Credit and Classification: The Impact of Industry Boundaries in Nineteenth-century America

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In this article, we examine how issues of multi-category membership (hybridity) were handled during the evolution of one of the first general systems of industrial classification in the United States, the credit rating schema of R. G. Dun and Company. Drawing on a repeated cross-sectional study of credit evaluations during the postbellum period (1870–1900), our empirical analyses suggest that organizational membership in multiple categories need not be problematic when classification systems themselves are emergent or in flux and when organizations avoid rare combinations or identities involving ambiguous components. As Dun's schema became institutionalized, boundaries between industries were more clearly defined and boundary violations became subject to increased attention and penalty by credit reporters. Our perspective highlights the utility of an evolutionary perspective and tests its implications for the salience of distinct mechanisms of hybridity.•

Classification plays a ubiquitous role in identifying and evaluating organizations in contemporary society. Phone books, newspapers, and the Internet offer classified listings of businesses and services, guiding our consumption activities, job searches, and appraisal of local amenities. Trade directories, catalogs, and reviews offer more specialized categorical schemata, with functions ranging from the rating of dining establishments (Rao, Monin, and Durand, 2005) and enumeration of distinct investment opportunities (Lounsbury and Rao, 2004) to the differentiation of artistic genres and producers (DiMaggio, 1987; Hsu, 2006a). Government agencies and academics rely on standard industrial classification systems, which emerged around the time of World War II in the United States (Kolesnikoff, 1940) and abroad (Beales, 1949) to assist in the collecting of official statistics and developing industrial policy.

A burgeoning literature in organizational theory, and social science more generally, focuses on how classification affects processes of social evaluation. Central to many of these arguments is the intuition that mass audiences and formal gatekeepers have difficulty understanding categorical misfits (Hsu, 2006a; Whetten, 2006) and devalue objects that cannot be assigned readily in a system of existing classifications (Hannan, Pólos, and Carroll, 2007). Although much of this research focuses on relatively stable classifications, recent work also places an emphasis on evolving categories and roles in a more dynamic perspective. One such perspective extends research from the ecological tradition, which has traditionally focused on the legitimation of singular organizational forms (Pólos, Hannan, and Carroll, 2002). The extension draws attention to factors that dampen the development of organizational populations, preventing legitimation and, consequently, the flow of approval and resources to organizations struggling in a new category. New-form recognition is especially problematic for populations that have a large number of entrants that are also involved in other domains (McKendrick and Carroll, 2001). These firms lack a focused identity, weakening the recognition needed to help legitimate and institutionalize a category (McKendrick et al., 2003).

In a related strand of work, appraisal of hybrid forms is conceptualized in terms of an actor's fitness in a role or form over time. Applying this typecasting perspective, scholars emphasize the sullying of an otherwise legitimate identity (Phillips and Zuckerman, 2001). The assumption of a complex identity is less problematic than the premature role transitions and combinations that lead an actor to "be regarded as too much of a dilettante to be accepted in any particular role" (Zuckerman et al., 2003: 1020; see also Faulkner, 1983). Having a complex identity remains possible if an actor has already achieved a degree of acceptance that allows observers to interpret deviance as broadening an identity rather than tarnishing it (Phillips and Zuckerman, 2001).

Although the form-emergence and typecasting perspectives employ distinct levels of analysis and focus on different outcomes, they share a common emphasis on the effect that hybridity exercises on the perceptions of audience members (see Hsu, Hannan, and Pólos, 2009). They offer less insight into how hybrid forms are valued or devalued as classification systems evolve over time, affecting the heuristics used to recognize and evaluate social objects. It is not enough to say that spanning static boundaries affects the legitimacy of organizational forms or the typecasting of actors' identities. Forms co-evolve, and meaningful identities are constructed in the context of classification regimes.

An evolutionary perspective calls attention to the ambiguity, rarity, and boundary violations of hybrid forms. First, the ambiguity of an underdeveloped organizational form lowers the recognition and evaluation of a hybrid combination that incorporates it. Because the emergence of a specific organizational form stalls when a large number of entrants are connected to other established industries (McKendrick and Carroll, 2001), a specific hybrid combination is likely to be devalued when the hybrid is connected to an underdeveloped form. Such ambiguity should be especially problematic if classifications are intended to capture the central and enduring features that constitute the identity of an organization and differentiate it from others (Albert and Whetten, 1985; Whetten, 2006). Second, the rarity of a hybrid lowers its recognition and evaluation. From an ecological perspective, density-dependence arguments apply to both singular forms and hybrids. When there are few exemplars that are similar to a particular hybrid combination, this results in a lower organizational density and consequently a lower level of legitimacy attributed to the combination (Carroll and Hannan, 2000). Third, the institutionalization of an entire system of forms and boundaries makes boundary violations more salient. Typecasting emphasizes the boundaries between organizational forms; hybrids become devalued when they violate classificatory codes that enjoy an imperative standing (Pólos, Hannan, and Carroll, 2002). In the early stage of a classification system's development, however, evaluative heuristics employed by gatekeepers and general audiences are likely to be underdeveloped, ruling out the risk of violation and subsequent devaluation (Rao, Monin, and Durand, 2005; Hsu, 2006b).

Prior analyses of categorical boundaries have tended to assume that the classification schemata used to evaluate

organizations or products are mature and stable, despite theoretical and empirical evidence that underscores their dynamic nature (Hannan and Freeman, 1986; Rao, Monin, and Durand, 2005; Haveman and Rao, 2006). In the absence of a situation in which classificatory codes have not yet attained an imperative status, however, it is difficult to assess whether hybrids are devalued because they violate industry boundaries or because they represent rare or ambiguous combinations of organizational activity. Further advances in research on the problem of organizational hybridity may therefore hinge on our ability to connect the literature on the evaluative impact of classification with that on the evolution of classification heuristics over time (Mohr and Duquenne, 1997; Ruef, 1999; Lounsbury and Rao, 2004). In this article, we offer an initial step in this direction. We trace the emergence of one of the first general systems of organizational classification in the United States and analyze its effects on the evaluation of individual enterprises. Systematic classification originated in mercantile agencies that sought to evaluate the credit-worthiness of businesses for purposes of trade finance and investment (see Carruthers and Cohen, 2006). Between the late 1850s and 1900, the most successful of these ventures, R. G. Dun and Company, developed an approach to classification that would remain in widespread use until after World War II. Although narrowly conceived for credit rating, the schema was soon widely adopted by American businesses for purposes of marketing, procurement, site planning, and evaluating competitors (Hayes, 1948). To test the impact of classification on organizational hybrids, this study draws on an extensive archive of materials from Dun and Co., including the classifications and credit ratings applied to a sample of over 100,000 business enterprises between 1870 and 1900.

PROBLEMS OF CLASSIFICATION FOR HYBRID ORGANIZATIONS

Observers and members try to define and understand the organizations they encounter by using classification schemata. In the abstract, an ideal classification system displays such properties as a set of categories that are mutually exclusive, a consistent set of rules for assigning objects to categories, and complete coverage of a substantive domain via the categories and rules at hand (Bowker and Star, 1999: 10–11). In reality, any exercise in classification is likely to reveal considerable imperfection and arbitrariness. As Albert and Whetten (1985: 267–268) noted, "schemes may not be completely elaborated or defined, their dimensions may be assembled without a consistent plan and without care to their independence[;] organization[s] may only be ambiguously or vaguely located within each scheme, and different schemes may be employed on different occasions with self-interest [being] the only principle of selection." Consequently, observers and members often encounter difficulties in mapping organizations and products to taxonomies, particularly when those taxonomic schemes are new or evolving.

From the standpoint of any given system of classification, hybrids can be defined as organizations "whose identity is composed of two or more types that would not normally be expected to go together" (Albert and Whetten, 1985: 270).

Parsing different interpretations of the phrase "would not normally go together," we arrive at three distinct problems that are faced by organizations that are classified as hybrids. The first is that they tend to be rare. To draw on Albert and Whetten's example of a church that operates a bank, for instance, there are relatively few other exemplars that participants can learn from or that external observers can use to inform their evaluations of such an organization. A second problem is ambiguity, resulting from the difficulty in knowing what implicit features of a hybrid organization's identity apply in any given context. When speaking with religious audiences, representatives of the church-bank hybrid may refer to it as a church that also has involvement in related business activities; or, when speaking with financial audiences, as a bank that also has responsibilities in the nonprofit realm. The reliance on residual categories in these instances serves to downplay explicit conflict between the identities of church and bank but leaves audiences uncertain about the exact range of activities that the organization is involved in. A third problem facing hybrids is their tendency to violate explicit boundaries, as recognized by either external audiences or organizational members. The church-bank hybrid may fall into this trap as well, insofar as the imperative requirements of the church (e.g., moral guidance for congregation members) are fundamentally different from those exhibited by the bank (fiscal responsibility to depositors). In large, multi-unit organizations, some of these issues can be addressed by assigning separate identities to different units and limiting the amount of interaction between them (Albert and Whetten, 1985: 271), but this is not possible for small organizations. For small hybrids what may matter is how many other comparable hybrids populate the organizational landscape.

Effects of Hybrid Frequency

In a widely rehearsed ecological argument, the constitutive legitimacy of an organizational population is expected to increase with density, possibly up to some ceiling, at which point the corresponding organizational form is viewed as being taken for granted (Carroll and Hannan, 2000). Recent extensions of this argument have noted that audiences often assign membership in organizational forms on a partial basis (Hannan, Pólos, and Carroll, 2007) and that the constitutive legitimacy of populations that feature such unfocused identities may suffer as a consequence (McKendrick and Carroll, 2001). Considering the case of disk array producers, for instance, McKendrick and his colleagues (2003) suggested that there was limited recognition of this emerging product category as a distinctive organizational form, owing largely to the substantial number of entrants with origins (and concurrent activities) in a wide range of other industries. They posited a social psychological mechanism impeding the identification of disk array firms as a separate industrial category. The unfocused identity of disk array producers meant that insiders and outsiders were less likely to recognize the category perceptually, less likely to adopt implicit rules governing the category's boundaries, and less likely to engage in activities that would promote an understanding of the category (McKendrick et al., 2003: 66).

To a considerable extent, these arguments can be extended to the industry categories employed in credit markets. A lack of focus in the identity of hybrids is also likely to affect their perceptual recognition among credit reporters. Historically, a key component of credit coverage has involved the judgment of a firm's or proprietor's "character" and their assignment to a standard type with a narrative that predicts the future prospects of the enterprise (Sandage, 2005; Olegario, 2006). By their very nature, hybrids can complicate such standardized narratives. When a hybrid is common and is frequently encountered by agents (e.g., hotel and restaurant), it may allow agents to agree on the extension and meaning of a combined label (Hannan, Pólos, and Carroll, 2007). When a combination is rare (drug store and bakery), however, agents have few other exemplars to turn to and little guidance to judge the hybrid. As a consequence, we anticipate that credit reporters will have a far greater propensity to cover those hybrid businesses that occur frequently.

Hypothesis 1 (H1): The credit coverage of hybrid organizations increases when the hybrid combination is common.

Because the ecological argument concerns the effect of organizational frequency on constitutive legitimation, it bears primarily on the ability of agents to recognize and understand an organizational type, not on their evaluation of that type. Other research concerning category evolution, such as a study of the erosion of categorical boundaries in French gastronomy (Rao, Monin, and Durand, 2005), sheds light on evaluation processes as well. Considering the distinction between classical and nouvelle cuisine, Rao and his colleagues analyzed the consequences that accrue to chefs and restaurants that borrow from a rival category, for example, a classical restaurant that introduces some dishes based on nouvelle cuisine elements. Borrowing increases the risk of a downgrade among critics, but this effect is attenuated significantly with increases in the proportion of chefs who borrow elements from a rival category in a given year. If this process can be extended to credit markets, we would anticipate that the negative credit ratings that reporters apply to hybrids could be counteracted for frequent combinations of trades. In those instances, sanctions against hybridity should weaken as combinations become taken for granted and reporters no longer view them as negative reflections on unfocused entrepreneurs with "too many irons in the fire" (Olegario, 2006: 105).

