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Heather A. Havemen, Anand Swaminathan, and Eric B. Johnson

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Heather A. Havemen
University of California, Berkeley

Anand Swaminathan
University of California, Davis

Eric B. Johnson
Columbia University

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Abstract

We study how employing organizations divide up the tasks they do, and therefore how they structure their employees' jobs. Much research in the past three decades has shown that employing organizations' job structures determine the social, economic, and psychological outcomes experienced by workers, and thus determine patterns of stratification and social mobility. Although much attention has been paid to the consequences of organizational job structures, little has been done to analyze their causes. Our analysis of job structures in U.S. wineries adds to the handful of causal studies on this topic. Building on sociological theory, we predict that technical factors – scale and scope of operations – increase the complexity of job structures, specifically the number of job titles, functions delineated by those titles, and people with multiple job titles. We further predict that cultural factors – organizational age, prevailing notions of what is “normal,” and organizational form – influence job structures. We find strong effects of both technical and cultural factors. We also find that these forces can conflict and complement each other, and that the identities embedded in organizational forms determine whether and how technical and cultural factors affect job structures.

Structure at Work: The Division of Labor in U.S. Wineries

Heather A. Haveman

Columbia University
Graduate School of Business
706 Uris Hall, 3022 Broadway
New York, NY 10027-6902
hah15@columbia.edu

University of California at Berkeley
Department of Sociology
410 Barrows Hall
Berkeley, CA 94720-1980
510-642-3495

Anand Swaminathan

University of California, Davis
Graduate School of Management
One Shields Drive
Davis, CA 95616-8609
aswaminathan@uc.davis.edu 530-752-9916

Eric B. Johnson

Columbia University
Department of Sociology
413 Fayerweather Hall
New York, NY 10027
ebj2001@columbia.edu 212-854-4680

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Abstract

We study how employing organizations divide up the tasks they do, and therefore how they structure their employees' jobs. Much research in the past three decades has shown that employing organizations' job structures determine the social, economic, and psychological outcomes experienced by workers, and thus determine patterns of stratification and social mobility. Although much attention has been paid to the consequences of organizational job structures, little has been done to analyze their causes. Our analysis of job structures in U.S. wineries adds to the handful of causal studies on this topic. Building on sociological theory, we predict that technical factors – scale and scope of operations – increase the complexity of job structures, specifically the number of job titles, functions delineated by those titles, and people with multiple job titles. We further predict that cultural factors – organizational age, prevailing notions of what is “normal,” and organizational form – influence job structures. We find strong effects of both technical and cultural factors. We also find that these forces can conflict and complement each other, and that the identities embedded in organizational forms determine whether and how technical and cultural factors affect job structures.

The division of labor has intrigued sociologists and economists for over two centuries. Adam Smith (1776 [1970]) argued that technical imperatives, specifically, the need to be efficient to compete with other organizations, determine how tasks are divided up in productive enterprises. Similarly, Max Weber (1904-1905 [1958]) recognized that a clear division of labor generates improvements in production, both qualitative and quantitative. Émile Durkheim (1893 [1984]) went further, arguing that not only does dividing tasks among people increase productive capacity, it also (and paradoxically) engenders social solidarity, because it makes people interdependent. Karl Marx (1867 [1992]) took a more pessimistic view of the consequences of a complex division of labor, arguing that it led to alienation, rendering workers spiritually and physically like machines, tiny cogs in the giant wheel of capitalism. Smith, Weber, and Marx all appreciated that in modern societies, the division of labor occurs within and between employing organizations. Picking up on this insight, contemporary sociologists have spent the past three decades studying the impact of job structures in employing organizations (*e.g.*, Kanter, 1977; Stolzenberg, 1978; Baron and Bielby, 1980; Hedström, 1991; Kalleberg, Reskin, and Hudson, 2000). The logic guiding this line of research was neatly summarized by Baron (1984:38):

[T]he division of labor among jobs and organizations generates a distribution of opportunities and rewards that often antedates, both logically and temporally, the hiring of people into those jobs.

Taken as a whole, this “new structuralist” research has shown conclusively that stratification and social mobility processes are mediated by employing organizations.

Given the evident importance of employing organizations for stratification and social inequality, it is not surprising that much effort has gone into understanding precisely how organizations shape which workers do what, where, when, and how. Some of this work focuses on formal policies, such as hiring, training, evaluation, and promotion practices (*e.g.*, Kanter, 1977; Reskin and McBrier, 2000) or the use of contingent temporary and part-time workers (*e.g.*, Kalleberg *et al.*, 2000; Broschak and Davis-Blake, 2006). Still others have studied how firms set

up reward systems, not just compensation (*e.g.*, Bridges and Nelson, 1989; Hedström, 1991), but also non-monetary benefits like flexible work hours and parental leaves (*e.g.*, Kelly and Dobbin, 1999). Related to this are studies of how employers respond to government regulation of employees' rights (*e.g.*, Kalev, Dobbin, and Kelly, 2006). A final line of analysis, inspired by Piore and Sabel's (1984) pioneering work, seeks to explain the impact of technology and technological change at work on employees' skill levels, power, and rewards (*e.g.*, Barley, 1986; Fernandez, 2001).

In contrast to the flood of research on the *consequences* of organizations' work structures and practices for inequality and social mobility, there has been little work on the *causes* of the division of labor within firms. Most research on job structures has used cross-sectional data and so has been able to assess only association, not causation. To our knowledge, only three studies of job structures use longitudinal data and conduct analyzes that can plausibly claim to demonstrate causal effects (Meyer, 1972; Baron and Bielby, 1986; Strang and Baron, 1990). This neglect is unfortunate, as the distribution of jobs across functional and hierarchical categories is the milieu within which social class develops (Grusky and Sørensen, 1998; Sandefur, 2001; Weeden and Grusky, 2005). Attention to jobs – that is, to detailed occupations within particular organizations – is especially important for explaining employees' behavior and attitudes. Job structures influence conflict between workers (Fine, 1996), turnover rates and commitment (Lincoln and Kalleberg, 1985), and job satisfaction (Wharton and Baron, 1987; Schooler and Naoi, 1988). More macroscopically, job structures are primary determinant of organizational cultures – the norms that pervade workplaces, the systems of meaning through which employees make sense of what they do and how they do it, and the agreements that develop about what workers value and disdain (Lincoln and Kalleberg, 1985; Harrison and Carroll, 1991; Fine, 1996).

It is especially important to understand the conditions under which a wide (rather than narrow) set of jobs develops (Hannan, 1988; Hedström, 1991; Greve, 1994). The more varied the set of jobs, the more likely many different kinds of workers, including women and members of racial/ethnic minorities, will find a job that suits their particular talents and personal goals.

The better the fit between workers and jobs, the less inequality in socioeconomic attainment will result. Moreover, a wider array of jobs can be combined to create a more varied set of job ladders and thus a wider array of career paths. This more macroscopic dimension of job structures intensifies the impact of job variety on equality of socioeconomic attainment: when more distinct career paths are available, it is easier for disadvantaged workers like women and members of racial/ethnic minorities to advance.

In this paper, we focus on one key aspect of the division of labor in employing organizations, namely the extent to which tasks are finely or coarsely divided into distinct jobs. Concretely, the division of labor in employing organizations is observed in the number of distinct job titles, the number of detailed functional areas delineated by job titles, and the number of levels of hierarchy.¹ We study job titles because these are relatively easy to observe and because they are significant and influential labels that have real social and economic consequences. For workers, job titles signal status and serve as prominent markers of identity. For employing organizations, job titles signal their similarity to other organizations that use similar titles and their distinctiveness from organizations that use different titles. Systems of job titles constitute an “organizational language” (Meyer and Rowan, 1977:349), and “speaking” this language signals employing organizations’ conformity with prevailing norms. Having structures, including job structures, that meet the expectations of external observers not only brings organizations legitimacy, it also brings resources, stability, and survival (Meyer and Rowan, 1977). For instance, the use of standard job titles and the existence of the expected set of distinct hierarchical ranks can facilitate the recruiting and retention of scarce talent because these are what prospective employees have come to expect and therefore value.

Empirical research has shown that job titles proliferate and complex systems of jobs (job ladders and specialized functions) develop because of internal technical imperatives, notably large size, which pushes organizations to specialize tasks and decentralize authority, as well as

¹ We focus on the horizontal division of labor and ignore the vertical division of labor because most of the organizations we study are small, so their job structures have little hierarchy.

external cultural factors, notably state regulation and institutional isomorphism, which force organizations to fit externally accepted patterns (Hall, Haas, and Johnson, 1967; Pugh *et al.*, 1969; Blau, 1970; Blau and Schoenherr, 1971; Meyer, 1972; Meyer and Brown, 1977; Hsu, Marsh, and Mannari, 1983; Baron and Bielby, 1986; Strang and Baron, 1990). Accordingly, our analysis includes both internal technical forces and external cultural forces. We study the distribution of jobs in the U.S. wine industry, looking at both differences between wineries at particular points in time and changes within wineries over time. This industry is an ideal setting for research on the division of labor in organizations because it includes a large number of organizations that vary greatly, both cross-sectionally and over time, which allows us to tease apart the influence of the forces that shape job structures.

Theory and Hypotheses

Employing organizations face multiple, often conflicting, pressures when they decide how to divide up the work they do. On the one hand, they have *technical imperatives* (Blau and Schoenherr, 1971; Rosen, 1983). For example, wineries must have someone to make the wine, someone to sell the wine, and someone to manage the legal issues involved in producing and selling alcoholic beverages in the U.S. To give another example in a different kind of productive organization, magazine publishers need people to create content, solicit and select that content, oversee physical production, manage subscription and newsstand distribution, and handle finances and accounting. On the other hand, employing organizations have *cultural or ceremonial imperatives*, which stem from the universal need to garner legitimacy for their existence and their actions (Meyer and Rowan, 1977). For example, all for-profit employers have to demonstrate to state and federal governments that they have paid required payroll and income taxes, and that they have not contravened workplace safety, antidiscrimination, or consumer-protection laws. More broadly, all organizations have to make sure that they do not violate expectations of the communities where they operate, and all must fulfill the demands of suppliers, distributors, and customers. More narrowly, each organization must conform to the particular expectations that

observers develop for its form – its form’s social code, which consists of both signals and rules of conduct (Pólos, Hannan, and Carroll, 2002; Hannan, Carroll, and Pólos, 2007). Adhering to this code confers benefits, while deviating from this code is punished.

