Cost Accountants, 1921), 34 (hereafter cited as *NACA Yearbook* with year); and George N. Voorhees, "The Story of Production Records," *Typotehtae Bulletin* 21, no. 17 (July 27, 1925): 281.

18. *NACA Yearbook, 1921*, 163-64.

19. *Uniform Cost Accounting Conference held at Congress Hotel, Chicago, Illinois, October 28-29, 1924*, 81, Hagley Museum and Library, Papers of the U.S. Chamber of Commerce, Acc. # 1960 (hereafter cited as CofC, October 1924).

20. Understanding the sources, character, and consequence of this policy reflexivity is the topic for another article. Here we simply want to document how antitrust authorities came to embrace collaborative learning and developmental associations.

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22. Hurley, *Awakening*, 59.

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26. See address of NACA's second president, CofC March 1924, 51-57.

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29. CofC, October 1923, 87-91; CofC, March 1924, 3-5; and CofC, October 1924, 57-59.

30. Bowman, "Politics of the Market"; Bowman, *Capitalist Collective Action*; Gordon, *New Deals*; Swenson, *Capitalists against Markets*; Hall and Soskice, "An Introduction to Varieties of Capitalism"; Culpepper, "Employers, Public Policy, and the Politics of Decentralized Cooperation"; and Culpepper, *Creating Cooperation*.

31. S. V. Dunkel, CofC, October 1923, 14-17.

32. R. E. Little, "The Results of Twelve Month's Intensive Work in the Milk Industry," CofC, October 1923, 3-4.

33. S. V. Dunkel, CofC, October 1923, 14-17.

34. Eric A. Camman, *Basic Standard Costs* (New York: American Institute Publishing, 1932), 34-35. For evidence of Camman's vice presidency, see NACA letter to Cost Accounting Unit of the Research and Planning Division of the NRA, RG 9, Entry 256, Box 1.

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37. On the use of loose-leaf binders, see George J. Warmbold Jr., vice president of the Printing Ink Cost Bureau, CofC, October 1924, 5-11.

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41. Charles R. Stevenson, "The Future of Trade Association Cost Work," *NACA Yearbook, 1923*, 297-301; and Stevenson's 1926 address before ATAE on Standard Costs.

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51. On product costing, or the "productive hour method," see F. I. Ellick, "The Results a Cost System Should Bring," in *Proceedings of the Twenty-fourth Annual Convention of the United Typothetae of America, 1910* (Chicago: United Typothetae of America, 1910).

52. "A Few Things the Cost System Has Done for the JB Lyon Co.," *Proceedings of the Second International Cost Congress of Employing Printers of America* (Chicago: American Printers' Cost Commission, 1910), 33-35.

53. On the use of "fillers," see Testimony of Frank W. Fillmore in Hearings re: *FTC v. UTA*, National Archives, NARA, RG122, Box 217, File #459-2-1, 1055, 1062-63. On stationery and other sales taken at a loss, see Ellick, "The Results a Cost System Should Bring."

54. Mabel H. Dwyer, "Departmental Cost Analysis," in *Proceedings of the Forty-fourth Convention of the UTA* (Chicago: United Typothetae of America, 1930); also in *Typothetae Bulletin* 32, no. 3 (October 27, 1930): 100-3.

55. Powell, *History of the UTA*, 168-73; and *Proceedings of the Thirtieth Annual Convention of the United Typothetae and Franklin Clubs of America* (Chicago: United Typothetae of America, 1916), 45-46.

56. Powell, *History of the UTA*, 168-73; and *Proceedings of the Thirtieth Annual Convention of the United Typothetae and Franklin Clubs of America* (Chicago: United Typothetae of America, 1916), 45-46.

57. George N. Voorhees, "The Use of Production Records: How Interest in Records Work has Spread—Necessity of Accurate Estimating—Typothetae Production Records Provide Accurate Efficiency Gauge," in *Proceedings of the Thirty-ninth Annual Convention* (Chicago: United Typothetae of America, 1925); also in *Typothetae Bulletin* (October 26, 1925): 136.

58. George N. Voorhees, "Better Pricing of the Product of the Printing Plant," address before the Convention of the Seventh District Typothetae Federation of Springfield, Ohio (November 9, 1920). NARA, RG 122, Box 218, File 2/459-2, 8-9.