Hypothesis 2 (H2): The credit evaluation of hybrid organizations increases when the hybrid combination is common.

Effects of Ambiguity

Hybrids spanning well-defined, if not institutionalized categories are unfocused in terms of their public identity (Hannan, Pólos, and Carroll, 2007), as the aforementioned problem of hybrid rarity suggests. The problem of hybridity may pose even greater difficulties to audience members when one of the components of a hybrid combination is difficult to place in a classification system. McKendrick and his colleagues (2003) suggested that entry of firms from other industries stalls the

legitimation of a new form. When entering into a new market, a hybrid projects a weak signal that minimizes, if not removes, its contribution to the felt legitimacy of the upstart category. At the same time, the lack of focus attributed to the upstart category generates problems of recognition and evaluation for the hybrid organization. If an organization can be mapped to more than one category, and one of those categories cannot be understood without additional contextual information, a problem of ambiguity arises (Abbott, 1997).

Organizational audiences are confronted on a regular basis with problems of ambiguity. Industrial categories may be ill-equipped to classify new lines of business, analysts lack schemata to deal with exceptions, and contextual information for resolving ambiguity is absent. For instance, in classifying a resort hotel in a categorical schema, an audience member may have access to categories for hotel, golf course, amusement park, spa, and miscellaneous, but none for resort. Lacking contextual information, the assignment of a category to the line of business becomes a matter of guesswork (e.g., hotel and amusement park versus hotel and spa), a failure to resolve ambiguity (hotel and miscellaneous), or the elision of categorical information in its entirety (no classification at all). When these circumstances occur in credit markets, we anticipate that analysts will rely more heavily on residual categories and tend to ignore businesses that are involved in a range of activities whose extent is undetermined or cannot be described adequately with the classification system at hand.

Hypothesis 3 (H3): The credit coverage of hybrid organizations declines when their public identities are classified as being ambiguous.

Failing to have a descriptive label from a classification system attached to a component category of a hybrid presents more than just a recognition problem. When a hybrid organization is relegated, in part, to an industrial category that carries the label of miscellaneous, etc., or NEC (not elsewhere classified), there is considerable uncertainty about the range of activities or products that it offers, handicapping an audience's ability to effectively interact with and evaluate the organization. The impact of this uncertainty tends to be greatest when such residual designations are not distributed throughout a classification system but appear only in generic form as a top-level category (Bowker and Star, 1999), as they do in early systems of credit and classification.

Hypothesis 4 (H4): The credit evaluation of hybrid organizations declines when their public identities are classified as being ambiguous.

Effects of Boundary Violation

Whereas the problem of ambiguity reflects poorly evolved categories, the problem of boundary violation reflects the poor fitness of organizations within those categories. As research on typecasting suggests, when firms meet the basic requirements for membership in multiple well-developed categories, and the categories clash, audiences are concerned with the resulting fitness within each category (Zuckerman et al., 2003; Hsu, Hannan, and Pólos, 2009). Audiences come to associate certain features with particular categories and evaluate organizations and their products on that basis.

Because organizations that span multiple categories are unlikely to exhibit the prototypical features of each one, they suffer from illegitimacy when examined on the basis of categorical expectations (Hannan, Pólos, and Carroll, 2007). Moreover, audience members who are gatekeepers (e.g., critics) develop schemata to help them evaluate organizations and products. When these social objects do not match imperative categories, gatekeepers devote less attention to covering and analyzing them (Zuckerman, 1999; Hsu, 2006b). Mass audiences then ignore organizations or products that are bereft of critical coverage.

A notable difficulty in isolating the effects of boundary violations for any given classification system is that "technical classifications grow out of and have to answer to our common sense, socially comfortable classifications" (Bowker and Star, 1999: 67; see also Durkheim and Mauss, 1963). For example, one could argue that Dun's system of industrial classification in the nineteenth century came to regard a "drug and grocery store" as a common yet problematic hybrid, not because credit analysts viewed this as a combination of two trades that ought to be separated but because the folk taxonomy of the general public already questioned whether a proprietor could functionally combine the skills of apothecary and grocer. To isolate the impact of boundary violations within a given classification system, we require a before-and-after design, in which hybrids such as "drug and grocery store" only become devalued once the boundaries between their constituent organizational forms have been institutionalized. Subject to this caveat, an emphasis on industrial boundaries proposes that:

Hypothesis 5 (H5): The credit coverage of hybrid organizations declines when they cross institutionalized industry boundaries.

Hypothesis 6 (H6): The credit evaluation of hybrid organizations declines when they cross institutionalized industry boundaries.

Theoretical Integration and Scope Conditions

The operational mechanisms linked to problems of hybridity in the literature are distinctive—focusing on rarity, ambiguity, and boundary violations—but theorists share a common argument that the challenge for these categorical misfits is that they are difficult to understand and communicate. Given the operational mechanisms, a key difference among the perspectives is whose understanding is impeded by hybridity. For scholars who focus on the density of hybrid organizations (e.g. McKendrick et al., 2003), a core assumption is that a lack of constitutive legitimacy can, in principle, impede the ability of any audience to understand an organizational form—that is, rarity is an objective property of hybrids. For scholars who emphasize boundary violations among critics or mass audiences, a core assumption is that a lack of understanding arises from the interface between an audience and a set of candidates (Zuckerman, 1999)—boundary violations occur in an intersubjective relationship in which hybrids fail to match the expectations of a particular audience. The logical formalization of Hannan, Pólos, and Carroll (2007) combines insights from both the ecological and audience-based views of hybrids. Finally, scholars who consider the ambiguity of organizational

identities (Albert and Whetten, 1985) suggest that the lack of understanding arises as well from the self-perception and self-promotion of organizational participants—ambiguity thus occurs subjectively when a social participant lacks adequate categories or contextual information to classify a hybrid.

In testing the perspectives within a common framework, these distinctions are important because they suggest different scope conditions that pertain with respect to the institutionalization of a classification system. Arguments that revolve around the categorical boundaries drawn by audiences, for instance, are contingent on the institutionalization of genres (DiMaggio, 1987), "consideration sets" (Zuckerman, 1999), or other higher-order classifications that indicate which objects belong together. To some extent, they also rely on the professional specialization of an audience on the basis of these consideration sets. Arguments concerning ambiguity assume that new categories do not emerge specifically to resolve the placement of organizations in residual or miscellaneous categories and, moreover, that institutionalization does not produce routinized methods that allow social participants to deal with residual categories. And arguments about hybrid frequency assume that the categories institutionalized in a classification system are in accord with the taken-for-granted forms that populate the organizational landscape. These scope conditions, in turn, reflect the nature of the audience that is conceptualized by each perspective: how does an institutionalized classification system relate objectively to the organizational forms that exist in a society; how does the classification system institutionalize the intersubjective relationship between an audience and a set of candidates that are to be evaluated; and what cognitive tools does a classification system offer to participants for them to manage their subjective perceptions of organizations?

CLASSIFICATION IN NINETEENTH-CENTURY AMERICA

We tested our hypotheses in a setting in which industrial classification was in the process of being institutionalized, focusing on business enterprise in late-nineteenth-century America. The institutionalization of this classification system was predicated on four properties: (1) categories in the system were sufficiently detailed so that it became clear when a boundary violation had occurred; (2) individuals using the classification system were trained specifically for this purpose; (3) there was a proliferation of organizations that promoted or drew on the classification system; and (4) the classification system was not viewed as being subject to legal or moral reproach. As highlighted by contemporary perspectives on institutionalization (Scott, 2007), the process thus drew on multiple foundations, including the gradual protection of credit classifications in law and jurisprudence (a regulative foundation), the acceptance of the schema by professionals and arbiters of business ethics (a normative foundation), and the intuitive understanding of those categories by credit reporters and other business audiences (a cognitive foundation).

Issues of hybridity were widespread in classifying business enterprise in the nineteenth century. Although commercial

specialization, particularly for wholesalers, had become prevalent in urban centers since the colonial period (Porter and Livesay, 1971; see Doerflinger, 1983, on the case of Philadelphia), retail proprietors in more rural areas continued to engage in diversified trade, offering an eclectic variety of product lines and services. In the postbellum Cotton South, for instance, an estimated 23 percent of all businesses engaged in multiple trades. On first contact, customers, suppliers, and creditors dealing with these enterprises faced considerable uncertainty as to how much inventory or labor was devoted to a particular line of business and, in some cases, whether such commitments were stable throughout the year or subject to seasonal variation. From the perspective of historical contemporaries, these unfocused pursuits also raised questions about the character and capacity of the business proprietors who were involved in them. As Olegario (2006: 105) noted, "the inability to remain in one pursuit was as much a danger as was the lack of enterprise[;] business writers warned against the perils of tying up capital, time, and energy in outside ventures."

Classification of some enterprises was even more difficult, given their adoption of inherently ambiguous identities. The term "sundries"—suggesting miscellaneous products, odds, and ends—dates to the mid-eighteenth century and was soon adopted by business proprietors who had extended their inventory or services in an undefined way (e.g., "drug store and sundries"). This ambiguity was encouraged by distribution practices at the time, given that wholesalers often added miscellaneous free goods to shipments as a competitive strategy. For instance, Clark (1946: 31, n. 13) described a characteristic case from the late 1800s in which a merchant transacting with Blackwell's Durham Tobacco Company "was given ten 25-pound boxes of soap with an order for the same amount of tobacco." Lacking detailed contextual knowledge about an enterprise's clientele and suppliers, some observers could only guess as to the lines of business it was engaged in.

Problems of hybridity were especially salient for the correspondents who were charged with evaluating the credit worthiness of businesses on behalf of mercantile agencies. Mercantile agencies operated "by classifying people [and firms], putting them into boxes tagged 'failure' or 'success,' 'winner' or 'loser'" and were paid "a premium for clear distinctions and bold contrasts" (Sandage, 2005: 10). In his treatise on credit evaluation, Peter Earling, a leading authority on mercantile credit during the late 1800s, warned that "no matter how great a man's ability, he can not hope to master every calling[;] to select *the* vocation suited to our special ability, is the most important step in a man's career" (Earling, 1890: 55, italics added). Contrary to other domains that have been studied by organizational scholars—such as art, films, gastronomy, and stock picking—the principle objective in nineteenth-century credit rating "was to minimize risk, not to encourage it as a source of growth or innovation" (Sandage, 2005: 142).

To modern observers, this emphasis on focus may seem odd, particularly when we consider arguments touting the financial benefits of diversification, however historically contingent

they may be (Davis, Diekmann, and Tinsley, 1994). But it is also important not to equate diversification (or multi-business firms) with hybridity. The former concept refers to a producer-side perspective, in which a firm hedges against risk by combining a number of (potentially unrelated) lines of business. The latter concept refers to an audience-side perspective, in which a firm is perceived to fall into multiple business categories by a particular audience (see also Hsu, Hannan, and Koçak, 2009). In our nineteenth-century context, the historical record reveals a prominent example of an organizational form that was highly diversified but that was not treated as a hybrid by credit reporters: the general store. In the postbellum South, general stores were involved in numerous and diverse lines of business, ranging from the sale of dry goods to the leasing of agricultural implements to the provision of banking services (Ransom and Sutch, 2001). But because they were the most common non-agricultural form at the time, general stores were recognized as a distinct organizational category by nineteenth-century audiences, rather than as hybrids. Fleshing out the perceptual bases of hybridity thus requires further attention to the classification systems that were adopted at the time and the purpose for which they were deployed, not just the diversity of products that were offered by business enterprises.

Credit and Classification

Antebellum business transactions suffered from fundamental gaps in information and trust. Local stakeholders could gain knowledge about a business through physical inspection or through their social networks, but audiences located at some distance had to rely on less reliable sources, such as letters of reference or reputational hearsay (Madison, 1974). The information gap was especially acute for providers of credit, who often offered loans or financed trade without the benefit of direct contact (Carruthers and Cohen, 2006; Olegario, 2006). Data for business loans, in the modern sense, only comprised a minor part of this information gap. Given the lack of efficient transportation and communication networks, any business transaction involving goods or services delivered at a distance could impose a need for credit assessment. This need was compounded by the scarcity and lack of standardization in hard currency during the colonial period and early Republic (Foulke, 1941). With economic expansion in the South and West, financiers and wholesalers in the large Northeastern seaboard ports were especially hard-pressed to obtain informative assessments of merchants and manufacturers in the hinterland.