In this study, we probe the ways employing organizations balance these multiple and potentially conflicting imperatives. We proceed as follows. We first relate technical imperatives to job structures, then discuss cultural pressures. After that, we consider conflicts and complementarities between the two sets of causal factors.

Technical Forces Shape Job Structures

Organizations are created because people cannot achieve their goals by working alone, in small informal groups, in families, or in dispersed social movements. People create formal organizations when the actions they must undertake to achieve their goals require the joint, sustained, and co-ordinated efforts of many people. Therefore, the set of jobs in organizations is driven, fundamentally, by pure technical considerations of the tasks at hand. We highlight here two of the most basic technical factors that determine job structures: scale and scope of operations.²

Scale of operations. Organizational size is the most studied, and conceivably the most important, feature of organizations (see Scott, 2002:263-268 for a review). Early sociologists speculated that group size affects the structure and pattern of social interaction, including workplace relations. Groups with a large number of members require complex forms of communication (Durkheim, 1893 [1984]:262; Spencer, 1898 (1):525-528; Simmel, 1902) because the ease of dyadic interaction declines with the number of members. This happens because the number of one-on-one relationships increases geometrically as size increases arithmetically

² Previous research has shown that technology (craft *vs.* batch *vs.* mass production, use of computers and computer-driven processes, or capital *vs.* labor intensity) fundamentally influences the tasks that organizations must do and the way organizations structure those tasks (*e.g.*, Pugh *et al.*, 1969; Blau *et al.*, 1976; Baron and Bielby, 1986; Kelley, 1990). However, our research site is an industry where firms rely on a production technology that dates back to ancient Sumeria. Thus, differences in production technology, both cross-sectional and longitudinal, are small in our sample. Accordingly, we make no predictions about technology.

(Graicunas, 1933). Because there simply isn't enough time for everyone in large organizations to interact one-on-one with everyone else, interactions between people in large organizations must use a more impersonal mode (mediated or broadcast) and assume a more formal style than interactions in small organizations (Chapin, 1951; Tsouderos, 1955; Grusky, 1961; Blau and Schoenherr, 1971). Growth-driven changes in communication mode and style are accompanied by fragmentation of communication efforts. In turn, fragmentation of communication between distinct subgroups of organizational members creates differentiation of authority, as each subgroup takes on or is given responsibility for a particular set of tasks (Hall *et al.*, 1967; Pugh *et al.*, 1969; Blau, 1970; Blau and Schoenherr, 1971; Meyer, 1972).

As a consequence of these growth-driven changes in social interaction and task differentiation, the division of labor in an employing organization increases with size (that is, with scale of operations and thus number of employees), but at a decreasing rate (Blau, 1970; Blau and Schoenherr, 1971). Organizations can operate more efficiently (with lower costs) and more effectively (with higher quality and greater reliability) when they divide tasks into specialized jobs (Smith, 1776 [1970]; Weber, 1904-1905 [1968]). Thus, as organizational size increases, the set of tasks to be done is spread across a larger number of ever-more-specialized jobs. In sum, large organizations are more complex than their small counterparts, and as such place employees in many different, highly specialized jobs (Simon, 1962).

When organizations operate on a small scale, some tasks may take up only a fraction of a worker's time and effort. For this reason, workers in small organizations may perform multiple tasks and may therefore have multiple job titles. For example, in a small winery, it is quite likely that a single person could serve as both general manager and winemaker, while in a small restaurant, a single person could be both host and receptionist. As organizations' scale of activities expands, many tasks come to require the full time and effort of one or more workers. As a result, the number of people that perform multiple tasks decreases, as does the number of people who have multiple job titles. Large wineries, for example, are quite likely to separate general-management tasks from production tasks, and so are likely to have one or more people

in administrative jobs and one or more people dedicated to making wine. Similarly, large restaurants are likely to separate the tasks of greeting and seating customers from the tasks of taking and confirming reservations.

There is reason to expect the opposite – that compared to their small counterparts, large organizations will have more people, rather than fewer, holding multiple job titles. The negative relationship between organizational size and number of people with multiple job titles may be attenuated, even reversed (rendered positive), by the tendency of large organizations to divide their tasks among more fine-grained categories than small organizations. In other words, large wineries may have more people than small ones, but they may also have *a lot* more distinct jobs. If the relationship between size and fineness of task categories is stronger than the relationship between size and number of employees, the effect of size on the number of people with multiple job titles may be positive rather than negative.

Before turning to explain how other factors influence the division of labor in employing organizations, we must make one thing clear. Because of its fundamental importance for organizational structures, including job structures, we consider all other forces that influence job structures only *after* taking into account the basic effect of organizational size. Thus, all subsequent predictions are *net of* scale of operations.

Scope of operations: Diversification. As the variety of organizational products, customers, or locations increases, the division of labor becomes more fine-grained because diversified organizations have to perform a wider array of tasks to create multiple products or serve many types of customers in multiple locations than do single-product, single-customer, or single-location organizations. In response to this technical imperative, organizations create broader sets of jobs as they diversify. In addition, as organizations diversify, the jobs employees do are spread across a larger number of ever-more-specialized functions. Finally, as organizations diversify, employees' time and efforts must be spread across more and more distinct tasks, so the number of people with multiple job titles increases.

Scope of operations: Vertical integration. As organizations become more involved in upstream or downstream stages of production, the division of labor becomes more complex, because more vertically integrated organizations have to perform a wider array of tasks. The tasks required to acquire or create inputs to the organizations' main production processes differ from the tasks involved in transforming inputs into end products. Similarly, the tasks involved in making end products differ from those involved in selling and servicing those products. In response to this technical imperative, organizations create a broader set of jobs as they integrate upstream or downstream. In addition, as organizations vertically integrate, the tasks their employees do are spread over a larger number of functions. Finally, as organizations integrate vertically, employees' time and efforts must be spread across more distinct tasks, so the number of people having multiple job titles will increase.

Summary. We expect that the sheer number of distinct jobs, as indicated by number of job titles, and the complexity of the job-title system, as indicated by the number of specialized functions, both increase with scale of operations because larger organizations need to do a larger variety of more fine-grained tasks than smaller organizations. By a similar logic, organizations that produce a diverse array of goods and services have broader and more complex personnel needs than do organizations that specialize in a small number of goods and services; hence horizontally differentiated and vertically integrated organizations will have more complex job systems than will otherwise-comparable specialized, vertically non-integrated organizations. Our predictions about the extent to which employees fill multiple jobs are more complex than our predictions about number of job titles and specific functions. We make competing predictions about the relationship between organizational size and number of people with multiple job titles – it can be either positive or negative – while we predict positive relationships between horizontal differentiation and vertical integration, on the one hand, and the number of people with multiple job titles, on the other.

Institutional Forces Shape Job Structures

All organizations need legitimacy to acquire essential resources (Meyer and Rowan, 1977). Legitimacy takes two main forms. Sociopolitical legitimacy consists of the ability to “call upon sufficient other centers of power, as reserves in case of need” (Stinchcombe, 1968:162) and implies approval by authorities such as the state, professional bodies, and renowned individuals. Constitutive legitimacy exists when organizations are comprehensible and taken-for-granted as the natural way to achieve some collective goal, when they are justified and explained on the basis of prevailing cultural models and accounts (Meyer and Rowan, 1977), and those involved cannot conceive of alternatives (Zucker, 1983). In the paragraphs below, we explain how attributes of employing organizations (specifically, their age), and their contexts (the structures of other nearby organizations), and the identities associated with their organizational forms push organizations to adopt particular job structures in order to acquire both kinds of legitimacy. As a result, job-title differentiation varies among organizations of different ages, in different contexts, and with different forms.³

Age. Aging has three complementary effects on the division of labor. First, as organizations age, the jobs their employees do may be transformed or even become obsolete, but old jobs will not necessarily disappear. As they age, organizations also tend to become more formalized and bureaucratic (Meyer and Brown, 1977), and thus more structurally inert (Hannan and Freeman, 1984). In turn, inertia makes aging organizations less likely to eliminate jobs that have become obsolete than one might expect based purely on technical considerations. Instead of replacing old jobs, organizations are likely to add new types of jobs to the set of existing jobs. Because of this tendency toward inertia in older organizations, job structures reveal the sedimented histories of employing organizations. In this way, job structures are similar to

³ Previous research has revealed two other cultural factors that lead to a fine-grained division of labor: the gender and ethnic/racial compositions of organizations’ workforces (*e.g.*, Baron and Bielby, 1986; Strang and Baron, 1990). Unfortunately, we do not have data on workers’ ethnicity/race, and we have not yet coded workers’ gender using employees’ first names. Therefore, our current analysis cannot touch on these important cultural determinants of job structures.

organizational rule structures – once created, many formal (written) rules and regulations tend to persist, even in the face of shifting circumstances that render them obsolete (March, Schulz, and Zhou, 2000). Second, age-related bureaucratization and formalization promote increased complexity in job structures because the accumulation of experience as organizations age can lead organizations to more finely distinguish among jobs, especially administrative ones (Meyer and Brown, 1977). Third, employees of older organizations have had more time than employees of younger organizations to find opportunities to advance their careers through idiosyncratic job redefinition and expansion (Miner, 1987; Miner and Estler, 1984). Job redefinition and expansion further increase the variety of jobs in older organizations. For all these reasons, the set of jobs in any organization is likely to become more elaborate with age. Therefore, we predict that the sheer number of distinct jobs and the complexity of the job-title system increases with age. We also predict that the number of people with multiple job titles increases with age, because age-related idiosyncratic job redefinition and expansion (Miner, 1987; Miner and Estler, 1984) make it more likely that workers in older organizations will take on more complex assignments.