59. For UTA annual membership from 1888 to 1926, see Powell, *History of the UTA*, 192-93. For figures on the growth of local and regional associations, and cost system distribution, see *Proceedings of the Twenty Sixth Annual Convention of the UTA, September 3-6, 1912*, 33-37; *Proceedings of the Twenty-eighth Annual Convention of United Typothetae and Franklin Clubs of America, 1914*, 97-98; *Proceedings of the 30th Annual Convention United Typothetae and Franklin Clubs of America, 1916*, 39; *Proceedings of Twenty-seventh Annual Convention of the United Typothetae and Franklin Clubs of America, 1913*, 21-22; and *Proceedings of the First Printers' Cost Congress of the Southeastern States*, April 20, 1911. For a list of new locals, see *Proceedings of Twenty-seventh Annual Convention of the United Typothetae and Franklin Clubs of America, 1913*, 27-29. On the growth of the composite statement, see H. W. J. Meyer, "Report of the American Cost Commission," in *Proceedings of the Thirty-first Annual Convention, United Typothetae of America, 1917*, 89-91. A year later, the figures on the composite statement were very much the same; see *Typothetae Bulletin* 12, no. 5 (November 1918): 24.

60. "Meeting of the Executive Council of the UTA and the Advisory Committee of the Allied Interests, August 23 and 24, 1918," 3. NARA, RG 122, Box 216, File 2/459-2.

61. "Development of the Three Year Plan," Resume of Progress made by the UTA as Reported to Representatives of the Allied Industries at a Meeting with the Executive Council of the UTA on January 23, 1920; and Edward T. Miller, "Uniform Cost Systems," American Trade Association Executives, Proceedings and Addresses, Second Annual Convention, 1921, 67.

62. E. T. Miller, CofC October 1924, 92; and Testimony of Miller, in the Official Report of the Proceedings before the Federal Trade Commission, Docket 459, *FTC v UTA*, July 5, 1922, 982, 990-991, in NARA, RG 122, Box 217, File # 459-2-1.

63. W. O. Foote, "Will the Use of the Cost System Cause Loss of Business, and the Results?" in *Proceedings of the Second International Cost Congress of Employing Printers of America* (Chicago: American Printers' Cost Commission, 1910), 114-18.

64. Quoted in Miller, "Uniform Methods and Standardized Costs," 150-51.

65. *Typothetae Bulletin* 12, no. 7 (January 1918): 3.

66. Mabel H. Dwyer, "Departmental Cost Analysis," in *Proceedings of the Forty-fourth Convention of the UTA* (Chicago: United Typothetae of America, 1930); also in *Typothetae Bulletin* 32, no. 3 (October 27, 1930): 100-3.

67. Reported by George N. Voorhees, "Management and the Accountant," *Typothetae Bulletin* (October 26, 1925): 143-45.

68. *Proceedings of the Twenty-fourth Annual Convention of the United Typothetae of America, May 17-19, 1910 (Assn, 1910)*, 29-97; and Miller, "Uniform Methods and Standardized Costs," 150.

69. *Typothetae Bulletin* 12, no. 5 (November 1918): 25-26; "Development of the Three Year Plan," Resume of Progress made by the UTA as reported to Representatives of the Allied Industries at a meeting with the Exec Council of the UTA on January 23, 1920, p. 1. NARA, RG 122, Box 218, File 2/459-2; and Testimony of Edward T. Miller, in Official Report of Proceedings before the FTC, Docket No. 459, *In the Matter of FTC vs. UTA*, Chicago, July 5, 1922, p. 990. RG 122, Box 217, File 459-2-1.

70. "Development of the Three Year Plan," Resume of Progress made by the UTA as reported to Representatives of the Allied Industries at a meeting with the Exec Council of the UTA on January 23, 1920, 3. NARA, RG 122, Box 218, File 2/459-2.

71. In 1924, Secretary Miller told participants at a National Chamber of Commerce meeting on uniform cost accounting that printers had long been "next to last in the credit ratings, in 80th place and the 81st place was the saloonkeeper. They are up to about the 15th place now." Charles L. Estey, "Address on the Three-Year-Plan," before the National Paper Trade Association, the Writing Paper Mfrs. Association, and the Cover Paper Mfrs. Association, June 1919, NARA, RG 122, Box 218, File 2/459-2. E. T. Miller, Uniform Cost Accounting Conference, Chicago, October 28-29, 1924, U.S. Chamber Papers, Acc. #1960, p. 95. See also Edward T. Miller testimony in *FTC v. UTA* Hearings, Chicago, etc., 928; George H. Gardner, vice president of the UTA, "Price Control," *Typothetae Bulletin* 12, no. 5 (November, 1918): 147-48. In 1917, the UTA conducted its own credit study, comparing a sample of "those members who used the Standard Cost system and an equal number of the same kinds and character of plants outside of the Organization." They found that "of the Cost System users, 84 percent were given first-grade credit. . . . Of those plants outside of the Organization, it was shown that 38 percent of them had no credit rating whatever." See *Proceedings of the 31st Annual Convention, United Typothetae of America, 1917*, 23-27. Four years later, the association reported that according to Dun and Bradstreet's, 90 percent of the failures in the printing business in 1921 were in cities without a UTA chapter. "The Proof of the Puddin'," *Typothetae Bulletin* 17, no. 25 (September 17, 1923): 389.