Rudimentary credit reporting arose in the early 1800s through correspondents, who toured distant districts, collected debts, and made notes on business activities. In 1829, the London firm of Baring Brothers signed a contract with a prominent Boston merchant, Thomas Wren Ward, who was charged with the task of selecting correspondents in North America and organizing their credit reports in a "Private Remarks Book" (Hidy, 1939). This book eventually contained information about more than 1000 businesses, organized into 11 credit categories, but lacked a systematic schema for industrial classification. Given Ward's extensive reliance on intimate

connections, ranging from small merchants to presidents of the United States, critics regarded his approach as "antediluvian" by mid-century (Hidy, 1939: 87). Around that time, systematic credit reporting depended on local attorneys as correspondents, who offered information on enterprises in their own communities. The new organizational form was pioneered by the New York firm of Griffen, Cleaveland and Campbell in 1835 and the Mercantile Agency of Lewis Tappan in 1841, to be refined further under the stewardship of Robert Graham Dun, who replaced Tappan as a partner in the mid-1850s (Foulke, 1941; Carruthers and Cohen, 2006).

By 1859, the R. G. Dun Mercantile Agency had enjoyed some early successes. It had 1,195 subscribers requesting credit information in New York alone and branch offices in more than a dozen cities in the U.S., Canada, and United Kingdom (Norris, 1978). But the business information provided by the agency suffered from a major weakness. Credit reports could only be obtained by subscribers who called on a "confidential clerk" at the agency about a particular enterprise, and there was no comprehensive volume summarizing the activities and credit ratings of a range of businesses. This weakness was being exploited by a Dun competitor, John Bradstreet, who in 1857 had begun issuing a bound volume that offered shorthand credit reports for a variety of enterprises. Bradstreet's initial volume contained reports on roughly 17,000 businesses in New York, Philadelphia, Boston, Baltimore, Pittsburgh, Cincinnati, Louisville, St. Louis, and Chicago (Foulke, 1941: 298). Although Bradstreet's *Commercial Reports* had more limited coverage than Dun and focused on urban businesses, its availability had a devastating effect on the profits of the Mercantile Agency. As a competitive response, the Mercantile Agency issued its own *Reference Book* in February 1859, covering more than 20,000 businesses, listed by name, line of business, and credit rating (Norris, 1978).

Given its format, Dun's *Reference Book* soon became a business standard for linking the evaluation of an enterprise to its industrial classification. As Foulke (1941: 313) noted in his retrospective on the history of R. G. Dun, this was a volume "which contains the names of all active commercial and industrial business enterprises in every city, town, village, and hamlet in the United States, together with two symbols, one before, and one after each name. The symbol which appears before each name indicates the line of business activity, and the one which follows indicates the estimated financial investment in the business and its general credit worthiness." The simple format was especially useful for wholesalers, who often required rapid checks on the credit worthiness of country merchants who would appear unannounced on their doorsteps (Olegario, 2006).

Dun's system of organizational classification did not emerge fully formed in the late 1850s. A detailed examination of the *Reference Book* over time suggests that its evolution can be periodized into three distinct classification regimes: (1) an antebellum schema, which offered an early, mutually exclusive classification of trades (1860); (2) a postbellum schema, which recognized the importance of hybrid organizational forms in the Reconstruction era (1864–early 1880s); and (3) a

"modern" schema, which combined features of the antebellum and postbellum approaches, persisting until the adoption of Standard Industrial Classification (SIC) codes in the mid-twentieth century (late 1880s–1950).

Classification Regimes at R. G. Dun

Shortly after producing the first volume of the *Reference Book*, Dun adopted a new approach to the 1860 volume that would divide its contents by industry groups.[1] Six industrial categories were advanced for this purpose, including shipping and commission merchants; silk, cotton, and woolen goods; boots and shoes; hardware, founders, metals, and house furnishings; booksellers, publishers, and stationers; and hats, caps, furs, and straw goods. The volume also added private bankers, who had not been covered by the inaugural volume. This subdivision was designed primarily to appeal to subscribers who specialized in one of the industry groups and thus only wanted to purchase that part of the *Reference Book*.

The antebellum schema proved to be abortive. Recognizing "that even under his elaborate classification system many country merchants defied clear classification," Dun excluded small traders and "adapted the present work to that class of merchants who grant credit as bankers, money-lenders and wholesale dealers" (quoted in Norris, 1978: 68–69). The number of firms covered in the book declined from over 31,000 to 25,260 in 1861, reflecting a more limited scope for the Mercantile Agency (Vose, 1916: 98). With the onset of hostilities in the Civil War, Dun suspended the production of the *Reference Book* entirely in 1862 and 1863. As the end of the conflict appeared in sight during the following year, the Mercantile Agency prepared to issue a new version of the book, delivering copies to subscribers in September 1864 and reissuing the volume with some corrections in January 1865.

The postbellum schema that emerged revealed a number of fundamental changes. Coverage in the *Reference Book* had been extended substantially, to 123,000 firms around the end of the war and a staggering half million by 1872 (Vose, 1916). Dun also incorporated estimates of capital worth to offer a more substantive financial basis for evaluating businesses. Most notably, the volume was increasingly geared toward large specialized wholesalers ("jobbers"), leading Dun to call for classification "without such rigid discrimination in the markings" (Norris, 1978: 83). The correspondents at the Mercantile Agency now referred to some 200 categories in classifying business organizations, including such categories as general store, tan yard, saw mill, or tailor. The schema allowed for the identification of hybrids (firms linked to multiple categories, such as a combined tailor and general store), including businesses that evidenced ambiguity in their product or service lines (marked with the residual category, '&c.,' for etcetera).

The postbellum classification schema was well suited to the ill-defined industry boundaries of the Reconstruction era. By the mid-1880s, however, Dun subscribers increasingly wanted categories at a higher level of aggregation, "so they could address circulars and draw off lists of names for the use of traveling salesmen" (quoted in Norris, 1978: 112).

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The full title of the 1860 edition is *The Mercantile Agency Reference Book (and Key), Containing Ratings on Merchants, Manufacturers and Traders Generally, Throughout the United States and Canada.* In this article, we refer to it, and subsequent editions, simply as the *Reference Book*.

In March 1885, the *Reference Book* added a column for "Trade Classification," which mapped businesses to one of 26 categories. The new categories were indicated symbolically (e.g., * for general stores, ⌐ for lumber dealers and saw mills) and supplemented the existing detailed classification. Although some hybrid forms did not fit comfortably into the higher-order categories, and other businesses (such as turpentine dealers) could not be mapped to them at all and were given no symbol, this schema became highly institutionalized. The number of industrial classifications with symbolic identification grew substantially during the early twentieth century, and by the 1940s, the *Reference Book* featured an index of 293 categories (Foulke, 1941: 314). This schema persisted until the adoption of SIC codes at Dun and Bradstreet in 1950.

More generally, the institutionalization of credit evaluation and classification at the Mercantile Agency was evident in several changes between the end of the Civil War and the turn of the century. The elaboration of the classification system from a single level of fine-grained industrial categories to a two-tier schema increasingly meant that credit correspondents had to consider the logical coherence of business functions in the enterprises they analyzed. In the data we analyzed, around 78 percent of hybrid organizations straddled the symbolic trade classifications that were adopted in 1885. The theoretical problems of hybridity can be interpreted concretely in this context. First, there were hybrid organizations that combined related trades falling within the same general trade group (e.g., shoes and tan yard). According to our theory, these businesses would primarily suffer devaluation if they represented combinations that were rarely encountered by credit reporters. Second, there were businesses that violated the symbolic boundaries that were created in 1885, combining what became identified as unrelated industrial categories, such as tailor and general store. Theoretical expectations would lead us to predict that these businesses primarily suffered devaluation after the adoption of a two-tier system of classification. Finally, there were hybrid organizations that were classified using residual categories (e.g., "liquors and sundries"). According to our theory, such businesses with involvement in ambiguous trades would always be subject to devaluation by credit reporters. Naturally, the different types of hybridity need not be mutually exclusive. Thus a store run by B. H. Bequest in the 1870 edition of the *Reference Book*, listed as "D[ry] G[oods], Gro., &c.", would entail both ambiguity and a boundary violation in the 1885 schema.

Several other features of institutionalization accompanied the development of the two-tier system of classification. On Robert Dun's insistence, reporters at the credit agency were subject to more training in the task of credit and industrial classification. At the end of the Civil War, his correspondents were typically unpaid locals—most often attorneys, bank cashiers, or merchants—with limited experience in credit reporting. In the succeeding decades, these correspondents were gradually replaced by a cadre of professional reporters, who journeyed over wide-ranging circuits, accumulating experience in credit reporting and exposure to business enterprise in diverse regions (Norris, 1978: 128–130). As an

infrastructural support to their activities, the reporters could count on an increasing number of branch offices that opened in the United States, Canada, and Europe. In the Cotton South, for instance, these offices numbered only two at the end of the Civil War (in New Orleans and Charleston), but by 1890 their numbers had swelled to ten, with new locations in Atlanta, Birmingham, Columbus, Macon, Mobile, Montgomery, Savannah, and Shreveport.

A more subtle facet of institutionalization involved public acceptance of business classification into nominal (industry) and ordinal (credit) categories. Between the 1840s and the 1880s, the morality behind Dun's schema was subject to regular attack, as the press and courts debated the "inquisitorial" (and potentially libelous) nature of credit rating agencies (Madison, 1974; Olegario, 2006). Opposition to credit rating reached its height in 1876, with the publication of *The Commercial Agency 'System' of the United States and Canada Exposed* by Thomas Meagher (also known as Charles Maynard), a disgruntled former employee of Robert Dun. Partially in response to such confrontation, the Mercantile Agency's approach to classification and credit rating evolved considerably until the 1880s. These changes seemed to bear fruit with a marked decline in journalistic and legal challenges during the closing decades of the nineteenth century. In 1882, federal courts established that credit reports were privileged communications and, in 1896, they were given copyright protection, defined as the intellectual property of the seller, not of the subject or purchaser of those reports (Sandage, 2005: 184). Although they had a distinct legal status from the credit reports, the ratings published in credit reference books were also increasingly protected by legal contracts, limiting the ability of subscribers to loan them out and requiring that the books be returned to R. G. Dun after a specified time (Olegario, 2006: 171). By the final decade of the 1800s, P. R. Earling, a leading authority on credit agencies, would declare that the Mercantile Agency was "a permanent institution with the American business-public, and has come to stay" (Earling, 1890: 301). Table 1 summarizes the effects of institutionalization on credit evaluation between 1864 and 1900.

Though institutionalization was accompanied by a number of fundamental changes in Dun's approach to business categorization, several features of the classification schema were untouched by this process. Perhaps most important among these was the rate with which new fine-grained industry categories appeared or disappeared from the schema. Between 1870 and 1900, categories appeared on a regular basis as a consequence of new technology (e.g., "power company") or changes in consumption patterns ("second hand store"), and others disappeared from Dun's *Reference Book* as a function of social obsolescence ("wig maker").

To shed further light on the effects of institutionalization, we focused our research design on the schema employed by Dun during the 35 years following the Civil War. The abandoned 1860 schema was only in use for a single year and may be regarded as historically idiosyncratic. By 1900, the year of Robert G. Dun's death, the mercantile system was an integral feature of American business life. Data from the

Table 1

The Impact of Institutionalization on Credit Evaluation at R. G. Dun and Company

	Early institutionalization (1864–early 1880s)	Mature institutionalization (late 1880s–1900)
Classification system	<u>Single-level</u> taxonomy; accommodation of hybrid firms	<u>Multi-level</u> taxonomy; ability to identify hybrids involving unrelated trades
Correspondents	<u>Untrained</u> local attorneys, merchants, and bank cashiers	<u>Professional</u> traveling credit reporters
Branch offices*	<u>Few</u> (two in the Cotton South after the Civil War)	<u>Numerous</u> (ten in Cotton South by 1890)
Legitimacy challenges	<u>Numerous</u> (including law suits and exposés by the press and former insiders)	<u>Few</u> (the Mercantile Agency is seen as a "permanent institution")

*These qualifiers only reflect the absolute numbers of branch offices toward the beginning of each period. The rate of branch office founding at R. G. Dun was fairly high during the 1870s, with three founded in the Cotton South alone. Conversely, relatively few Dun offices were established after the panic of 1893.

intervening years, as described in the following section, thus provide the most appropriate window on the evolving relationship between classification and organizational evaluation at Dun and Company.