Isomorphic pressures. Organizations often face great uncertainty about what is the “best” way to divide up their tasks and people – not only the most technically efficient and effective, but also the most culturally legitimate. The set of jobs organizations must fill to conform to cultural demands varies over time, as expectations in the minds of local communities, customers, suppliers, distributors, and industry peers evolve (Meyer and Rowan, 1977; DiMaggio and Powell, 1983). Expectations about organizational structures, including job structures, are incarnated in the structures of other organizations. Organizational decision makers tend to pay the most attention to the structures of nearby organizations because they are more visible than organizations in other regions, they are more likely than organizations in other regions to be directly connected to the focal organization through routine exchanges, and they are more likely than organizations in other regions to be in the same structural position as the focal organization (DiMaggio and Powell, 1983). Therefore, we expect that organizations’ job structures will be

patterned on the “typical” job structures of the organizations in their region. When and where the job structures of other organizations are complex, organizations will develop more complex job structures. But when and where the job structures of other organizations are simple, organizations will develop less complex job structures.

Organizational form and identity. Organizational forms are identities or social codes, “recognizable patterns that take on rule-like standing and get enforced by social agents” (Pólos, Hannan, and Carroll, 2002:89; see also Hannan, Pólos, and Carroll, 2007). Such socially-coded identities comprise both rules of conduct and signals to internal and external observers. Rules of conduct provide guidelines for members of an organizational population (a collection of organizations in a bounded physical space, all with a single form) by delimiting what they should and should not be, and what they should and should not do. For their part, signals generate a cognitive conception about the organizational form because they define what observers understand organizations with that form to be and not to be, and what they do and don’t do.

Conformity with the social code that constitutes an organizational form’s identity is rewarded by external observers, while violation is punished. To judge conformity with social codes, external observers focus on features that distinguish one organizational form from another and ignore features that are common across forms – those that do not identify organizational forms as distinct categories. Therefore, all organizations demonstrate their membership in a particular form by adopting structural elements that are distinctive of that form. For example, advertising agencies must balance creative urges and profit motives; therefore, the job structures of advertising agencies include both those on the creative side (*e.g.*, copywriter) and those on the business side (*e.g.*, account manager). In this way, advertising agencies’ job structures tend to reflect the social codes developed for their particular industry. Similarly, wineries face pressures to manage aspects of their operations that are distinctive to their organizational form, notably the growing of grapes (viticulture) and the fermenting, refining, and bottling of wine from grapes. Therefore, wineries’ structures highlight jobs devoted to these form-specific tasks.

Within any organizational form, there are often distinct subforms, each of which has a distinctive socially coded identity. For instance, American breweries can be divided into four subforms: mass producers, microbreweries, contract brewers, and brewpubs (Carroll and Swaminathan, 2000). Similarly, American wineries have two main subforms: mass producers and farm wineries (Swaminathan, 1995, 2001). Sometimes organizational forms can be blurred; consider, for example, firms that manufacture disk arrays. They have heterogeneous origins and so derive their primary identities from other fields, which makes it impossible for the disk-array-producer form to cement its own distinctive identity (McKendrick and Carroll, 2001; McKendrick, Jaffee, Carroll, and Khessina, 2003). When there are sharp (rather than blurred) distinctions between subforms, we expect that organizations pay attention to other organizations with their subform, and pay less, if any, attention to organizations with other subforms. Thus, organizational (sub)form determines which other organizations are seen as “typical” and used as role models.

Summary. We expect that the complexity of the job-title system – as indicated by the number of job titles, the number of specialized functions, and the number of people with multiple titles – all increase with organizational age and with the complexity of job structures in other nearby organizations. We also expect that organizations model their job structures primarily on the job structures of other organizations with the same subform, and therefore the same socially coded identity, and to a lesser extent, if at all, on the job structures of other organizations with different subforms.

The Joint Impact of Technical and Cultural Forces on Job Structures

Organizations vary in the degree to which they are susceptible to pressures to adopt highly legitimate structures and thus become isomorphic with others in their field (Meyer and Rowan, 1977; DiMaggio and Powell, 1983; Strang and Tuma, 1993). Most basically, organizations that are already highly legitimate are less sensitive to isomorphic pressures than

organizations that do not enjoy such standing. In particular, old and large organizations may be less susceptible to isomorphic pressures than small and young ones. We consider each in turn.

There are fundamental differences between new and old organizations beyond those described above. New ventures have no reputations because they have no track records. Their lack of track records makes it hard for outsiders to measure young organizations' past success, much less predict their future success. Therefore, young organizations are particularly likely to be judged by other criteria, such as their use of highly institutionalized structures and practices (Stinchcombe, 1965; Aldrich and Fiol, 1994). In contrast, many old organizations have venerable records of past achievements, because they survived past rounds of environmental selection: old organizations were either lucky or capable; in either case, they performed well enough to triumph over environmental selection pressures (Stinchcombe, 1965; Levinthal, 1991). Paraphrasing the Bible, many organizations have "a good old age – full of days, riches, and honor." In their "good old age," one of the most important "riches and honor" that old organizations acquire is legitimacy. In addition, old organizations have built solid relationships with suppliers, distributors, customers, oversight agencies, competitors, and trade and professional associations, all of which bolster the legitimacy old organizations derive from past performance. In sum, as Hannan and Freeman (1984:158) argued, "nothing legitimates organizations more than longevity."

By a similar logic, small organizations are fundamentally different from large ones. In addition to the technical differences described above, large organizations have more market power than small ones (Pfeffer and Salancik, 1978:52-54), so large organizations are buffered from the need to adjust their structures to meet shifting external expectations. Also, because size is valued in Western societies, large organizations are generally held in higher esteem than small ones. Finally, because large organizations are more visible than small ones, large organizations are more familiar to external observers, so they feel less pressure to justify their structures. All these considerations point to size being *both* a technical and a cultural force, in that large organizations possess greater legitimacy than small ones.

Summary. Old and large organizations' legitimacy generally shields them from skeptical scrutiny by exchange partners and other observers.⁴ For this reason, old and large organizations are less susceptible than young and small ones to external pressures to adopt common and therefore legitimate organizational structures, including job structures. In other words, in the market for job structures, old and large organizations are "market makers," while young and small organizations are "market takers." Therefore, we predict that organizational age and size will weaken any observed impact of the isomorphic pressures manifested in regionally typical job structures.

Research Design

To probe variation in the division of labor within employing organizations, we analyze the job structures of all wineries in the United States from 1940, shortly after Prohibition ended and the wine industry rebounded, to 1989. (We are currently gathering data for 1990 onward, so we can bring the analysis up to the present time, but those data are not yet ready.) We chose to study a single industry because this controls, by design, several factors that prior research has shown affect the division of labor: product technology (craft *vs.* small-batch *vs.* mass production), product and client attributes, unionization, public *vs.* private sector, and industry (Baron and Bielby, 1986; Strang and Baron, 1990). This research design also allows us to focus on attributes of focal organizations and the organizations that constitute their local environments.

The wine industry is an ideal setting for research on the division of labor, for two reasons. First, it contains many organizations that vary greatly in size and nature of operations. Wineries range from huge firms such as Gallo and Canandaigua, which have massive operations in several states and so are likely to possess complex administrative structures, to small

⁴ The fact that large organizations are more visible than small ones militates against our prediction that large organizations are less likely to respond to isomorphic pressures from regionally typical job structures.

producers such as Babcock and S. Anderson, whose owners directly run their single facility and which therefore are likely to have little, if any, formal administrative structure. Indeed, U.S. wineries mirror most American employing organizations in that many wineries are small (Granovetter, 1984; Aldrich and Auster, 1986). This fact facilitates generalizing the results of our analysis to other settings. Second, the distribution of firms in the U.S. wine industry has changed greatly since the industry was re-established after the repeal of Prohibition. The industry has seen both rapid concentration, as large mass-producer wineries gobbled up small ones, and the emergence of a new organizational form, specialist farm wineries (Swaminathan, 1995, 2001). Thus, the U.S. wine industry offers great variation in firms, both cross-sectionally and over time, which gives us empirical leverage to tease apart the forces that shape firms' job structures.

A Brief History of the Wine Industry in the U.S.

The U.S. wine industry dates back to the middle of the nineteenth century (Adams, 1990). This flourishing industry was literally wiped off the map in 1919 by national Prohibition, which outlawed the production and sale of alcoholic beverages, except for a few narrowly-defined medicinal and religious purposes. Fifteen years after it was imposed, Prohibition was rescinded, and the wine industry slowly rebounded. By 1940, there were 1,033 wineries operating across the U.S. After that date, the wine industry began to consolidate, and the number of wineries declined almost continuously, reaching a low of 330 in 1967. Despite the shrinking number of wineries, industry sales continued to rise. Large firms, such as United Vintners, E&J Gallo, and Guild Wineries, achieved most of these sales gains at the expense of small producers. Industry observers attributed this consolidation to two factors: the operation of economies of scale, and acquisitions of small and medium-sized wineries, often by firms from outside the industry (Moulton, 1984). As a result, industry concentration increased: the share of industry capacity held by the four largest firms increased from 23.0% in 1940 to 52.4% in 1990 (*Wines & Vines Statistical Survey*, various years).