72. Elizabeth F. Baker, *Displacement of Men by Machines: Effects of Technological Change in Commercial Printing* (New York: Columbia University Press, 1933), 18-24, 201. Baker divides her figures on press sales at 1913. In order to adjust for the effects of uniform cost accounting, we reconfigured her calculations to break at 1916.

73. Between 1900 and 1919, value added per worker in book and job printing increased from $26,372 to $31,118. These levels exceeded the average value added per worker for all

American manufacturing industries by $3,825 to $7,864. Following the three-year plan, value added for printers increased from $31,118 in 1919 to $50,411 in 1929, levels that exceeded the American manufacturing average by $9,058 to $14,469.

74. Warren D. Devine Jr., *Technological Change and Electrification in the Printing Industry, 1880-1930*, Institute for Energy Analysis, Oak Ridge Associated Universities, January 1985, Research Memorandum ORAU/IEA-84-8 (M), 58-59; and Baker, *Displacement of Men by Machines*, 48-80. Nor was the continued decentralization of the industry a foregone conclusion. In the late 1910s and the early 1920s, census data seemed to show the opposite and some knowledgeable commentators predicted continued concentration. See Lewis, "The UTA Marketing Program," 96.

75. As noted in part I, the Chamber of Commerce formed its own uniform cost accounting group, and convened a series of conferences in April 1920, October 1923, and March and October 1924, bringing together hundreds of firms and associations to discuss cost accounting systems and their implementation. These conferences provide us with lists of participants, as well as proceedings and papers describing what particular associations had done to develop and operate classification schemes, costs manuals, and benchmarking systems. In addition, the Federal Trade Commission conducted an extensive investigation of open price associations in the 1920s, generating an inventory of associations that had "Uniform Systems" and a table documenting the activities of those organizations in some detail in its 1927 Report. Taken together, these sources provide a wealth of detailed data on developmental associations and their activity across American industries in the 1920 to 1925 period.

76. In compiling this list, we focused on associations—they dominated the conference proceedings numerically and were the only organizations listed in the FTC study. Yet we also kept track of businesses, typically large corporations like Kodak, Bethlehem Steel, and AT&T, who attended conferences, but as individual firms rather than as officers, representatives, or members of associations.

77. Note that in constructing these data sets, we took a conservative approach in assigning higher levels of involvement to associations and industries. We coded them to the *substantial involvement* or *benchmarking* categories only when archival materials and reports provided detail on those associations and when that information supported such categorizations. In contrast, all associations for which such information was absent were restricted to the minimal, or *any involvement*, category, even though it is quite possible that some in this group were more deeply involved. As a result, our data likely underestimate the number of associations and industries substantially or fully involved in benchmarking activities.

78. This group of firms included AT&T and Stromberg Carlson, Kodak, Johnson and Johnson, National Cash Register, Standard Chemical, and Harrisburg Shoe, as well as General Tire, Deere, Corona Typewriter, and a number of large steel producers including Bethlehem, Laclede, and Peerless Tube.

79. The figures presented are calculated as percentages of (1) the total number of manufacturing industries listed in the U.S. Census in 1919, and (2) the estimated number of national and regional business associations in existence in the United States in the 1920s. Reliable estimates of associations during this time period vary between 600 and 1,000. For perhaps the most comprehensive study, which results in the lower estimate, see Howard Aldrich and Udo Staber, "Organizing Business Interests: Patterns of Trade Association Founds, Transformations and Deaths," in Glen Carroll ed., *Ecological Models of Organization* (Cambridge, Mass.: Ballinger, 1988), 123; and Howard Aldrich, Udo Staber, Catherine Zimmer, and John J Beggs, "Minimalism and Organizational Mortality: Patterns of Disbanding among U.S. Trade Associations, 1900-1983," in Jitrendra Singh, ed., *Orga-*

nizational Evolution (Beverly Hills, CA: Sage, 1990), 33. Studies from the 1920s to 1940s vary between 500 and 1,500 (though the latter includes about 500 fraternal associations). After careful review, the National Industrial Conference Board (NICB) concluded there were between 800 and 1,000 national or interstate business associations in 1925. See National Industrial Conference Board, *Trade Associations: Their Economic Significance and Legal Status* (New York: National Industrial Conference Board, 1925): 319-26. Jay Judkins, *National Associations of the United States* (Washington, D.C.: U.S. Department of Commerce, 1949), viii, and *National Trade and Professional Associations of the United States* (New York: Columbia Books, 1990), 7, both report approximately 1,000 trade associations in 1920. We report the interval between 600 and 1,000.