METHOD

Data

The study employs data from R. G. Dun's *Reference Book*, the most extensive listing of business classifications and credit ratings in the nineteenth century (Norris, 1978). To focus attention on the period of institutionalization in the Dun classification scheme, we sampled firm data from four decennial cross-sections in the *Reference Book*, including 1870, 1880, 1889, and 1900. The timing of these waves offers the advantage of comparison with census coverage of a subset of enterprises, particularly those in the manufacturing sector. Exploratory analyses suggest that Dun's coverage is more complete than that achieved by the census and includes a large number of sectors (retail, wholesale, hospitality, service, professional, etc.) that are not covered by the census at all. For 1889, coincidence with census data was not a consideration (owing to the destruction of the 1890 census) and sampling was timed for the sake of completeness of the archives in the Library of Congress.

In 1870, Dun listed credit information for 430,573 proprietary enterprises; ten years later, the total was roughly 764,000; and, by 1900, the number had expanded to over 1.2 million enterprises (Vose, 1916). The sampling frame was then narrowed to address two empirical concerns: (1) all sampled businesses should be located in a region that is subject to relatively homogeneous institutional and economic conditions; and (2) correspondents in that region should be unencumbered by previous classification schema, particularly the 1860 template for categorizing trades. Both design considerations point to the Cotton South (including the states of Alabama, Georgia, Louisiana, Mississippi, and South Carolina) as a particularly useful case for empirical analysis. The welfare of businesses in the region was strongly tied to the success of a single commodity crop, even when those enterprises did not

directly engage in the production or distribution of cotton. Moreover, Lewis Tappan's abolitionist sensibilities had constrained the Mercantile Agency's penetration in the South before the Civil War (Wyatt-Brown, 1966) and antebellum southern newspapers had denounced credit reporters as agents of Yankee espionage (Olegario, 2006). Though the South was not entirely virgin territory for R. G. Dun, the two decades after the war witnessed substantial expansion and legitimation of its credit rating efforts in that region, including the founding of eighteen branch offices in former Confederate states (Norris, 1978: 108, 157).

The July 1870 edition of the *Reference Book* identified 19,929 businesses in the Cotton South; the July 1880 edition contained 31,673 organizations in the region (approximately 4 percent of all firms enumerated by Dun); 48,053 and 54,983 entries appeared in the 1889 and 1900 editions, respectively. For each case, we coded information on the business location, name(s) of proprietor(s), proprietor demographics, legal form of the business, capital assets, industrial classification, and credit rating. Listwise deletion removed cases that were either cross-listed duplicates or had missing information on capital assets or classification, leaving 119,231 cases for use in multivariate analysis.

Using proprietor names, we linked businesses that had a common owner, both within each cross section and between cross sections. The linking algorithm applied three possible matching criteria: (1) an exact match on the name of any proprietor, as well as business location (county); (2) an exact match on the names of all proprietors, as well as a match on at least one organizational form; and (3) a match on a proprietor surname, business location (county), and at least one organizational form. About a third of all observations (N = 40,258) could be organized into panel data using this procedure. To parse out the potential impact of unobserved proprietor characteristics, these panel data were analyzed separately, as noted below, as well as part of the repeated cross-sectional data.

Measures

Credit ratings. Credit evaluations serve as the dependent variable in the analysis. In summarizing the credit-worthiness of an enterprise, correspondents were instructed to consider factors such as capital assets, the "nature, extent and hazard of business," the character and qualifications of proprietors, and firm strengths and weaknesses (Norris, 1978: 55). During the postbellum period, firms were ranked into seven credit categories, ranging from A1, for a respected firm with unlimited credit, and 1 or 1.5, for firms with strong credit ratings, down to 2 or 2.5, indicating good credit, 3, indicating fair credit, and 3.5, indicating an undesirable credit report.[2] The distribution of ratings was highly skewed, with many businesses receiving undesirable ratings (roughly 55 percent in the Cotton South) and few receiving strong or unlimited credit endorsements (less than 2 percent at a rating of 1.5 or higher). For purposes of analysis, ratings were reverse-coded into an ordinal scale ranging from 1 (undesirable report) to 7 (unlimited credit). In 20 percent of the cases in the *Reference Book*, an enterprise received no credit coverage from a Dun

[2] During the 1880s, an eighth credit category (4) was added to denote financially unstable firms. For the sake of comparability with previous years, this category was subsumed in our study under undesirable credit ratings.

correspondent. Because subscribers were instructed to view the credit-worthiness of such enterprises with suspicion, we analyzed credit rating and coverage jointly, within the framework of a selection model, as well as modeling both outcomes separately.

Capital assets. Credit reporters at Dun assigned firms to ten categories of "pecuniary strength," ranging from a class of small enterprises (referenced by the code K), with less than $2,000 in working capital, to the largest firms (referenced by A+), which possessed more than one million dollars in capital assets.[3] These codes offered a crude assessment of the "worth" of an enterprise, based on information provided by credit applicants on real estate holdings, merchandise, personal property, and cash on hand (Olegario, 2006). Although a firm's assets were logically independent from its credit rating, R. G. Dun emphasized that assessments of capital worth should be an important criteria for the evaluations offered by his correspondents, leading to a high correlation between these measures.[4] For purposes of analysis, we converted capital assets into a continuous measure using mid-point estimation and logged the measure to reduce skewness. The small number of top-coded firms (N = 206) were assigned assets of $1.5 million prior to log transformation.

Industrial classification. Using Dun's detailed industry descriptors, each firm was assigned to one or more of 219 categories identified in the *Reference Book* during the postbellum period. Approximately 83 percent of the firms in the 1870–1900 period were listed with only one explicit category, slightly over 15 percent were listed with two, 1 percent with three, and only .05 percent were associated with four explicit categories. *Hybrid* organizations were defined as any firms that combined more than one category.

Form frequency is one feature predicted to moderate the effect of hybridity. Some hybrids are so common that they take on an idiomatic status (e.g., restaurant and bar) and are widely viewed as cognitively congruent; others entail infrequent combinations (e.g., restaurant and barber shop) that may challenge taxonomic schemata among consumers and evaluators. Consequently, our models included both a general control for the frequency with which a particular form or combination is encountered in the Dun *Reference Book* (in 1,000s) and an interaction effect that addressed whether form frequency is particularly relevant for the coverage and evaluation of hybrid enterprises.

Boundary violations occurred when hybrids contained unrelated lines of business. These violations were operationalized on both a factual and counterfactual basis. From 1885 on, we identified violations as instances in which credit reporters attempted to ascribe a second-order category to a hybrid business, but the multiple lines of business that the firm was involved in could not be mapped to a single trade group. Before 1885, the same procedure was applied counterfactually to identify boundary violations that would be at odds with the second-order system of classification that was later implemented. In selected analyses, we estimated the effect of such counterfactual boundary violations in the absence of institutionalized industry boundaries.

[3]
In 1875, a new category of pecuniary strength (L) was added to identify enterprises with less than $1,000 in working capital, and another category (M) appeared in the 1880s to identify firms with less than $500. For the sake of historical consistency, both categories were subsumed within asset class K for our study.

[4]
This correlation is only partly empirical. Given Dun's credit rating schema, businesses with few assets could not, by design, receive the highest credit scores, though this restriction was not always applied consistently in practice.

Credit and Classification

Ambiguous businesses were defined as firms that were assigned a residual category in addition to one or more explicit industry categories. In the sample, the classification of 9 percent of all firms was marked with an etcetera ('&c.'), denoting an ambiguous product line or service for a multi-product enterprise.[5] Given this operationalization, organizations classified as ambiguous are a proper subset of hybrids.

In selected models, we also included fixed effects for common industries to address the possibility that specific industry contexts affected credit scores and coverage. Using a frequency cut-off of 1,500 firms as a criterion for inclusion, this led to the addition of controls for general stores (N = 40,905), grocers (18,727), dry good stores (5,948), drug stores (5,252), saloons (4,739), farms (4,586), professionals' offices (2,714), and eight other industry categories (blacksmiths, cobblers, commission merchants, confectionaries, grist mills, jewelers, millineries, and saw mills).

Local market conditions. Considering recent ecological treatments of classification (Hannan, Pólos, and Carroll, 2007), we controlled for the impact of other firms in a region on the coverage and evaluation of each focal enterprise. If the local prevalence of businesses matching a particular form serves to enhance legitimacy (Hannan and Freeman, 1989), then firms should benefit in coverage and ratings when numerous firms in a county receive the same industrial classification from credit reporters. Local correspondents will feel a strong sense of familiarity with these enterprises and favor them with attention and approbation. Conversely, one may argue, local firms will also compete with one another for credit coverage and ratings, given a finite amount of bank capital, mercantile credit, and correspondents' time. Because such competition extends across industrial boundaries, we included another variable for all firms in a locale (firms in settlement). Previous research in organizational ecology has suggested that the effects of such competitive interaction may be more geographically localized than the benefits of legitimation (Carroll and Hannan, 2000: chap. 11). Consequently, we operationalized the number of all firms at the level of settlements—i.e., identifiable post office locations, villages, towns, and cities in the Dun *Reference Book* – rather than counties as a whole. As a general proxy for consumer demand, all models also controlled for the population residing in a given county. Given a high pairwise correlation of this variable with the count of all firms, we subjected the latter measure to a log transformation to avoid multicollinearity in the analyses.

Branch offices. A firm's proximity to a Dun branch office could affect its credit rating and coverage, though the direction of these associations is not clear from the outset. On the one hand, proximity to a branch office may have increased the coverage and ratings, given the greater monitoring capacity of the Mercantile Agency in that area and the possibility of favoritism toward local enterprise. Coverage in distant locales was especially likely to be affected once Dun relied on traveling correspondents, who were charged with the responsibility of returning to branch offices on a regular basis. On the other hand, credit ratings could also suffer near branch offices, given the more stringent credit assessments conducted

by branch staff. To examine these effects, we included a proximity variable in all models, indicating the straight-line distance (in miles) separating the county center in which a firm was located from the nearest Dun branch office.

Periodization. Our historical discussion of the early and mature institutionalization of business classification at R. G. Dun suggests a disjuncture in this process during the mid-1880s. In March 1885, Dun introduced a new two-tiered system of classification that grouped industries into related trades. Simultaneously, Dun strongly encouraged the replacement of untrained local correspondents with professional traveling reporters, even telling branch managers to "send out men from their staff of clerks" rather than rely on the locals (February 1885; quoted in Norris, 1978: 129). These developments in rationalization and professionalization were accompanied by the regulative legitimation of Dun's approach to credit reporting. A few years earlier, in 1882, federal courts had ruled that the classification of businesses in Dun's credit reports represented a privileged communication and thereby restricted the legal liability of the Mercantile Agency against claims of libel or slander. Consequently, we estimated many of our models of credit evaluation and coverage separately for two historical periods (1870–1880 and 1889–1900) to address the effect of institutionalization on the problems of hybridity (rarity, boundary violation, and ambiguity).[6]

Control variables. We coded the legal form of each enterprise from the proprietor listing in Dun's *Reference Book*, distinguishing among sole proprietorships (which serve as the reference category), partnerships (involving more than one proprietor), and corporations (designating incorporated entities). In addition, listed firms could involve agency relationships, in which one or more proprietors served as agents of an individual or firm. Another characteristic of interest from the Dun files concerns the demography of the owners. The analyses below distinguish firms that have at least one female owner, as well as those that are co-owned by family members as opposed to involving non-kin partnerships. For female proprietors, credit coverage was likely to be limited, as there was a widely held perception during the nineteenth century that their involvement in business affairs was temporary, considered a "stepping stone" to other pursuits, such as marriage and raising a family (Olegario, 2006: 110). Other characteristics of proprietors, such as ethnicity or religious background, were not available in the *Reference Book*, but we controlled for them indirectly using a panel modeling approach featuring repeated observations on a proprietor. The panel models controlled for proprietor credit history, and in all models we included an indicator for the length of credit history, based on previous appearances in the *Reference Book*. Table 2 summarizes the descriptive statistics and bivariate correlations for all measures.