Starting in the mid 1960s, the number of wineries increased rapidly, reaching 1,327 by 1990 and over 3,600 by 2006 (*Wine Business Monthly*, 2006). This expansion was driven by the proliferation of specialist wineries, which have variously been called “farm,” “boutique,” “chateau,” and “small” wineries. We follow Adams (1990) in calling this specialist organizational form farm wineries. Farm wineries typically produce small quantities of premium varietal wines, often from specific vineyards. Industry norms suggest that farm wineries produce less than 50,000 cases of wine per year or have storage capacity of less than 100,000 gallons (Hiaring, 1976). These size-based definitions are also reflected in the farm winery laws passed by several states to encourage the establishment of farm wineries. In 1940, there were 722 farm wineries. This number declined almost continuously, reaching a low of 141 in 1967. Early farm wineries typically produced undifferentiated products, and their numbers likely declined due to increasing competition within the group and with the more-efficient mass-production wineries. Since the mid 1960s, a new wave of farm winery foundings has fueled the rapid growth in numbers of this organizational form. By the beginning of 1990, there were 1,022 farm wineries, all except 31 founded after 1966. The specialist strategy adopted by modern farm wineries is distinctive in that it involves the production of a wide variety of low-volume, high value-added products (Swaminathan, 1995, 2001).

The major product segments for wine in the immediate post-Prohibition period were dessert (that is, sweet) and fortified wines. Changes in consumer preferences began to manifest themselves in altered patterns of wine consumption in the 1950s and 1960s. By 1968, shipments of table wines, which are tart rather than sweet, exceeded dessert-wine shipments. The sparkling-wine segment also expanded from 0.7% to 5.7% of the domestic market between 1940 and 1990 (*Wines & Vines Statistical Survey*, various years). Some of this increased demand for table and sparkling wines was met by existing mass-production wineries, which migrated to the new niche composed of these two product market segments (Delacroix, Swaminathan, and Solt, 1989). But a substantial portion of this demand was met by farm wineries (Swaminathan, 1995).

Data and Measures

We gathered data on wineries in the U.S. between 1940 and 1989 from *Wines & Vines Annual Directories*, which list all wineries in the U.S., Canada, and Mexico. Data were reported for individual plants (bonded premises), so we aggregated data to the firm level. For every winery every year, the *Directories* record winery name; street address, city, and state; telephone number; year founded; size in terms of storage and fermentation capacity, as well as number of plants; vertical integration in terms of acres of vineyards owned, if any, and presence of a bottling line; diversification in terms of number of brands and types of wine produced; and, central to our analysis, the names of principals (owners and employees), along with their job titles. The *Directories* do not list all employees – just key players – so we see only the tip of the personnel and job-structure iceberg. This is fine for our purposes, because variation in job structures at the top of organizational hierarchies is inevitably correlated with variation in structure in the middle and bottom ranks, and because the set of functions delineated at the top levels of organizational hierarchies is correlated with the breadth of functional specialization in the middle and bottom ranks (Zorn, 2004).

Conversations with managers at the firm that publishes the *Directories* revealed that wineries can list whomever they wish, so each winery's listing reveals its perceptions of its key personnel. Because responses are voluntary, the lists of personnel and job titles might be signals to the wine field rather than reflections of actual organizational structure. If so, then we would not expect to see any effects of technical forces. Finding such effects would demonstrate that listings in the *Directories* do, indeed, reflect technical exigencies, not just pressures to conform to cultural expectations. In other words, finding effects of technical forces proves that these job structures have substance; they are not just symbols.

Measures of dependent variables. We analyze three related outcomes: the number of distinct job titles in each winery, the number of functions among the job titles in each winery, and the number of people in each winery with multiple job titles. To create these variables, we began by coding job titles exactly as recorded in the *Directories*, creating one observation per job title per

person per winery per year. If two or more people in a winery had the same job title in a year, we entered each person separately into our database. If one person in a winery had two or more job titles in a year, we entered each job title separately into the database. If one person worked for two or more wineries in a year, we entered each position separately into the database. Job-title listings in the *Directories* were occasionally inconsistent with respect to format and spelling (*e.g.*, Comptroller *vs.* Controller), sometimes used different short forms (*e.g.*, Vice President, Vice Pres., or VP), and often combined information on functional area and level inconsistently (*e.g.*, Sales Director *vs.* Director of Sales). After entering job titles into our database exactly as they appeared in the *Directories*, we imposed a uniform coding scheme.

After standardizing job titles, we coded areas of functional specialization, in two stages. First, we coded five general functions: corporate governance, general administration, finance and control, sales and marketing, and production. Second, we coded specific functions within each general function. In both stages, our decisions were based on the content of job titles. The general function “marketing and sales,” for example, includes eight specific functions: advertising, hospitality, marketing, merchandising, packaging, purchasing, sales, and service. Table 1 lists the specific functions associated with each general function and examples of actual job titles, with the specific function assigned to each job title. Note that for a tiny minority job titles (*e.g.*, broker, agent, operator – a total of 12 annual records), we were unable to code general function. In addition, some job titles in three of the general functions – corporate governance, general administration, and production – were not precise enough to allow us to code a specific function. For these job titles, we left specific function blank, as shown in Table 1. A couple of examples will make clear why this happened: we coded the job title foreman as having the general function of production but assigned no specific function; similarly, we coded the job title general manager as having the general function of general administration but assigned no specific function. Not surprisingly, the vast majority of records where specific function is blank were in general administration. Our analysis of focuses on specific functions rather than general

functions because there is greater variation, both cross-sectionally and longitudinally, in number of specific functions.

[Table 1 about here]

Next, we aggregated data to the firm-year level of analysis. The *Directories* often recorded data for subsidiaries separately from their parent firms. We first merged data on subsidiaries into data on parent firms. Then for each firm in each year, we counted the *number of distinct job titles* and the *number of (specific) functions* among the reported job titles. We also counted the *number of people with multiple job titles*.

Measures of independent variables. Following other studies of the U.S. wine industry (Delacroix *et al.*, 1989; Swaminathan, 1995, 2001), we measured *organizational size* as the winery's storage capacity, in thousands of gallons. This variable was log-normally distributed – there were many small wineries and a few large ones – so we took its natural logarithm to normalize the distribution. That transformation is consistent with our expectation and with the findings of previous research (Blau and Schoenherr, 1971) that job structures become more complex as size increases, but at a decreasing rate. We constructed a second measure of size, number of plants, to capture the extent to which wineries were divided into distinct operating units.

Taking our cue from previous studies of the U.S. wine industry (Swaminathan, 1995; 2001), we measured the extent of *horizontal diversification* in two ways, with number of brands and number of product categories. We measured *vertical integration* in two ways. First, upstream integration was measured as the total acreage of vineyards, if any, in millions of acres. This is a time-varying variable, as wineries often acquired vineyards after founding, and added to or reduced their acreage at different points in time. Second, downstream integration was measured using a binary variable indicating whether or not a winery had a bottling line – that is, whether the winery bottled, labelled, and crated the wine it produced in-house, or sent its wine out to be packaged. Again, this is a time-varying variable, as many wineries first outsourced these functions, then later brought them in-house.

We measured *organizational age* as years since founding, as proxied by years since first appearance in the *Directories*. Other studies using data from these *Directories*, which cross-checked these data with annual records from the wine industry's principle regulator, the U.S. Bureau of Alcohol, Tobacco, and Firearms, have found the *Directories* to be accurate in their reporting of winery foundings (Swaminathan 1995, 2001). We expect the effects of age to be nonlinear, as the difference between firms that are one and five years old should be greater than the difference between firms that are 30 and 35 years old. For that reason, we took the natural logarithm of organizational age.

Most previous studies of organizations' propensities to imitate other organizations have focused on the diffusion of particular categories of practices or structures; for instance, the spread of civil-service reform among American cities (Tolbert and Zucker, 1983) or the adoption of the multidivisional structure by large American corporations (Fligstein, 1985). Because their dependent variables were binary (0,1) variables, previous studies have measured imitation pressures as the number of organizations that have already adopted the practice or structure in question. Our situation is unusual, in that our dependent variables are counts: the number of job titles, specific functions, and people with multiple titles in each winery. Therefore, we measured *imitation pressures* using the mean of each dependent variable for all wineries in each winery's state, apart from the focal winery. The mean of any distribution captures its central tendency; in this case, it indicates how the "typical" winery in the state structured its workforce. We focused on the other wineries within each winery's state because states are highly salient regional boundaries in the wine industry. Wineries' identities are, at bottom, state-centered: wine labels list state (and, in recent years, narrower viticultural area), wineries are often active in state industry associations that co-operate to promote tourism and lobby governments for favourable legislation, and wholesalers and retailers distinguish between wines from different states, which causes consumers to do the same. In addition, many aspects of wineries' operations – for instance, whether they can ship directly to retailers in other states, or they must go through wholesalers – depend on regulations in their headquarters state.

To assess the hypothesized interaction effects – *the attenuating effects of age and size* – we created two sets of interaction variables. For each outcome studied, we multiplied our measure of imitation by winery age and size, both logged. Note that when only one winery operated in a state, imitation pressures could not be calculated, and observations on these wineries dropped out of the analysis.

As explained above, wineries can be divided into two distinctive organizational forms and identities: mass producers and farm wineries (Adams, 1990; Swaminathan, 1995, 2001). To investigate whether wineries' job structures were patterned primarily on the structures of other wineries with the same form and identity, and less (or not at all) on the structures of wineries with a different form and identity, we calculated means on the outcomes of interest – the number of titles, functions, and people with multiple titles – for mass producers and farm wineries separately. In the analysis of mass producers, the mean for mass producers was calculated after excluding the focal winery and the mean for farm wineries was calculated using data on all farm wineries in the state. In the analysis of farm wineries, the mean for farm wineries was calculated after excluding the focal winery and the mean for mass producers was calculated using data on all mass producers in the state. We investigated the hypothesized attenuating effects of age and size by multiplying our form-specific measures of imitation by logged winery age and size.