80. In *The Great Merger Movement*, 88fn1, Lamoreaux finds that 52 of the 232 industries in her study, or 22 percent, experienced significant consolidation activity during the great merger wave, a figure broadly consistent with Fligstein's reanalysis, which finds that 21 percent of 230 sectors, or 48 industries, underwent consolidation (in *Transformation of Corporate Control*, 318-19). Curiously, there are no established metrics or benchmarks in the literature on economic organization for establishing when or where a particular form, institutional logic, or industrial order becomes significant or dominant within an economy.

81. These are industry level data from the 1919 and 1929 Census of Manufactures. Productivity data consist of (1) the average of the value added per worker for all of the industries falling in each category for 1919, and (2) the average of the increase in the value added per worker from 1919 to 1929 for all industries in each category. Growth data consist of (1) the average of the number of workers employed per industry for all of the industries falling in each category for 1919, and (2) the average of the increase in employment from 1919 to 1929 for all industries in each category. The averages are not adjusted for the sizes or initial productivity. Note that the involvement categories listed here are mutually exclusive and exhaustive.

82. Wolfgang Streeck and Philippe Schmitter, "Community, Market, State-and Associations? The Prospective Contribution of Interest Governance to Social Order," in Wolfgang Streeck and Philippe Schmitter, eds., *Private Interest Government* (Beverly Hills, CA: Sage, 1985); Michael Atkinson and William Coleman, "Corporatism and Industrial Policy," in Alan Cawson, ed, *Organized Interests and the State* (London: Sage, 1985); Philippe Schmitter, "Neo-corporatism and the State," in Wyn Grant, ed., *The Political Economy of Corporatism* (London: Macmillan, 1986); Schneiberg and Hollingsworth, "Can Transaction Cost Economics Explain Trade Associations?"; and Lindberg, Campbell, and Hollingsworth, "Economic Governance and the Analysis of Structural Change in the American Economy."

83. See notes 2 and 3 above. We also draw here on our own recent work along these lines, and research by new institutionalists in organizational sociology that have begun to reconceptualize systems and fields as constituted by multiple institutional logics. See Berk, *American Possibilities*; Schneiberg, "Organizational Heterogeneity and the Production of New Forms"; and Marc Schneiberg, "Private, Public, or Cooperative? Economic Order, Institutional Embeddedness and Organizational Form in the US Electrical Utility Industry," paper presented at the annual meeting of the Society for the Advancement of Socio-Economics, Minneapolis, Minnesota, June 27-30, 2002. The classic piece in sociology is Roger Friedland and Robert R. Alford, "Bringing Society Back In: Symbols, Practices and Institutional Contradictions," in Powell and DiMaggio, eds., *The New Institutionalism in Organizational Analysis*. See also Bruce Carruthers and Sarah Babb, "The Color of Money and the Nature of Value: Greenbacks and Gold in Postbellum America," *American Journal of Sociology* 101 (1996), 1556-91; Elizabeth Clemens, *The People's Lobby: Organizational Innovation and the Rise of Interest Group Politics in the United*

States, 1890-1925 (Chicago: University of Chicago Press, 1997); Hayagareeva Rao, "Caveat Emptor: The Construction of Nonprofit Watchdog Organizations," *American Journal of Sociology* 4 (1998): 912-51; W. Richard Scott, Martin Ruef, Peter Mendel, and Carol Caronna, *Institutional Change and Healthcare Organizations* (Chicago: University of Chicago, 2000); and Robin Stryker, "Legitimacy Processes as Institutional Politics: Implications for Theory and Research in the Sociology of Organizations," in Samuel Bacharach and Edward Lawler, eds., *Research in the Sociology of Organizations* (Greenwich, Conn.: JAI, 2000).

84. Berk, *American Possibilities*, chap. 1, provides a fuller discussion of reflexivity and agency in institutional development, and the related concepts of recombination, syncretism, and redeployment. See also, Sabel, "Learning by Monitoring"; Sabel and Zeitlin, "Stories, Strategies, Structures;" Stark, "Recombinant Property in Eastern European Capitalism"; Berk, "Discursive Cartels"; Joas, *The Creativity of Action*; Sewell, "A Theory of Structure"; Clemens, *People's Lobby*; Calvin Morrill, "Institutional Change and Interstitial Emergence: The Growth of Alternative Dispute Resolution in American Law, 1965-1995," in Walter Powell and Dan Jones, eds., *How Institutions Change* (Chicago: University of Chicago, 2003); and Kathleen Thelen, *How Institutions Evolve*, chap. 1 (unpublished ms., 2003).

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