Statistical Methodology

We used an ordered logit specification to predict the ranking of each firm in the Dun credit rating system. Given potential changes in model parameters over the 1870–1900 period, we organized the data in a repeated cross-sectional design

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Robustness checks (available from the authors) suggest that this periodization most accurately captures variation in the effects of those problems of hybridity, particularly boundary violations, that we expected to be historically contingent.

Table 2

Descriptive Statistics and Pearson Pairwise Correlations for Dun *Reference Book* Entries in the Cotton South, 1870–1900*

Variable	Mean	S.D.	1	2	3	4	5	6	7	8
1. Year (1870 = 0)	18.36	10.44								
2. Assets ($1000s)	17.51	79.08	−.02							
3. Credit history (years)	2.11	5.24	.19	.11						
4. Branch distance (miles)	95.08	86.37	−.41	−.08	−.13					
5. Form frequency (1000s)	3.84	5.31	.34	−.08	.03	−.03				
6. Hybrid	.23	.42	.01	.02	.04	−.01	−.38			
7. Boundary violation	.08	.27	.18	.01	.08	−.07	−.20	.53		
8. Ambiguous	.08	.28	.05	−.01	.01	−.05	−.21	.54	.01	
9. Corporation	.12	.33	.03	.23	−.00	−.02	−.04	−.02	−.02	−.01
10. Partnership	.17	.37	−.03	.03	.03	.06	.05	.00	−.01	.00
11. Agency	.01	.07	.00	−.01	−.01	−.01	.00	−.00	−.00	−.00
12. Family-owned	.06	.24	.04	.03	.03	−.01	.06	.02	.02	.02
13. Female-owned	.05	.23	.04	−.04	−.03	−.04	−.03	.02	−.01	.01
14. Firms in settlement (all)	526.40	1202.3	.05	.11	.11	−.42	−.23	.03	.02	.05
15. Firms in county (same type)	62.23	163.45	.13	−.01	.05	−.24	.07	−.02	.05	−.02
16. Population (1000s)	50.42	66.89	.05	.12	.10	−.45	−.21	.02	.01	.04
17. Credit rating	1.84	1.22	−.21	.59	.15	.01	−.19	.05	−.01	−.00
18. Credit coverage	.81	.40	−.15	.10	.08	.00	−.05	.05	.04	−.01

Variable	9	10	11	12	13	14	15	16
10. Partnership	−.17							
11. Agency	−.02	−.03						
12. Family-owned	−.07	.54	−.01					
13. Female-owned	−.08	−.10	−.01	−.05				
14. Firms in settlement (all)	.01	−.05	−.02	−.02	.07			
15. Firms in county (same type)	−.05	−.04	−.01	−.02	.07	.56		
16. Population (1000s)	.02	−.06	−.02	−.03	.06	.96	.55	
17. Credit rating	.29	.10	−.02	.06	−.09	.13	−.04	.14
18. Credit coverage	.10	.10	−.08	.05	−.07	.08	.02	.07

***N = 96,021 for credit ratings; N = 119,231 for other variables (following listwise deletion of cases without asset or classification data).

(Firebaugh, 1997). Successive model specifications considered (1) whether a firm's attributes and hybrid classification were correlated with its credit evaluation; (2) to what extent the effect of hybridity could be attributed to hybrid frequency, boundary violations, or ambiguity; and (3) whether the effect of parameters of theoretical interest differed between the period of early institutionalization (through 1885) and mature institutionalization (after 1885) of Dun's schema. We then used a parallel set of models to predict credit coverage of firms, employing a basic logit specification. Because the error terms in credit evaluations are likely to be correlated from one business to another, perhaps as a function of unmeasured environmental conditions, such as crop viability or local political stability, we applied Huber-White estimators to obtain robust standard errors in all models.

Similarities between the predictors for credit rating and credit coverage raise concerns about incidental sample selection bias (Winship and Mare, 1992), i.e., the possibility that the business organizations that are most likely to get low credit

ratings are also those that are most likely to be ignored by credit reporters. To evaluate the potential impact of sample selection, we obtained maximum likelihood estimates of Heckman's (1979) model for both equations, with Y1 denoting the observed credit ratings and Y2 denoting whether a firm was covered or not:

$$Y_1 = \mathbf{x}\beta + u_1 \qquad \text{if } Y_2 > 0 \qquad (1)$$

$$Y_2 = \mathbf{z}\gamma + u_2 \qquad (2)$$

where the vector $\mathbf{x}$ contains the independent variables predicting credit rating, and the vector $\mathbf{z}$ contains the variables predicting credit coverage. Application of the model requires that at least one variable in $\mathbf{z}$ not appear in $\mathbf{x}$; to this end, we included female ownership as a hypothesized predictor of credit coverage, but not of credit rating, because female business owners were significantly less likely to receive credit coverage during this period, and there is no association between female ownership and credit rating in the multivariate models. The Heckman model conceptualizes Y_1 as a continuous outcome, leading to some differences from the ordered logit specification that are noted below.

RESULTS

Credit Rating

Table 3 reports the effect of organizational attributes and classification on business credit ratings for all cross sections. A baseline model (1) suggests that business attributes aside from classification affect credit ratings in a predictable pattern. Enterprises that boast more extensive capital assets and a longer credit history have better credit ratings. While a sole proprietorship that only had $1,000 in assets in 1870 could expect an undesirable credit report (3.5 rating, net of other factors), a proprietorship that had $100,000 in assets could expect a strong credit report (1.5 rating). Agency relationships were penalized by Dun's credit reporters, perhaps reflecting the perception that agents were not as invested, either financially or reputationally, in their enterprises as independent proprietors. The trend estimate for *year* also shows some evidence that credit reporters became increasingly stingy over time in allocating high ratings, a development that was encouraged by the gradual replacement of local correspondents, who sometimes inflated the ratings of businesses in their communities, with traveling credit reporters (Norris, 1978: 128–130). The geographic distance of firms from Dun branch offices led to more generous credit scores. Reporters were also influenced by local market conditions, increasing their ratings for each focal enterprise as a function of county population and decreasing ratings as a function of competition with other local businesses of all types.

Figure 1 graphs the estimates of credit rating and coverage by the type of industrial classification. In the pooled sample, the estimates for classification suggest that hybridity generally posed problems for firms being evaluated by credit reporters and that ratings declined for organizational forms that were frequently analyzed for Dun's *Reference Book*.[7] For instance, as shown in section A of figure 1, the probability of a fair (or

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The latter finding may be attributed to diffuse competition among organizational populations exhibiting an especially high density (Carroll and Hannan, 2000). Alternatively, credit reporters may have developed more critical templates for evaluating such businesses, as opposed to forms that were relatively novel.

Table 3

Coefficients and Robust Standard Errors from the Regression (Ordered Logit Model) of Dun Credit Ratings on Organizational Attributes and Classification (N = 96,021)

| Independent variable	Model 1	Model 2	Model 3	Model 4 (1870–1880)	Model 5 (1889–1900)
Year (1870 = 0)	−0.111•••	−0.109•••	−0.108•••	−0.150•••	−0.071•••
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Assets ($1000s)*	3.461•••	3.464•••	3.475•••	3.343•••	3.956•••
	(0.019)	(0.019)	(0.019)	(0.027)	(0.031)
Credit history (years)	0.028•••	0.028•••	0.027•••	0.030•••	0.021•••
	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)
Branch distance (100s miles)	0.305•••	0.303•••	0.293•••	0.223•••	0.110•••
	(0.013)	(0.015)	(0.013)	(0.017)	(0.026)
Classification					
Form frequency (1000s)	−0.044•••	−0.047•••	−0.055•••	−0.057•••	−0.024•••
	(0.003)	(0.003)	(0.004)	(0.013)	(0.006)
Hybrid	−0.174•••	−0.015	−0.013	0.015	−0.005
	(0.022)	(0.031)	(0.033)	(0.067)	(0.064)
Hybrid × Form frequency	–	0.027	−0.005	0.170	−0.389••
		(0.071)	(0.079)	(0.129)	(0.150)
Boundary violation	–	−0.292•••	−0.257•••	−0.097	−0.157••
		(0.041)	(0.044)	(0.072)	(0.065)
Ambiguous	–	−0.271•••	−0.278•••	−0.194••	−0.184••
		(0.039)	(0.040)	(0.077)	(0.064)
Legal form					
Corporation	0.013	0.005	0.006	0.042	0.148•••
	(0.025)	(0.025)	(0.025)	(0.040)	(0.034)
Partnership	−0.157•••	−0.158•••	−0.154•••	−0.057	−0.209•••
	(0.025)	(0.025)	(0.025)	(0.037)	(0.038)
Agency	−1.337•••	−1.323•••	−1.324•••	−1.119•••	−1.834•••
	(0.218)	(0.219)	(0.220)	(0.315)	(0.375)
Owner demography					
Family	0.090•	0.095•	0.094•	0.006	0.097•
	(0.037)	(0.037)	(0.037)	(0.060)	(0.049)
Female	−0.046	−0.045	−0.071	0.045	−0.118
	(0.057)	(0.057)	(0.060)	(0.083)	(0.101)
Local market conditions					
No. of firms (all)*	−0.027•••	−0.028•••	−0.034•••	−0.067•••	0.008
	(0.006)	(0.006)	(0.007)	(0.010)	(0.010)
No. of firms (100s, same type)	0.000	0.003	0.002	0.063••	0.013
	(0.008)	(0.008)	(0.009)	(0.021)	(0.000)
County population (1000s)	0.004•••	0.004•••	0.004•••	0.005•••	0.003•••
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
–2 Log pseudo-likelihood	91750.10	91676.07	91547.42	41950.94	44387.29
Industry fixed effects	No	No	Yes	Yes	Yes
Degrees of freedom (model)	14	17	32	32	32

• $p < .05$; •• $p < .01$; ••• $p < .001$; one-tailed tests for hypothesized effects, two-tailed otherwise.
*To reduce skewness, these variables were transformed using a natural log function.

higher) credit rating for a sole male proprietor running a grocery store with a hybrid classification was less than .24, compared with .27 for a proprietor running a comparable store classified exclusively in the grocery category and .28 for a proprietor running a comparable store exclusively in the (less common) jewelry category. The preliminary model cannot identify whether this decline in credit rating tends to occur due to a violation of industry boundaries, the ambiguity of the

Figure 1. Estimates of credit rating and coverage by type of industrial classification.*

A. Probability that a firm receives a fair rating (Dun rating 3 or better)

- ■ Grocery Store (Gr)†
- ■ Gr (Hybrid)†
- ■ Gr (Ambiguous)
- ■ Gr (Boundary Violation)
- ■ Gr (Ambiguous & Violation)
- ☐ Jewelry Store†
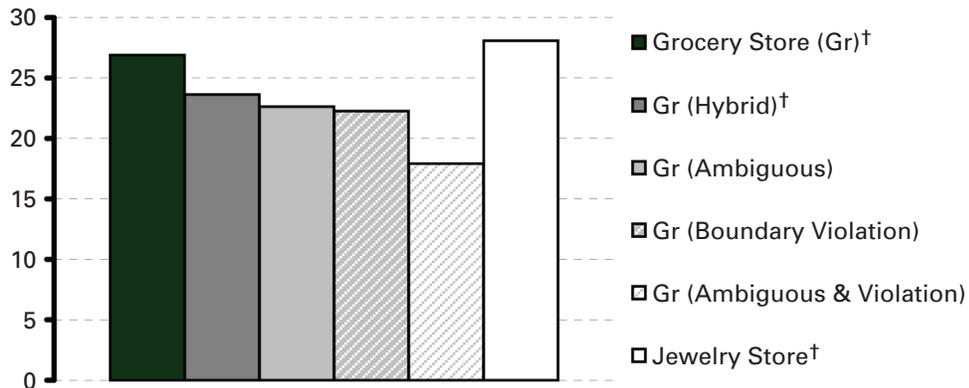
B. Probability that a firm receives no credit coverage