Our knowledge of the industry and these two organizational forms allows us to make more nuanced predictions about cross-form susceptibility to isomorphism pressures. Mass producers are the dominant form of winery. As explained above, they are far larger than farm wineries. Between 1940 and 1989, mass producers were on average 98 times as large as farm wineries: average storage capacity was 2,802,942 gallons for mass producers, compared to 28,700 gallons for farm wineries. Their size makes mass producers far more visible than farm wineries; it also gives them much greater market power and legitimacy. We expect, therefore, that mass producers will attend *only* to the structures of other mass producers in their state, and not at all to the structures of farm wineries. We further we expect that farm wineries will attend

to *both* the structures of other farm wineries and the structures of mass producers, but that the structures of farm wineries will have a bigger impact than those of mass producers.

Measures of control variables. We controlled for several other factors that may influence wineries' job structures. First, we controlled for calendar year, to remove the influence of secular trends not included in our models. This is important because many variables increased monotonically throughout the 50 years we study wineries. Second, we included the main effect of winery subform, using a dummy variable set equal to one for mass producers and zero for farm wineries. We also controlled for whether or not wineries entered the industry through an acquisition – that is, whether or not entry constituted diversification by established firms from outside the wine industry. We controlled for the cumulative number of acquisitions made by each winery, because we reasoned that growth through acquisition might lead wineries to develop more elaborate job structures than internal growth. (Our data are left-truncated at 1940, so for wineries that were alive in 1940, this variable is the count of acquisitions made from 1940 onward.) Our final control is the number of wineries in the state, excluding the focal winery. This lets us gauge the extent to which the local industry is highly structured (DiMaggio and Powell, 1983).

The *Directories* covered all 2,940 wineries that operated in the U.S. between 1940 and 1989 and yielded a total of 31,300 annual observations. Data were missing on size, horizontal diversification, and vertical integration for some wineries in some years. After eliminating *Directory* records with missing data, our data set was reduced to 26,933 annual observations on 2,305 wineries. As explained above, we could not calculate measures of isomorphic pressures when there was only one winery in a state. After dropping records where isomorphic pressures were not defined, we were left with 26,693 annual observations on 2,295 wineries. When we distinguished between isomorphic pressures stemming from the two subforms, we lost a few more records, as there were several instances where there were two wineries in a state, one a mass producer and the other a farm winery. For the analyses of within- and across-subform

isomorphism, we ended up with 10,459 annual observations on 634 mass-producer wineries and 13,838 annual observations on 1,459 farm wineries.

Methods of Analysis

All three outcomes of interest are counts: the number of job titles, functions, and people with multiple job titles in each winery each year. Accordingly, we analyze all three outcomes using event-count methods (Cameron and Trivedi, 1986), in which the dependent variable is a count (of job titles, specific functions, or people with multiple job titles) in a winery in a year, and each observation on each winery is assumed to be drawn from a Poisson distribution whose fundamental parameter is λ_{wt} :

$$Pr[Y_{wt} = y_{wt}] = \frac{\exp[-\lambda_{wt}] \lambda_{wt}^{y_{wt}}}{y_{wt}!}, \quad y_{wt} = 0, 1, 2, \dots,$$

where y_{wt} is the number of job titles (or specific functions or people with multiple job titles) in winery w at time t (during calendar year t). We expressed λ_{wt} as a multiplicative (log-linear) function of observable explanatory variables (\mathbf{X}_{wt}), all of which are measured for each winery, each year:

$$\lambda_{wt} = \exp[\boldsymbol{\beta}' \mathbf{X}_{wt}].$$

The Poisson model assumes that the dependent variable has equal mean and variance. When this assumption is violated (*i.e.*, when the variance exceeds the mean and the dependent variable is over-dispersed), the model generates spuriously small standard errors for explanatory variables and thus artificially inflates their significance levels (Cameron and Trivedi, 1990). Our data show substantial over-dispersion. Therefore, we estimated negative-binomial models using the `xtnbreg` procedure in Stata (2005), which corrects over-dispersion by rescaling standard errors and recalculating goodness-of-fit statistics. We have more than one observation on each winery, and these observations are unlikely to be independent. To account for this non-independence, we estimated models using generalized estimating equations, with robust standard errors clustered on wineries.

Results

Descriptive Statistics

As explained above, the composition of the industry changed greatly over the half-century we study it. Figure 1 shows trends in firms and job structures in the U.S. wine industry between 1940 and 1990. Between 1940 and 1967, the number of wineries fell. After that point, the number of wineries rose. In contrast to the consolidation and later re-expansion of the industry, job titles steadily proliferated. The number of distinct job titles used across the U.S. wine industry rose from fewer than 50 in 1940 to about 170 in 1989, as did the number of functions. (When we ignored the most highly idiosyncratic job titles – those that were used by a single winery in the focal year – the number of job titles still rose over time.)

[Figure 1 about here]

The data charted in Figure 1 show the structure of the U.S. wine industry as a whole. But what about individual wineries? The average number of job titles used by U.S. wineries to describe their key personnel rose steadily through the first three decades covered by our study period, from 1.6 in 1940 to 4.3 in 1970, then levelled out in the 1970s and declined slightly in the 1980s, ending at 3.7 in 1989. The average number of (specific) functions followed a similar trajectory: it rose from 1.2 in 1940 to a high of 2.9 in 1977 and then fell slightly to 2.6 in 1989. Finally, the number of key people in each winery with multiple titles rose from 0.21 in 1940 to a peak of 0.93 in 1968 and then fell slightly to 0.87 in 1989. Figure 2 shows all of these trends. These patterns suggest that two competing forces are at work: increases in the complexity of job structures is driven by increases in firm size and in the diversity of firms across the industry, while decreases are driven by the increasing structuration and institutionalization of the industry.

[Figure 2 about here]

The trends shown in Figure 2 suggest that the distribution of wineries by job structure may have varied over time. To investigate this, we plotted the fraction of U.S. wineries with different numbers of job titles each year, which is shown in Figure 3. This graph reveals that the number of wineries with undifferentiated job structures – those run by a single person, usually

the owner, and those that did not report any specific job titles – declined from the 1940s to the 1960s as the old style of farm winery, which created undifferentiated products, disappeared. The number of wineries with two to five job titles also declined as old-style farm wineries disappeared. The emergence in the late 1960s of the new style of farm winery, which made a wide variety of low-volume, high value-added products, led to a resurgence in the number of wineries with two to five distinct job titles. The fraction of wineries with moderately and highly differentiated job structures – those with six to ten job titles and those with more than ten job titles, respectively, rose steadily over our study period.

[Figure 3 about here]

Table 2 presents univariate statistics for the variables in our multivariate models. The correlations, which we do not show here, to save space, generally support our hypotheses. None of the correlations is above .54, except for the correlations among the three dependent variables, among the measures of typical job structures, between size (in terms of storage) and form, and between interactions and their component variables. Therefore, multicollinearity is unlikely to inflate standard errors or bias parameter point estimates.

[Table 2 about here]

Multivariate Analyses

Table 3 presents the results of our multivariate analyses of all three outcomes, using data on all wineries, both mass producer and farm. The first pair of models in each table analyzes number of job titles; the second pair, number of functions; and the third pair, number of people who have multiple job titles. For each outcome studied, there are two models. The first model in each pair includes only main effects; the second, main effects plus interactions.

[Table 3 about here]

Most of the technical factors have the expected effects on all three aspects of job structures. Large wineries, where size is measured in terms of storage capacity, reported more distinct job titles, more functions, and more people with multiple job titles than did small

wineries. The result for people with multiple titles suggests that the relationship between scale of operations and the fine-grained division of labor is stronger than the relationship between scale of operations and number of employees. In other words, large wineries had *some* more people than small ones, but they also had *a lot* more distinct jobs. After controlling for winery storage capacity, the second indicator of scale of operations – the degree to which wineries operate multiple distinct units (the number of plants) – had no effect on job structures.

One measure of horizontal integration – number of brands – had the expected positive effects on all three outcomes. In addition, the number of product types had a positive and significant effect on the number of functions, a positive but only marginally significant effect on the number of titles, and a positive but nonsignificant effect on the number of people with multiple titles. The extent to which wineries were vertically integrated – acres of vineyards under cultivation and the existence of a bottling line – increased the number of functions, as expected. But only one aspect of vertical integration – the existence of a bottling line – had a significant effect on the number of job titles and people with multiple titles.

Let us turn now to the purely cultural factors. Older wineries had consistently more complex job structures than younger ones: more job titles, functions, and people with multiple job titles. All three results are in line with our predictions. We also see that wineries tended to imitate the job structures of other wineries in their state, as the main effects of this variable (the average value for the outcome of interest among other wineries in the state) were positive and statistically significant for all three outcomes. This, again, is in line with our predictions. Finally, Models 2, 4, and 6 show that the effects on both interaction terms were negative, as predicted, for all three outcomes. But only the interaction terms involving age were statistically significant. Taken together, these results indicate that great age, but not large size, buffers organizations from the need to imitate the structures that are prevalent in their states.

Tables 4 and 5 show the results of the separate analyses we conducted on the two forms of wineries.⁵ These tables parallel Table 3: the first pair of models in each table analyzes number of job titles; the second pair, number of functions; and the third pair, number of people who have multiple job titles. For each outcome studied, there are two models: the first model in each pair includes only main effects; the second, main effects plus interactions.

[Tables 4 and 5 about here]

These analyses reveal big differences between the two types of wineries. Consider first the main effects, which are shown in models 1, 3, and 5 of both tables. The job structures of mass-producer wineries were affected primarily by their size (in terms of storage capacity but not units operated), integration (downstream into bottling, but not upstream into vineyards), age, and the structure of other mass-producer wineries in the state. Only one aspect of mass producers' job structures (the number of functions) was influenced by upstream integration into vineyards, while another (the number of people with multiple titles) was influenced by horizontal diversification (number of brands). Finally, only one aspect of mass producers' job structures (the number of functions) was influenced by the structure of farm wineries in the state. In contrast, the job structures of farm wineries were affected by their size, again in terms of storage capacity. One aspect of farm wineries' job structures (the number of people with multiple titles) was also affected by size in terms of number of units operated. In addition, horizontal diversification (the number of brands) and vertical integration (both upstream into vineyards and downstream into bottling) had consistent positive effects on farm wineries' job structures. Surprisingly, winery age had no effect on farm wineries' job structures. As expected, farm wineries' job structures were influenced by the structures of other farm wineries in the state. Finally, two aspects of farm wineries' job structures (the number of titles and functions)

⁵ To save space, these tables do not report parameter estimates on the control variables. But both analyses include the same control variables as used in the analysis of all wineries, except, of course, the indicator for winery subform.

were influenced by the structures of mass-producer wineries in the state. For the number of job titles, however, the effect was only marginally significant ($p < .06$).