- ■ Grocery Store (Gr)†
- ■ Gr (Hybrid)
- ■ Gr (Ambiguous)
- ■ Gr (Boundary Violation)
- ■ Gr (Ambiguous & Violation)
- ☐ Jewelry Store†
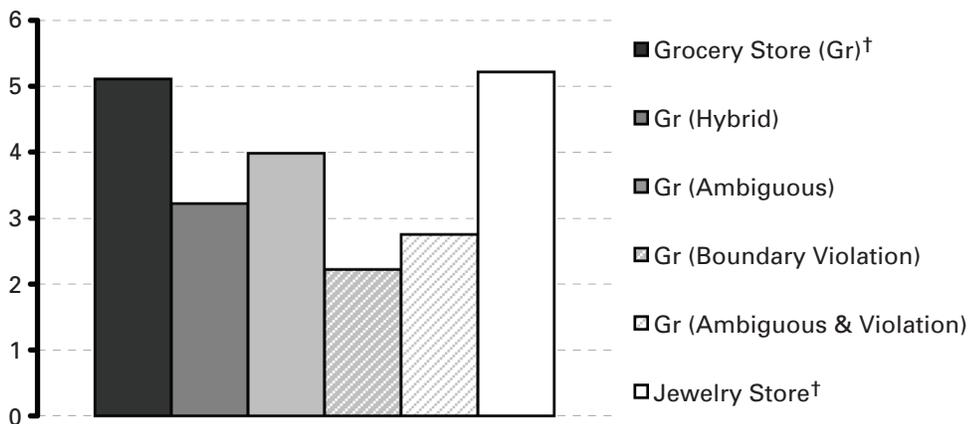
*All estimates are based on a male-owned, sole proprietorship with other variables held at their means.
†Estimates from model 1 in tables 4 and 5, respectively. Other estimates are from model 2.

grocery store hybrid, its infrequency relative to the exclusive grocery category, or some other problem associated with hybridity.

In the second model, we investigated the distinct drawbacks that may be linked to categorical hybrids. Ambiguity in the categorization of a business has a negative and highly significant correlation with its credit rating ($p < .001$), suggesting that reporters who encountered organizations engaged in unspecified lines of business were inclined to lower their evaluations (H4). Similar devaluation is evident for boundary violations following the implementation of the 1885 classification schema (H6). Using the previous grocery store example, we estimated the probability of a fair credit rating at .23 for this business when it was flagged as ambiguous and .22 when it violated the industry groups introduced in 1885, as shown in section A of figure 1. There is no statistically significant impact on credit ratings associated with the interaction of hybrid form and frequency, contrary to hypothesis 2. Notably,

the baseline effect for hybridity is rendered insignificant once these additional variables are introduced, suggesting that they account for most of the rating devaluation for businesses classified in multiple categories. The estimates are largely unchanged in model 3, which introduces fixed effects for industries.

The last two specifications addressed the possibility of change over time in the key parameters of empirical interest. As expected, the estimates for the measure of boundary violation are different between the 1870–1880 and 1889–1900 periods, with no penalty accruing to firms that straddle (counterfactual) industry groups during the former era and a significant negative effect appearing during the latter. This is consistent with the intuition that the institutionalization of the classification schema at Dun served to construct industry boundaries that had a normative as well as a cognitive standing. Over the two periods, there is no significant change in the effect of ambiguity, which has a consistent negative correlation with credit ratings.

Other changes offer hints about the institutionalization of credit rating at Dun. Correspondents seemed to be placing an increasing amount of importance on firms' capital assets in judging credit worthiness. The economic rationalization of credit reporting over time is understandable, given Robert Dun's own exhortation that "there should be a constant effort to keep the credit marking [of firms] in close relation to [their] capital marking" (quoted in Norris, 1978: 93). Evidence of the evolution of credit reporting also appears in the impact of local market conditions on credit rating. Until 1880, local correspondents reacted strongly to the competition for credit that might be generated by other enterprises in a settlement, as well as the legitimacy that could accrue to a firm when others in the region adopted the same organizational form (model 4). But after Dun switched to traveling correspondents, the local demography of organizations had less bearing on credit rating processes (model 5).

Credit Coverage

The pooled results for credit coverage displayed in table 4 reveal a fundamental difference from those for credit rating: as model 1 shows, hybrid enterprises are generally associated with more coverage than those categorized within a single industry. Because this result appears to contradict previous analyses of hybridity and coverage, it is worth addressing the mechanisms that might underlie the observed correlation in some detail. Model 2 shows that, as predicted by hypothesis 3, firms that exhibit an ambiguous classification are less likely (20 percent) to be covered by reporters than other hybrids, perhaps owing to the greater effort and time involved in evaluating these enterprises. By contrast, businesses that straddle the industry groups introduced in 1885 were 47 percent more likely to be covered than other hybrids. Although analyses of advanced classification systems tend to find that audiences ignore organizations and products that do not fit neatly into taken-for-granted categories (H5), our examination of Dun's schema during the process of institutionalization suggests a different process, in which observers display

Table 4

Coefficients and Robust Standard Errors from the Regression (Logit Model) of Dun Credit Coverage on Organizational Attributes and Classification (N = 119,231)

Independent variable	Model 1	Model 2	Model 3	Model 4 (1870–1880)	Model 5 (1889–1900)
Intercept	1.262	1.255	0.930	0.841	1.752
	(0.040)	(0.040)	(0.046)	(0.086)	(0.070)
Year (1870 = 0)	−0.036•••	−0.038•••	−0.034•••	−0.021•••	−0.072•••
	(0.001)	(0.001)	(0.001)	(0.004)	(0.002)
Assets ($1000s)*	2.019•••	2.014•••	1.983•••	1.293•••	3.739•••
	(0.031)	(0.031)	(0.031)	(0.030)	(0.101)
Credit history (years)	0.015•••	0.014•••	0.013•••	−0.021••	0.014•••
	(0.002)	(0.002)	(0.002)	(0.006)	(0.002)
Branch distance (100s miles)	−0.138•••	−0.137•••	−0.130•••	0.034	−0.154•••
	(0.013)	(0.013)	(0.013)	(0.019)	(0.021)
Classification					
Form frequency (1000s)	0.018•••	0.020•••	−0.003	0.088•••	−0.014•
	(0.002)	(0.002)	(0.004)	(0.017)	(0.006)
Hybrid	0.209•••	0.148•••	0.115••	0.352•••	0.011
	(0.023)	(0.039)	(0.042)	(0.091)	(0.062)
Hybrid × Form frequency	–	0.234••	−0.209•	0.309	−0.314•
		(0.082)	(0.096)	(0.199)	(0.140)
Boundary violation	–	0.382•••	0.274•••	0.021	0.274•••
		(0.046)	(0.050)	(0.096)	(0.068)
Ambiguous	–	−0.220•••	−0.135••	−0.363•••	−0.025
		(0.043)	(0.046)	(0.095)	(0.066)
Legal form					
Corporation	0.154•••	0.160•••	0.125•••	−0.137•	0.193•••
	(0.036)	(0.036)	(0.036)	(0.067)	(0.044)
Partnership	0.338•••	0.344•••	0.325•••	0.171••	0.421•••
	(0.033)	(0.033)	(0.033)	(0.056)	(0.042)
Agency	−1.699•••	−1.704•••	−1.729•••	−1.735•••	−1.771•••
	(0.095)	(0.095)	(0.096)	(0.141)	(0.143)
Owner demography					
Family	0.086	−0.089	−0.069	−0.145	−0.092
	(0.052)	(0.053)	(0.053)	(0.100)	(0.064)
Female	−0.143•••	−0.135•••	−0.310•••	−0.082	−0.376•••
	(0.031)	(0.031)	(0.036)	(0.078)	(0.043)
Local market conditions					
No. of firms (all)*	−0.059•••	−0.053•••	−0.017•	−0.108•••	0.022••
	(0.006)	(0.006)	(0.007)	(0.012)	(0.008)
No. of firms (100s, same type)	0.021••	0.012	0.038•••	0.017	0.053•••
	(0.006)	(0.006)	(0.007)	(0.035)	(0.008)
County population (1000s)	0.003•••	0.003•••	0.003•••	0.008•••	0.002•••
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
−2 Log pseudo-likelihood	84707.03	84531.53	83856.14	27394.08	53673.88
Industry fixed effects	No	No	Yes	Yes	Yes
Degrees of freedom (model)	14	17	32	32	32

• $p < .05$; •• $p < .01$; ••• $p < .001$; one-tailed tests for hypothesized effects, two-tailed otherwise.
*To reduce skewness, these variables were transformed using a natural log function.

an unusual interest in firms that violate newly constructed industry boundaries. Considering hypothesis 1, we also find some evidence that coverage for hybrids improves when a hybrid combination is common. The estimate, however, is highly sensitive to the inclusion of industry fixed effects and is not consistent in subsequent model specifications

(cf. model 3). This is not entirely surprising, given that much of the variance in form frequency is accounted for by the industry fixed effects.

In contrast to the analysis of credit ratings, hybridity itself seems to play a role in influencing the coverage of businesses, apart from the mechanisms associated with hybrid rarity, boundary violation, or ambiguity. To return to our previous example, in section B of figure 1, a male grocer's business had a 5 percent chance of not receiving credit coverage, holding all other variables at their means. If that grocer was also involved in another trade, the chance of non-coverage decreased to nearly 3 percent, controlling for the size of the enterprise. And if the other trade entailed a violation of the boundaries of industry groups (e.g., drug and grocery store), then the likelihood of non-coverage was reduced to a mere 2 percent.

Estimating the model by separate time periods (models 4 and 5) again suggests that the effect of boundary violations may be sensitive to the institutionalization of Dun's classification schema. The main effect of hybridity declines markedly over the 30-year period (Wald test $\chi^2 = 9.63$, $p < .01$), while coverage of firms involving boundary violations increases following the implementation of the 1885 schema ($\chi^2 = 4.65$, $p < .05$). In the early stage of institutionalization, the attention of credit reporters was drawn to any business engaged in multiple trades; in the mature stage, reporters only allocated disproportionate coverage to those firms that combined trades that violated the industry groups delineated by Dun & Co. Some evolutionary changes are also apparent for ambiguity, which had a larger negative correlation with coverage before Dun had a widely institutionalized system of credit evaluation. The accumulation of context-specific information through branch offices and professional training may have encouraged credit reporters to cover hard-to-classify enterprises, which had previously been ignored.

Selection Model

The set of models in table 5 address the possibility of sample selection bias on the credit rating variable. Given that the selection model is identical to that employed in table 4 (albeit using a probit function), we restrict attention to the substantive model of credit ratings. A comparison of the ordered logit estimates for credit rating (without modeling selection) and the estimates presented here, based on a Heckman selection model, suggest broad similarities. In both cases, ambiguity and boundary violations prove detrimental to credit ratings in the pooled sample of businesses, and these estimates maintain their statistical significance in a specification with industry fixed effects (models 1 and 2). Adjusting for sample selection, we also find that the period-specific models continue to highlight the increasing and negative impact of boundary violations on ratings with the institutionalization of Dun's classification system. There are also some notable differences from the ordered logit specification. The estimate for the nonselection hazard is significant ($p < .001$), suggesting that models of credit coverage and credit rating cannot be considered to be independent. In addition, the interaction term for form frequency and hybridity is statistically significant in some model specifications, indicating modest support for hypothesis 2.

Table 5

Coefficients and Robust Standard Errors from the Regression (Heckman Model) of Dun Credit Ratings on Organizational Attributes and Classification (N = 96,021)

Independent variable	Model 1	Model 2	Model 3 (1870–1880)	Model 4 (1889–1900)
Constant	0.915	0.941	0.930	0.879
	(0.008)	(0.009)	(0.016)	(0.014)
Nonselection hazard (λ)	0.550•••	0.600•••	0.539•••	0.549•••
	(0.002)	(0.003)	(0.002)	(0.002)
Year (1870 = 0)	−0.014•••	−0.015•••	−0.023•••	−0.010•••
	(0.000)	(0.000)	(0.001)	(0.000)
Assets ($1000s)*	0.726•••	0.726•••	0.753•••	0.709•••
	(0.002)	(0.002)	(0.003)	(0.002)
Credit history (years)	0.002•••	0.002•••	0.004•••	0.003•••
	(0.000)	(0.000)	(0.001)	(0.000)
Branch distance (100s miles)	0.028•••	0.028•••	0.038•••	−0.026•••
	(0.002)	(0.003)	(0.003)	(0.004)
Classification				
Form frequency (1000s)	0.006•••	−0.000	−0.004	−0.000
	(0.000)	(0.001)	(0.003)	(0.001)
Hybrid	0.009	−0.002	0.005	0.009
	(0.007)	(0.007)	(0.016)	(0.012)
Hybrid x Form frequency	0.021	0.038•	0.078••	0.015
	(0.015)	(0.017)	(0.029)	(0.027)
Boundary violation	−0.070•••	−0.029•••	−0.023	−0.030•
	(0.009)	(0.009)	(0.017)	(0.013)
Ambiguous	−0.085•••	−0.072•••	−0.045••	−0.081•••
	(0.008)	(0.008)	(0.017)	(0.013)
Legal Form				
Corporation	0.070•••	0.069•••	0.039•••	0.083•••
	(0.006)	(0.006)	(0.011)	(0.008)
Partnership	−0.011•	−0.010	−0.007	−0.023••
	(0.006)	(0.006)	(0.009)	(0.007)
Agency	−0.297•••	−0.297•••	−0.295•••	−0.303•••
	(0.028)	(0.028)	(0.043)	(0.036)
Owner demography				
Family	−0.003	−0.002	−0.020	0.019
	(0.009)	(0.009)	(0.015)	(0.011)
Female†	–	–	–	–
Local market conditions				
No. of firms (all)*	−0.011•••	−0.016•••	−0.023•••	−0.013•••
	(0.001)	(0.001)	(0.002)	(0.002)
No. of firms (100s, same type)	−0.003•	−0.002	0.020•••	−0.002
	(0.001)	(0.001)	(0.005)	(0.001)
County population (1000s)	0.001•••	0.001•••	0.001•••	0.001•••
	(0.000)	(0.000)	(0.000)	(0.000)
2 log likelihood	179035.08	178681.80	66184.68	111350.16
Industry fixed effects	No	Yes	Yes	Yes
Degrees of freedom (model)	16	31	31	31

• $p < .05$; •• $p < .01$; ••• $p < .001$; one-tailed tests for hypothesized effects, two-tailed otherwise.
*To reduce skewness, these variables were transformed using a natural log function.
†Variable included as instrument in the selection equation.

Panel Model

A relevant concern in judging the relationship between classification and credit is that there may be unmeasured proprietor characteristics that affect both the classification of

a business and its credit rating. In particular, proprietors who suffer from low status or discrimination in a community (based on ethnicity, religious background, and the like) may also tend to employ a strategy of product diversification that allows them to hedge their bets against the vagaries of any specific market niche. In turn, this would lead to an increased probability that their businesses would be classified as a hybrid by outside evaluators as well as an increased probability of receiving a poor rating from those evaluators. To help address this concern, we reorganized our data into groups of observations sharing a common proprietor and reestimated the model of credit ratings using a panel model. This model recognizes the Mercantile Agency's own assessment of the continuity of proprietor "character" in affecting credit scores, suggesting that the agency "has made men take their real character along with them, the character they bear at home [or] wherever they go to do business" (quoted in Sandage, 2005: 115).

Compared with models for repeated cross sections, panel data on credit evaluations has its own shortcomings, which are worth emphasizing. Relatively few firms in the postbellum South survived long enough to appear in multiple waves. Those that did clearly exhibit an upward survival bias in their credit ratings, as intimated by the effect of credit history duration in table 3, above. In addition, the majority of panels entail two observations per firm, with only 30 percent including three or more observations. This limits the usefulness of the panel data in tracing the evolutionary impact of classification on credit evaluation.

Table 6 summarizes the estimates of credit rating from a random effects model when we limit consideration to firms with multiple observations.[8] Two parameters of fundamental interest—boundary violation and ambiguous classification—continue to exhibit a strong negative correlation with credit rating. Consequently, it does not appear that these estimates are unduly affected by unmeasured proprietor characteristics. In this specification, the main effect for hybridity is negative, even controlling for these other mechanisms. It is worth noting that a firm's credit history also has a considerable bearing on its present rating, with substantial benefits accruing to businesses with good or excellent histories.

The preceding analyses offer evidence of a fairly robust correlation between classification and credit rating but are unclear as to the causal nature of this relationship. Did credit reporters react to difficulties in classifying these businesses by lowering their credit ratings and adjusting their coverage of firms? Or did reporters first decide how to rate these firms and only then arrive at their industrial classification? In the absence of fine-grained data on the credit evaluation process or an experimental design, it is impossible to establish causal direction with full certainty, but unpacking the mechanisms in the credit rating process offers additional support for the intuition that classification has an impact on credit ratings.

8
A Hausman test comparing the random effects specification to a fixed effects model was inconclusive, owing to the numerical sensitivity of the test to the inclusion of credit history. Consequently, we present estimates from the more parsimonious random effects model here.

The explicit instructions given to credit reporters emphasized that they should first evaluate the "nature" of the business and then assign credit ratings. Classification was thus proffered as a logical precedent to credit evaluation at the Mercantile Agency. Moreover, as the sample in table 7

Table 6

Coefficients from the Regression (Random Effects Model) of Dun Credit Ratings on Organizational Attributes and Classification for Repeat Observations (N = 35,225)

Independent variable	Coefficient
Constant	0.989
	(0.017)
Year (1870 = 0)	−0.016•••
	(0.000)
Assets ($1000s)*	0.721•••
	(0.002)
Branch distance (100s miles)	0.019•••
	(0.004)
Classification	
Form frequency	−0.006•••
	(0.001)
Hybrid	−0.037••
	(0.012)
Hybrid × Form frequency	−0.003
	(0.028)
Boundary violation	−0.034••
	(0.014)
Ambiguous	−0.038••
	(0.014)
Legal form	
Corporation	0.101•••
	(0.010)
Partnership	0.003
	(0.010)
Agency	0.086
	(0.081)
Owner demography	
Family	−0.009
	(0.014)
Female	0.025
	(0.019)
Credit history	
Length (years)	0.003•••
	(0.001)
Good (rating 2 or better)	0.199•••
	(0.011)
Excellent (rating 1 or better)	0.533•••
	(0.020)
Local market conditions	
No. of firms (all)*	0.003
	(0.002)
No. of firms (100s, same type)	0.012•••
	(0.002)
R-square (overall)	0.838
Fraction of variance from unobserved proprietor effects	0.062
Industry fixed effects	Yes
Degrees of freedom (model)	33

• $p < .05$; •• $p < .01$; ••• $p < .001$; one-tailed tests for hypothesized effects, two-tailed otherwise.
*To reduce skewness, these variables were transformed using a natural log function.

Table 7

Sample of Entries in Handwritten Credit Ledger*

Proprietor name	Location	Classification
<u>FRED'K SCHMIDT</u>	<u>NEW ORLEANS</u>	<u>GRO. & BAR</u>

Mar '72: Married, of good character and habits, and considered an honest, clever, good man Industrious and hard-working. Keeps a stock of about $2 to 3,000, and can get credit for small amounts.

Mar '73: Doing a good business in his line. Has stock on hand worth about $5000.

June '73: Stock $3 to 6,000. Credit good for wants.

June '75: In business several years. Of good character, doing good business, and has credit for wants. Generally estimated worth $8 to 10,000.

Dec '75: In close saving and economical. Doing a small, safe business. Owns the property he occupies. Bought in '67 for $5,500, now clear. Has in business about $1,500 and doesn't buy large. Fair pay, regarded good for a moderate amount. Means in all about $7,000.

Jul '76: In a good location and apparently doing a fair trade. Has a good stock. Owns real estate worth $5,000. Is considered a good and economical man and has credit for fair amounts. Is pretty fair pay. Estimated worth $7 to 8,000.

Jul '77: Has a very nice store. Not very large, but well filled. Said to be doing a fair trade. Owns real estate and is a good, economical man. Pays very well. Estimated worth $6 to 9,000.

Sep '77: Owns his store. Cost formerly $5,500, worth now only $2,500. Has a stock of about $1,500. Pays well and enjoys fair credit. Means altogether estimated at $4,000.

Jan '79: Does small, close business. Pays well. Has good credit.

Mar '80: No change. Is doing a good, living business. Pays promptly. Is in good credit, and regarded good for his engagements. His estimated worth $2 to 5,000.

<u>W. WINKLEMAN</u>	<u>NEW ORLEANS</u>	<u>SALOON</u>

Mar '72: Formerly kept the "Half Way House" where he failed. Afterwards undertook the grocery business, which he then left when he married a widow who kept saloon. She is worth fully $12–15,000. The building belongs to her. W. is worth of himself $3–4,000. He has always been considered honest and prompt in his payments, and gets credit for his wants.

Jul '73: Doing but little and considered rather slow. Is thought to change about too often.

Jul '74: Out of business.

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*Source: Louisiana, vol. 15, p. 64, R. G. Dun & Co. Collection, Baker Library, Harvard Business School.

shows, the handwritten credit ledgers maintained by Dun reporters required that proprietor name(s), location, and industrial classification be entered first, followed by entries on assets, credit evaluation, and activities, often over a period of successive months. For the majority of entries, classification thus appeared as a temporal precedent to credit evaluation. Entries and updates for credit standing were common, while those for industrial classification were relatively rare. As a practical consequence, a given entry in the typewritten *Reference Book* (e.g., July 1873) would typically pick up a relatively recent assessment of credit and assets (June 1873, in the case of Frederick Schmidt) and a less proximate judgment of industrial classification (March 1872). Despite the cross-sectional nature of the *Reference Book* data, then, the mechanics of credit evaluation often ensured that classification occurred prior to credit scoring.

A more subtle causal issue concerns the exogeneity of the effect of classification. When classification and credit rating for a given business enterprise were conducted by the same correspondent, it is possible that any observed correlation between these two constructs was affected by common

methods variance, in which the measurement approach of the credit reporter contributes systematically to the correlation. To assess how widespread this problem might be in our data, we collected a more complete longitudinal sample of New Orleans ledger data from 1866 to 1883 to complement our cross-sectional sample. In the ledger sample, which included 220 firms with 1,297 ledger entries, we found that the agent's classification preceded the credit evaluation in 83 percent of the cases; in 70 percent of the cases, business classification and evaluation were not performed by the same agent. Although this does not rule out common methods bias in any particular instance, it does suggest that such bias may not be an issue for the majority of the credit listings issued by Dun, owing to turnover and rotation among credit reporters.

DISCUSSION

In the period surrounding the Civil War, Robert Dun's Mercantile Agency created one of the first general schema for classifying and evaluating business enterprises in the United States. At an early stage, Dun's system evidenced limited institutionalization along a number of dimensions, including the complexity of his industrial taxonomy, the training of his correspondents, the organizational infrastructure available to support their activities, and the general public's acceptance of his classifications and evaluations. Within the span of a mere thirty years, the Mercantile Agency and its reference books became a permanent institution in American business. Professional correspondents replaced amateurs, branch offices proliferated, and legal assaults on the credit rating system ebbed. By the end of the century, the industry boundaries constructed by Dun and his agents were well established and affected the fate of firms that violated them.

The implementation of Dun's schema during the postbellum period offers a unique historical window onto a system of social classification in the process of emergence. Given that most recent organizational studies have been concerned with the effects exercised by mature systems of classification, this case proves to be both theoretically and empirically informative. While taken-for-granted classification systems lead audiences to ignore or sanction objects that straddle social boundaries (Zuckerman, 1999; Hsu, 2006a), Dun's correspondents imposed few significant penalties when rating these enterprises during the period of early institutionalization. At a later stage of institutionalization, boundary violations contributed to both increased attention and lower credit ratings from correspondents. As Zuckerman (2000: 614) posited, "pressure to abide by industry categories should be found only for markets that group [firms] by industry," a practice that developed at R. G. Dun during the 1880s. The resulting system of classification remained distinct from that noted in contemporary contexts, in which categorical non-conformity tends to decrease both attention to an organization or product and its rating from critical audiences.