These results make sense when we consider basic differences between the two types of wineries. Mass producers generally emphasize quantity over quality, while farm wineries generally emphasize quality over quantity (Adams, 1990; Swaminathan, 1995, 2001). To ensure the quality of raw materials and to signal their concern for quality, farm wineries often vertically integrate upstream, acquiring vineyards to grow their own grapes. Thus, for farm wineries, upstream vertical integration is both a technical *and* a cultural force shaping job structures. That is why upstream vertical integration had effects on the job structures of farm wineries but not on those of mass-producer wineries. Because they focus on producing high-quality wines, farm wineries compete by differentiating their products, while mass producers compete more on price. Therefore, horizontal diversification (the branding of distinctive products) is a more critical strategic action for farm wineries than for mass-producer wineries. For this reason, number of brands had stronger effects on farm wineries than on mass-producer wineries.

The results change in interesting ways when we add interactions between the average structures of other wineries in the state and the focal winery's age and size. Table 4 shows that both great age and large size made mass-producer wineries less likely to imitate the structures of other mass-producer wineries, which is consistent with our predictions. In results not shown here, we investigated whether great age and large size buffered mass producers from their propensity to imitate farm wineries with regard to number of functions. The interactions between mass-producer size and age, on the one hand, and imitation of the typical farm winery, on the other, had nonsignificant effects. We conclude, therefore, that isomorphic pressures stemming from farm wineries are not attenuated by the age or size of the focal mass-producer winery. In contrast, Table 5 shows that great age buffered farm wineries from pressures to imitate the structures of other wineries, but large size did not. All interactions with farm-winery age were negative and statistically significant, but all interactions with farm-winery size were positive, and only one out of six was even marginally significant: the interaction between size

and the typical job structure among other farm wineries in the analysis of number of functions ($p < .07$). The results for the interactions with age were consistent with our predictions, but the results for the interactions with size were not.

These disaggregated analyses make clear why we found null results for interactions between size and imitation pressures in models 2, 4, and 6 of Table 3, which pooled data on both types of wineries: for the 41% of annual observations on wineries in the pooled sample that were mass-producer wineries, the interaction effect was negative, but for the 59% of observations in the sample that were farm wineries, the interaction effect was essentially nonexistent. Pooling data on these two very different forms of wineries, which had two very different identities, as we did for the analyses presented in Table 3, obscured these two very different effects of size.

This pattern of findings presents us with a puzzle: why were large mass-producer wineries less likely than small ones to be influenced by other mass-producer wineries, but large farm wineries were *not* less likely than small ones to be influenced by other farm wineries? The significant results for size interactions on mass producers and the null results for size interactions on farm wineries may be due to two opposing pressures that large wineries face, both of which bear differentially on farm and mass-producer wineries. First, *all* large wineries are generally more legitimate than otherwise comparable small wineries, so in general, large wineries face *less* pressure to conform to prevailing norms, including norms about job structures. But *mass producers* gain more legitimacy from increases in size than do farm wineries, because mass producers' identity values quantity over quality while farm wineries' identity values quality over quantity. The effect of size on the legitimacy of farm wineries is complicated by the fact that large farm wineries inevitably tend to resemble mass producers (Swaminathan, 2001). Recall that the distinction between these two forms is determined partly by scale of operations: both industry norms and state regulation place the size-based boundary at 100,000 gallons (Hiaring, 1976). Very large farm wineries bump up against this constraint, and can therefore be confused with mass producers (Swaminathan, 2001). To reduce confusion over their identities,

large farm wineries may be especially vulnerable to isomorphic pressures, especially pressures to adopt the “appropriate” formal structure. In sum, mass producers accrue more legitimacy stemming from large size than do farm wineries; indeed, farm wineries may actually *lose* legitimacy if they become too large. Therefore, pressures to imitate other nearby wineries will be lessened by size more for mass producers than for farm wineries; imitation pressures may even be *strengthened* by size for farm wineries.

The second impact of size is that *all* large wineries are more visible than otherwise comparable small ones, so they may face *more* pressure to conform to prevailing norms. All mass-producer wineries are fairly large, so there is little difference in the visibility of small and large mass-producer wineries. But there is a tremendous difference in the size and therefore the visibility of small and large farm wineries: small farm wineries are so tiny that they can easily “fly under the radar,” but large ones cannot. Thus, visibility stemming from size will have bigger effects on farm wineries than on mass producers; in turn, pressures to imitate other nearby wineries will be strengthened by size more for farm wineries than for mass producers.

The upshot of these form-specific differences is that the impact of size on legitimacy and propensity to imitate other nearby organizations is clear for mass producers but ambiguous for farm wineries. Compared to small mass producers, large mass producers have more legitimacy but not much more visibility. Thus, they are less prone than small mass producers to imitate other wineries’ structures. Compared to small farm wineries, large farm wineries feel three opposing effects of size: increased legitimacy in general, decreased legitimacy if they near the scale of mass producers, and increased visibility. Thus, compared to small farm wineries, large farm wineries may be more, less, or equally likely to imitate other wineries’ structures.

Conclusion

We examined the technical and cultural factors that influence the way employing organizations structure their tasks and therefore their employees’ job titles. Much previous research has shown that employing organizations’ job structures determine the social, economic,

and psychological outcomes experienced by workers. In addition, on a more macroscopic scale, much research has demonstrated that organizational structures strongly influence stratification and social mobility processes. Despite the attention paid to the *consequences* of employing organizations' job structures, little has been done to analyze the *causes* of job structures. Our analysis adds to the handful of studies that demonstrate what causes (rather than what is correlated with) organizations' job structures (Meyer, 1972; Baron and Bielby 1986; Strang and Baron, 1990). Consistent with arguments advanced by economists and sociologists (Blau and Schoenherr, 1971; Rosen, 1983), we found that technical factors – specifically, scale and scope of operations – had strong effects on the number of job titles, number of functions delineated by those titles, and number of people with multiple job titles. And consistent with predictions made by sociologists (Meyer and Rowan, 1977; DiMaggio and Powell, 1983; Pólos, Hannan, and Carroll, 2002), we found that cultural factors – specifically, organizational age, prevailing ideas of what is “normal,” and the distinctive identity associated with each organizational form – also influenced these job structures. In addition, our analysis has demonstrated that the forces impinging on organizations can sometimes conflict. While all older organizations were less susceptible to prevailing norms, only larger generalist firms (mass producers) were less susceptible, while larger specialist firms (farm winery) were just as susceptible as their smaller counterparts. Analyzing the two forms of wineries separately demonstrated that organizational forms and associated identities are context-specific cultural features about which it is impossible to make sweeping general predictions.

Like most populations of employing organizations, the industry we studied contains many small and few large organizations (Granovetter, 1984; Aldrich and Auster, 1986). Our analysis of farm wineries *versus* mass producers revealed important differences in the effects of organizational size on job structures. These findings demonstrate the need to study all organizations, tiny as well as humungous, rather than relying on size-biased samples. Size is, arguably, the most studied and most important determinant of organizational structure. But much research focuses on large organizations – often the largest corporations in America – and

ignores small organizations. The reasons for this sample-selection bias are many: data are more readily available for large organizations, large organizations are “sexier” and more powerfully individually, and large organizations are better-known. But our analysis has shown how critical it is to study the full range of organizational size if we want to tease apart the impact of size.

References

- Adams, Leon D. 1990. *The Wines of America, 4th Edition*. New York: McGraw-Hill.
- Aldrich, Howard E., and Ellen R. Auster. 1986. Even dwarfs started small: Liabilities of age and size and their strategic implications. In B. Staw and L. Cummings, eds., *Research in Organizational Behavior*, 8: 165-198. Greenwich, CT: JAI Press.
- Aldrich, Howard E., and Marlene Fiol. 1994. Fools rush in? The institutional context of industry creation. *Academy of Management Review*, 19: 645-670.
- Barley, Stephen R. 1986. Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments. *Administrative Science Quarterly*, 31: 78-108.
- Baron, James N. 1984. Organizational perspectives on stratification. In John Hagan, ed., *Annual Review of Sociology*, 6: 737-765.
- Baron, James N., and William T. Bielby. 1980. Bringing the firms back in: Stratification, segmentation, and the organization of work. *American Sociological Review*, 45: 737-765.
- Baron, James N., and William T. Bielby. 1986. The proliferation of job titles in organizations. *Administrative Science Quarterly*, 31: 561-586.
- Blau, Peter M. 1970. A formal theory of differentiation in organizations. *American Sociological Review*, 35: 2: 201-218.
- Blau, Peter M., Cecilia McHugh Falbe, William McKinley, and Phelps K. Tracy. 1976. Technology and organization in manufacturing. *Administrative Science Quarterly*, 21: 20-40.
- Blau, Peter M., and Richard Schoenherr. 1971. *The Structure of Organizations*. New York: Basic Books.
- Bridges, William P., and Robert L. Nelson. 1989. Markets in hierarchies: Organizational and market influences on gender inequality in a state pay system. *American Journal of Sociology*, 95: 616-658.
- Broschak, Joseph P., and Alison Davis-Blake. 2006. Mixing standard work and nonstandard deals: The consequences of heterogeneity in employment arrangements. *Academy of Management Journal*, 49: 371-393.
- Cameron, A. Colin, and Pravin K. Trivedi. 1986. Econometric models based on count data: Comparisons and applications of some estimators and tests. *Journal of Applied Econometrics*, 1: 29-53.
- Cameron, A. Colin, and Pravin K. Trivedi. 1990. Regression-based tests for overdispersion in the Poisson model. *Journal of Econometrics*, 46: 347-364.