Some boundary transgressions are tolerated in primitive systems of classification because the boundaries themselves are in flux or have not yet achieved social legitimacy. But ambiguity presents more fundamental problems. At an early

stage, when Dun's correspondents encountered firms with "miscellaneous" lines of business, they reduced their probability of credit coverage and increased the likelihood of bad credit ratings for such firms. By contrast, experienced audiences can sometime deal with ambiguity routinely through categorical defaults or rapid access to contextual information (DiMaggio, 1997). With the evolution of the Mercantile Agency's system, ambiguity no longer posed problems for coverage, though it continued to have an adverse impact on ratings.

These results have several implications for the sociology of organizations. Scholars in the field have long recognized that meaningful classification is essential to analyzing differences in products, routines, authority structures, and goals among organizational actors (DiMaggio, 1987; Hannan and Freeman, 1989). While early work considered objective features that could be identified by analysts in efforts to develop organizational taxonomies, the more recent literature has taken a decidedly constructivist turn, emphasizing the subjective perspective of organizational stakeholders and audiences (Aldrich and Ruef, 2006: chap. 6; Hannan, Pólos, and Carroll, 2007). An examination of the evolution of classification systems continues this constructivist trend, intimating how different problems of hybridity affect organizations over time. In lieu of ahistorical accounts, our understanding of how society evaluates different forms of organizations becomes enriched by attention to cultural change in the evaluative schema themselves.

Considered from an evolutionary standpoint, the present analysis has a number of implications for the relative utility of existing theories of hybridity. First, it has suggested that hybrid density has a relatively limited impact on coverage and evaluation when classification systems are new. Much as recent work in organizational ecology has pushed for more refined measures of focused identity on the part of producers entering a new industry (e.g., McKendrick and Carroll, 2001; McKendrick et al., 2003), this empirical finding suggests that scholars expecting to find an effect of density on hybrid acceptance may require measures that go beyond raw frequency (see Hannan, Pólos, and Carroll, 2007, for steps in this direction). Second, we have proposed a new method to isolate the impact of boundary violations, testing the overall impact of those violations in a pooled sample, testing them again in a sample in which the boundaries can be constructed counterfactually, and a third time in a sample in which the boundaries have been clearly established. Using this approach, we found that violating categorical boundaries generates increased attention and evaluative sanctions for firms. Moreover, these effects are due to the classification schema of the audience, not their prior assumptions about the kinds of trades that might logically be combined with one another. As noted previously, the observed effect of boundary violations on coverage is opposite to that evidenced in modern markets for films and stocks, a finding that reflects on the scope conditions associated with this operational mechanism, particularly the lack of institutionalized category specialization among credit reporters in the late 1800s. Finally, our results suggest that some mechanisms—especially those associated with ambiguity—may have a more stable impact

over the course of institutionalization in classification systems than others. If the evaluation of organizations hinges, in part, on their ability to project central, enduring, and distinctive features to audience members (Albert and Whetten, 1985), then it may be less important for an organization to conform to some acceptable combination of explicit categories and more important that it avoid being relegated to an ill-defined residual category. Given the scope conditions of the theory, this should be true if the institutionalization of a classification system is not also associated with routines that assist audiences in making sense of categorical defaults.

These findings are subject to many of the customary caveats about sampling and analytical methodology. For the historical data employed here, there is no reliable universe of business firms that we can sample from. Consequently, the risk set for credit coverage pertains to those enterprises that Dun subscribers requested information on or that Dun agents were aware of. Many small or self-sufficient businesses, especially in the domain of agriculture, are likely to be ignored by this sampling procedure. There are also a number of mechanisms that are omitted from our evolutionary account of classification and remain to be explored further. A growing literature in organizational studies has documented the processes contributing to the creation of new product categories (Lounsbury and Rao, 2004) and organizational forms (Ruef, 2000). How is the evaluation and coverage of organizations affected by the appearance of new categories in a classification schema? Do hybrid organizations that draw on new categories in a schema warrant less or more devaluation by critical and mass audiences? What happens to hybrid organizations that are partially classified in a category that is removed from a schema? Are they accorded an exclusive classification in a remaining category, with a resulting boost in critical ratings, or do analysts consider them ambiguous, with a resulting decline in ratings? By attending to the process of institutionalization surrounding such changes in classification, and the problems of hybridity that accompany them, organizational scholars will be able to craft more encompassing explanations of the effects of social categorization.

REFERENCES

Abbott, A.
1997 "Seven types of ambiguity." Theory and Society, 26: 357–391.

Albert, S., and D. H. Whetten
1985 "Organizational identity." In L. L. Cummings and B. M. Staw (eds.), Research in Organizational Behavior, 7: 263–295. Greenwich, CT: JAI Press.

Aldrich, H. E., and M. Ruef
2006 Organizations Evolving, 2d ed. London: Sage.

Beales, R. E.
1949 "Industrial classification—National and international." Journal of the Royal Statistical Society (Series A. General), 112: 316–330.

Bowker, G. C., and S. L. Star
1999 Sorting Things Out: Classification and Its Consequences. Cambridge, MA: MIT Press.

Carroll, G. R., and M. T. Hannan
2000 The Demography of Corporations and Industries. Princeton, NJ: Princeton University Press.

Carruthers, B. G., and B. Cohen
2006 "The mechanization of trust: Credit rating in 19th c. America." Working paper, Department of Sociology, Northwestern University.

Clark, T. D.
1946 "The furnishing and supply system in southern agriculture since 1865." Journal of Southern History, 12: 24–44.

Davis, G. F., K. A. Diekmann, and C. H. Tinsley
1994 "The deinstitutionalization of conglomerate firms in the 1980s." American Sociological Review, 59: 547–570.

DiMaggio, P. J.
1987 "Classification in art." American Sociological Review, 52: 440–455.
1997 "Culture and cognition." Annual Review of Sociology, 23: 263–287.

Doerflinger, T. M.
1983 "Commercial specialization in Philadelphia's merchant community, 1750–1791." Business History Review, 57: 20–49.

Durkheim, É., and M. Mauss
1963 Primitive Classification. R. Needham, trans. (First published in 1903.) Chicago: University of Chicago Press.

Earling, P.
1890 Whom to Trust: A Practical Treatise on Mercantile Credits. New York: Rand, McNally.

Faulkner, R. R.
1983 Music on Demand: Composers and Careers in the Hollywood Film Industry. New Brunswick, NJ: Transaction Books.

Firebaugh, G.
1997 Analyzing Repeated Surveys. Thousand Oaks, CA: Sage.

Foulke, R. A.
1941 The Sinews of American Commerce. New York: Dun and Bradstreet.

Hannan, M. T., and J. H. Freeman
1986 "Where do organizational forms come from?" Sociological Forum, 1: 50–57.
1989 Organizational Ecology. Cambridge, MA: Harvard University Press.

Hannan, M. T., L. Pólos, and G. R. Carroll
2007 Logics of Organization Theory: Audiences, Codes, and Ecologies. Princeton, NJ: Princeton University Press.

Haveman, H. A., and H. Rao
2006 "Hybrid forms and the evolution of thrifts." American Behavioral Scientist, 49: 974–986.

Hayes, S. P.
1948 "Industrial classification by Dun and Bradstreet." American Statistician, 2: 8–9, 19.

Heckman, J. J.
1979 "Sample selection bias as a specification error." Econometrica, 47: 153–161.

Hidy, R. W.
1939 "Credit rating before Dun and Bradstreet." Bulletin of the Business Historical Society, 13: 81–88.

Hsu, G.
2006a "Evaluative schemas and the attention of critics in the U.S. film industry." Industrial and Corporate Change, 15: 467–496.
2006b "Jacks of all trades and masters of none: Audiences' reactions to spanning genres in feature film production." Administrative Science Quarterly, 51: 420–450.

Hsu, G., M. T. Hannan, and L. Pólos
2009 "Typecasting and legitimation: A formal theory." Working paper, Graduate School of Management, University of California–Davis.

Hsu, G., M. T. Hannan, and Ö. Koçak
2009 "Multiple category memberships in markets: An integrative theory and two empirical tests." American Sociological Review, 74: 150–169.

Kolesnikoff, V. S.
1940 "Standard classification of industries in the United States." Journal of the American Statistical Association, 35: 65–73.

Lounsbury, M., and H. Rao
2004 "Sources of durability and change in market classifications: A study of the reconstitution of product categories in the American mutual fund industry, 1944–1985." Social Forces, 82: 969–999.

Madison, J. H.
1974 "The evolution of commercial credit reporting agencies in nineteenth-century America." Business History Review, 48: 164–186.

McKendrick, D. G., and G. R. Carroll
2001 "On the genesis of organizational forms: Evidence from the market for disk arrays." Organization Science, 12: 661–682.

McKendrick, D. G., J. Jaffee, G. R. Carroll, and O. M. Khessina
2003 "In the bud? Analysis of disk array producers as a (possibly) emergent organizational form." Administrative Science Quarterly, 48: 60–93.

Mohr, J. W., and V. Duquenne
1997 "The duality of culture and practice: Poverty relief in New York City, 1888–1917." Theory and Society, 26: 305–356.

Norris, J. D.
1978 R. G. Dun & Co. 1841–1900: The Development of Credit-Reporting in the Nineteenth Century. Westport, CT: Greenwood Press.

Olegario, R.
2006 A Culture of Credit: Embedding Trust and Transparency in American Business. Cambridge, MA: Harvard University Press.

Phillips, D. J., and E. W. Zuckerman
2001 "Middle-status conformity: Theoretical restatement and empirical demonstration in two markets." American Journal of Sociology, 107: 379–429.

Pólos, L., M. T. Hannan, and G. R. Carroll
2002 "Foundations of a theory of social forms." Industrial and Corporate Change, 11: 85–15.

Porter, G., and H. C. Livesay
1971 Merchants and Manufacturers: Studies in the Changing Structure of Nineteenth-Century Marketing. Baltimore, MD: Johns Hopkins Press.

Ransom, R. L., and R. Sutch
2001 One Kind of Freedom: The Economic Consequences of Emancipation, 2d ed. (Originally published in 1977.) Cambridge: Cambridge University Press.

Rao, H., P. Monin, and R. Durand
2005 "Border crossing: Bricolage and the erosion of culinary categories in French gastronomy." American Sociological Review, 70: 968–991.

Ruef, M.
1999 "Social ontology and the dynamics of organizational forms: Creating market actors in the healthcare field, 1966–1994." Social Forces, 77: 1403–1432.
2000 "The emergence of organizational forms: A community ecology approach." American Journal of Sociology, 106: 658–714.

Sandage, S. A.
2005 Born Losers: A History of Failure in America. Cambridge, MA: Harvard University Press.

Scott, W. R.
2007 Institutions and Organizations: Ideas and Interests, 3rd ed. London: Sage.

Vose, E. N.
1916 Seventy-Five Years of the Mercantile Agency: R. G. Dun & Co., 1841–1916. New York: R. G. Dun and Co.

Whetten, D. H.
2006 "Albert and Whetten revisited: Strengthening the concept of organizational identity." Journal of Management Inquiry, 15: 219–234.

Winship, C., and R. D. Mare
1992 "Models for sample selection bias." Annual Review of Sociology, 18: 327–350.

Wyatt-Brown, B.
1966 "God and Dun & Bradstreet, 1841–1851." Business History Review, 40: 432–450.

Zuckerman, E. W.
1999 "The categorical imperative: Securities analysts and the legitimacy discount." American Journal of Sociology, 104: 1398–1438.
2000 "Focusing the corporate product: Securities analysts and de-diversification." Administrative Science Quarterly, 45: 591–619.

Zuckerman, E. W., T. Y. Kim, K. Ukanwa, and J. von Rittmann
2003 "Robust identities or nonentities? Typecasting in the feature film labor market." American Journal of Sociology, 108: 1018–1075.