- Carroll, Glenn R., and Anand Swaminathan. 2000. Why the microbrewery movement? Organizational dynamics of resource partitioning in the American brewing industry after Prohibition. *American Journal of Sociology*, 106: 715-762.
- Chapin, F. Stuart. 1951. The growth of bureaucracy: An hypothesis. *American Sociological Review*, 16: 835-836.
- Delacroix, Jacques, Anand Swaminathan, and Michael E. Solt. 1989. Density dependence versus population dynamics: An ecological study of failings in the California wine industry. *American Sociological Review*, 54: 245-262.
- Durkheim, Émile. 1893 [1984]. *The Division of Labor in Society*. (Translated by W.D. Halls.) New York: Free Press.
- Fernandez, Roberto M. 2001. Skill-based technological change and wage inequality: Evidence from a plant retooling. *American Journal of Sociology*, 107: 273-320.
- Fine, Gary Alan. 1996. *Kitchens: The Culture of Restaurant Work*. Berkeley: U.C. Press.
- Fligstein, Neil. 1985. The spread of the multidivisional form among large firms, 1919-1979. *American Sociological Review*, 50: 377-391.
- Graicunas, V.A. 1933. Relationship in organization. *Bulletin of the International Management Institute* (March) 39-42.
- Granovetter, Mark S. 1984. Small is bountiful: Labor markets and establishment size. *American Sociological Review*, 49: 323-334.
- Greve, Henrich R. 1994. Industry diversity effects on job mobility. *Acta Sociologica*, 37: 119-139.
- Grusky, David B., and Jesper B. Sørensen. 1998. Can class analysis be salvaged? *American Journal of Sociology*, 103: 1187-1234.
- Grusky, Oscar. 1961. Corporate size, bureaucratization, and managerial succession. *American Journal of Sociology*, 67: 261-269.
- Hall, Richard H., J. Eugene Haas, and Norman J. Johnson. 1967. Organizational size, complexity and formalization. *American Sociological Review*, 32: 903-912.
- Hannan, Michael T. 1988. Social change, organizational diversity, and individual careers. In M. Riley, ed., *Social Change and the Life Course, Vol. 1*: 161-174. Newbury Park, CA: Sage.
- Hannan, Michael T., László Pólos, and Glenn R. Carroll. 2007. *Logics of Organization Theory: Audiences, Codes, and Ecologies*. Forthcoming from Princeton University Press.
- Hannan, Michael T., and John Freeman. 1984. Structural inertia and organizational change. *American Sociological Review*, 49: 149-164.
- Harrison, J. Richard, and Glenn R. Carroll. 1991. Keeping the faith: A model of cultural transmission in formal organizations. *Administrative Science Quarterly*, 36: 552-582.

- Hedström, Peter. 1991. Organizational differentiation and wage dispersion. *American Journal of Sociology*, 97: 96-113.
- Hiaring, Philip E. 1976. Defining some wine terms. *Wines & Vines*, 57 (Aug.): 28.
- Hsu, Cheng-Kuang, Robert M. Marsh, and Hiroshi Mannari. 1983. An examination of the determinants of organizational structure. *American Journal of Sociology*, 88: 975-996.
- Kanter, Rosabeth Moss. 1977. *Men and Women of the Corporation*. New York: Basic Books.
- Kaley, Alexandra, Frank Dobbin, and Erin Kelly. 2006. Best practices or best guesses? Diversity management and the remediation of inequality. *American Sociological Review*, 71: 589-617.
- Kalleberg, Arne L., Barbara F. Reskin, and Ken Hudson. 2000. Bad jobs in America: Standard and non-standard employment relations and job quality in the United States. *American Sociological Review*, 65: 256-278.
- Kelley, Maryellen R. 1990. New process technology, job design, and work organization: A contingency model. *American Sociological Review*, 55: 191-208.
- Kelly, Erin, and Frank Dobbin. 1999. Civil rights law at work: Sex discrimination and the rise of maternity leave policies. *American Journal of Sociology*, 105: 455-492.
- Levinthal, Daniel A. 1991. Random walks and organizational mortality. *Administrative Science Quarterly*, 36: 397-420.
- Lincoln, James R., and Arne L. Kalleberg. 1985. Work organization and workforce commitment: A study of plants and employees in the U.S. and Japan. *American Sociological Review*, 50: 738-760.
- March, James G., Martin Schulz, and Xueguang Zhou. 2000. *The Dynamics of Rules: Change in Written Organizational Codes*. Stanford, CA: Stanford University Press.
- Marx, Karl. 1867 [1992]. *Capital: A Critique of Political Economy*. (Translated by Ben Fowkes) Harmondsworth: Penguin Books.
- McKendrick, David G., and Glenn R. Carroll. 2001. On the genesis of organizational forms: Evidence from the market for disk arrays. *Organization Science*, 12: 661-682.
- McKendrick, David G., Jonathan Jaffee, Glenn R. Carroll, and Olga M. Khessina. 2003. In the bud? Analysis of disk array producers as a (possibly) emergent organizational form. *Administrative Science Quarterly*, 48: 60-93.
- Meyer, John W., and Brian Rowan. 1977. Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83: 340-363.
- Meyer, Marshall W. 1972. Size and the structure of organizations: A causal analysis. *American Sociological Review*, 37: 434-441.

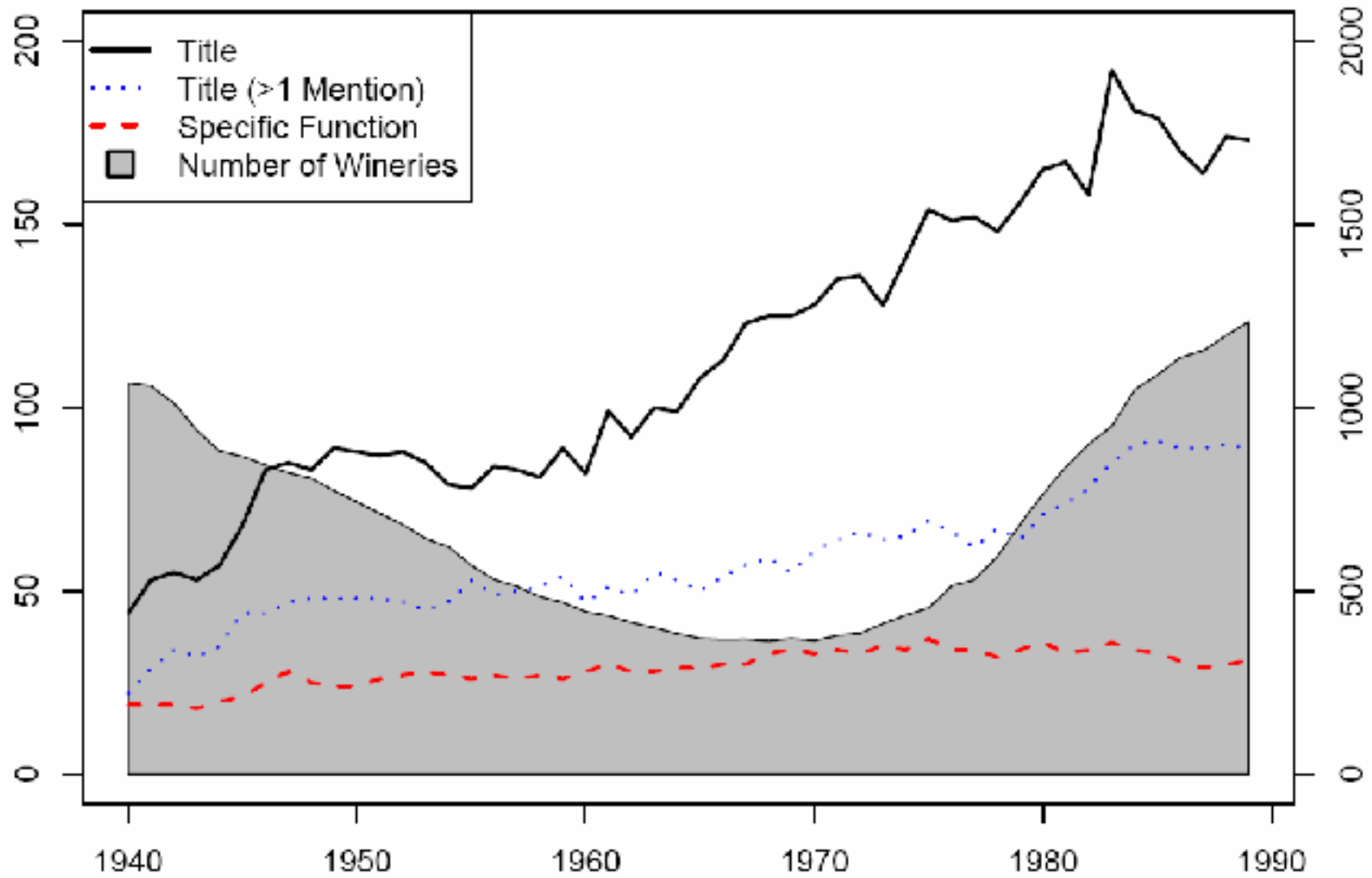
- Meyer, Marshall W., and M. Craig Brown. 1977. The process of bureaucratization. *American Journal of Sociology*, 83: 364-385.
- Miner, Anne S. 1987. Idiosyncratic jobs in formalized organizations. *Administrative Science Quarterly*, 32: 327-351.
- Miner, Anne S., and Suzanne E. Estler. 1984. Accrual mobility: Job mobility in higher education through responsibility accrual. *Journal of Higher Education*, 56: 121-143.
- Moulton, Kirby. 1984. The economics of wine in California. In Doris Muscatine, Maynard A. Amerine, and Bob Thompson, eds., *The Book of California Wine*. 380-405. Berkeley, CA: University of California Press/Sotheby Publications.
- Pfeffer, Jeffrey, and Gerald R. Salancik. 1978. *The External Control of Organizations: A Resource Dependence Perspective*. New York: Harper and Row.
- Piore, Michael J., and Charles F. Sabel. 1984. *The Second Industrial Divide: Possibilities for Prosperity*. New York: Basic Books.
- Pólos, László, Michael T. Hannan, and Glenn R. Carroll. 2002. Foundations of a theory of social forms. *Industrial and Corporate Change*, 11: 85-115.
- Pugh, Derek S., David J. Hickson, C. Robin Hinings, and C. Turner. 1969. The context of organizational structures. *Administrative Science Quarterly*, 14: 91-114.
- Reskin, Barbara F., and Debra Branch McBrier. 2000. Why not ascription? Organizations' employment of male and female managers. *American Sociological Review*, 65: 210-233.
- Robinson, Jancis, ed. 1999. *The Oxford Companion to Wine, 2nd Ed.* Oxford: O.U. Press.
- Rosen, Sherwin. 1983. Specialization and human capital. *Journal of Labor Economics*, 1: 43-49.
- Sandefur, Rebecca. 2001. Work and honor in the law: Prestige and the division of lawyers' labor. *American Sociological Review*, 66: 382-403.
- Schooler, Cami, and Atsushi Naoi. 1988. The psychological effects of traditional and economically peripheral job settings in Japan. *American Journal of Sociology*, 94: 334-355.
- Scott, W. Richard. 2002. *Organizations: Rational, Natural, and Open Systems, 6th Ed.* Upper Saddle River, NJ: Prentice-Hall.
- Simmel, Georg. 1902. The number of members as determining the sociological form of groups. *American Journal of Sociology*, 8: 1-46, 158-196.
- Simon, Herbert A. 1962. The architecture of complexity. *Proceedings of the American Philosophical Society*, 106: 467-482.
- Smith, Adam. 1776 [1970]. *The Wealth of Nations*. Harmondsworth: Penguin.
- Spencer, Herbert. 1898. *Principles of Sociology*. New York: Appleton.

- Stinchcombe, Arthur L. 1968. *Constructing Social Theories*. Chicago: University of Chicago Press.
- Stolzenberg, Ross M. 1978. Bringing the boss back in: Employer size, employee schooling, and socioeconomic achievement. *American Sociological Review*, 43: 813-828.
- Strang, David, and James N. Baron. 1990. Categorical imperatives: The structure of job titles in California state agencies. *American Sociological Review*, 55: 479-495.
- Strang, David, and Nancy Brandon Tuma. 1993. Spatial and temporal heterogeneity in diffusion. *American Journal of Sociology*, 99: 614-639.
- Swaminathan, Anand. 1995. The proliferation of specialist organizations in the American wine industry, 1941-1990. *Administrative Science Quarterly*, 40: 653-680.
- Swaminathan, Anand. 2001. Resource partitioning and the evolution of specialist organizations: The role of location and identity in U.S. wine. *Academy of Management Journal*, 44: 1169-85.
- Tolbert, Pamela S., and Lynne G. Zucker. 1983. Institutional sources of change in the formal structure of organizations: The diffusion of civil service reform, 1880-1935. *Administrative Science Quarterly*, 28: 22-39.
- Tsouderos, John E. 1955. Organization change in terms of a series of selected variables. *American Sociological Review*, 20: 206-210.
- Weber, Max. 1904-1905 [1958]. *Economy and Society: An Outline of Interpretive Sociology*. (Translated and edited by Guenther Roth and Claus Wittich.) Berkeley: University of California Press.
- Weeden, Kim A., and David B. Grusky. 2005. The case for a new class map. *American Journal of Sociology*, 111: 141-212.
- Wharton, Amy S., and James N. Baron. 1987. So happy together? The psychological impact of gender segregation on women at work. *American Sociological Review*, 52: 574-587.
- Wine Business Monthly*. 2006. Number of U.S. wineries tops 5,300. Wine Communications Group, Inc. (<http://www.winebusiness.com/ReferenceLibrary/webarticle.cfm?dataId=42349>, accessed 1/8/2007)
- Wines & Vines*. Various Years. *Annual Directory* and *Annual Statistical Survey*. San Rafael, CA: The Hiaring Company.
- Zorn, Dirk M. 2004. Here a chief, there a chief: The rise of the CFO in the American firm. *American Sociological Review*, 69: 345-364.
- Zucker, Lynne G. 1983. Organizations as institutions. In S. Bacharach, ed., *Research in the Sociology of Organizations*, 2: 1-47. Greenwich, CT: JAI Press.

Table 1: General and Specific Functions

General Function	Specific Functions	Examples of Job Titles (Specific Function)
Corporate Governance	Board of Directors Founder Lessor Officer	Owner Partner (may also be left blank)
		Proprietor (Owner) Chairman (Board of Directors)
Finance/Control	Accounting Controller Finance	Secretary Treasurer
		Bookkeeper (Accounting) Credit Manager (Accounting)
General Administration	Administration Consulting Human Relations Legal	Planning Technical (may also be left blank)
		Compliance Manager (Legal) Office Manager (Administration)
Marketing/Sales	Advertising Hospitality Merchandising Marketing	Packaging Public Relations Sales Service
		Promotion Manager (Sales) Communications Director (Public Relations)
Production	Distribution Grape Growing Logistics Plant Purchasing Quality Control Research & Development	Spirits Wine Cellar Winemaking Wine Science Wine not elsewhere classified (may also be left blank)
		Bottling Superintendent (Plant) Grower Relations Manager (Purchasing) Vineyard Manager (Grape Growing)
No General Function	(very rare titles)	
		Broker, Agent

Figure 1: Number of Wineries, Job Titles, and Functions in the U.S. Each Year



Note: The left axis counts number of titles and specific functions. The right axis counts number of wineries.

Figure 2: Average Number of Job Titles, Functions, and People with Multiple Titles in U.S. Wineries

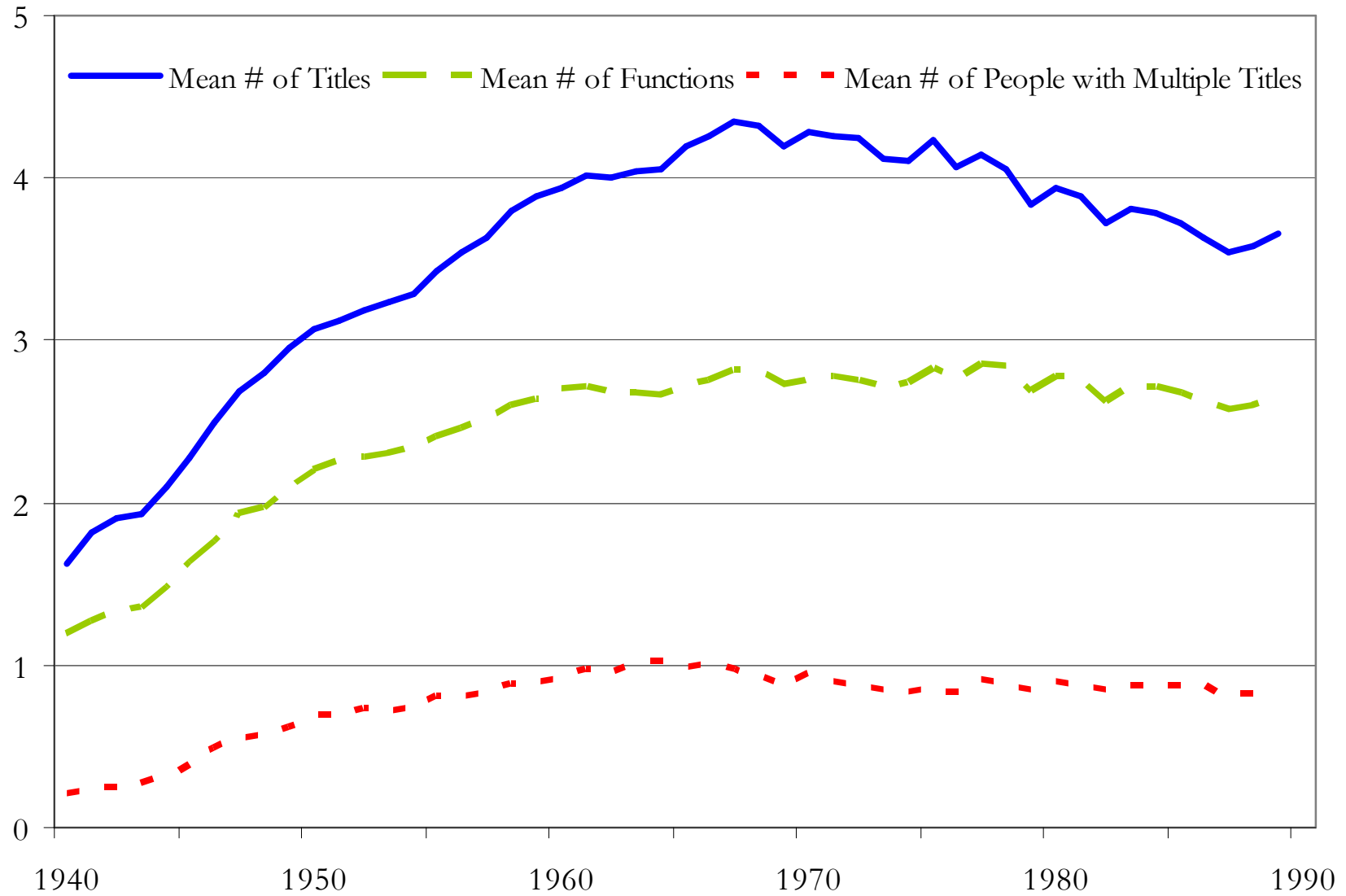


Figure 3: Number of Wineries by Number of Job Titles Over Time

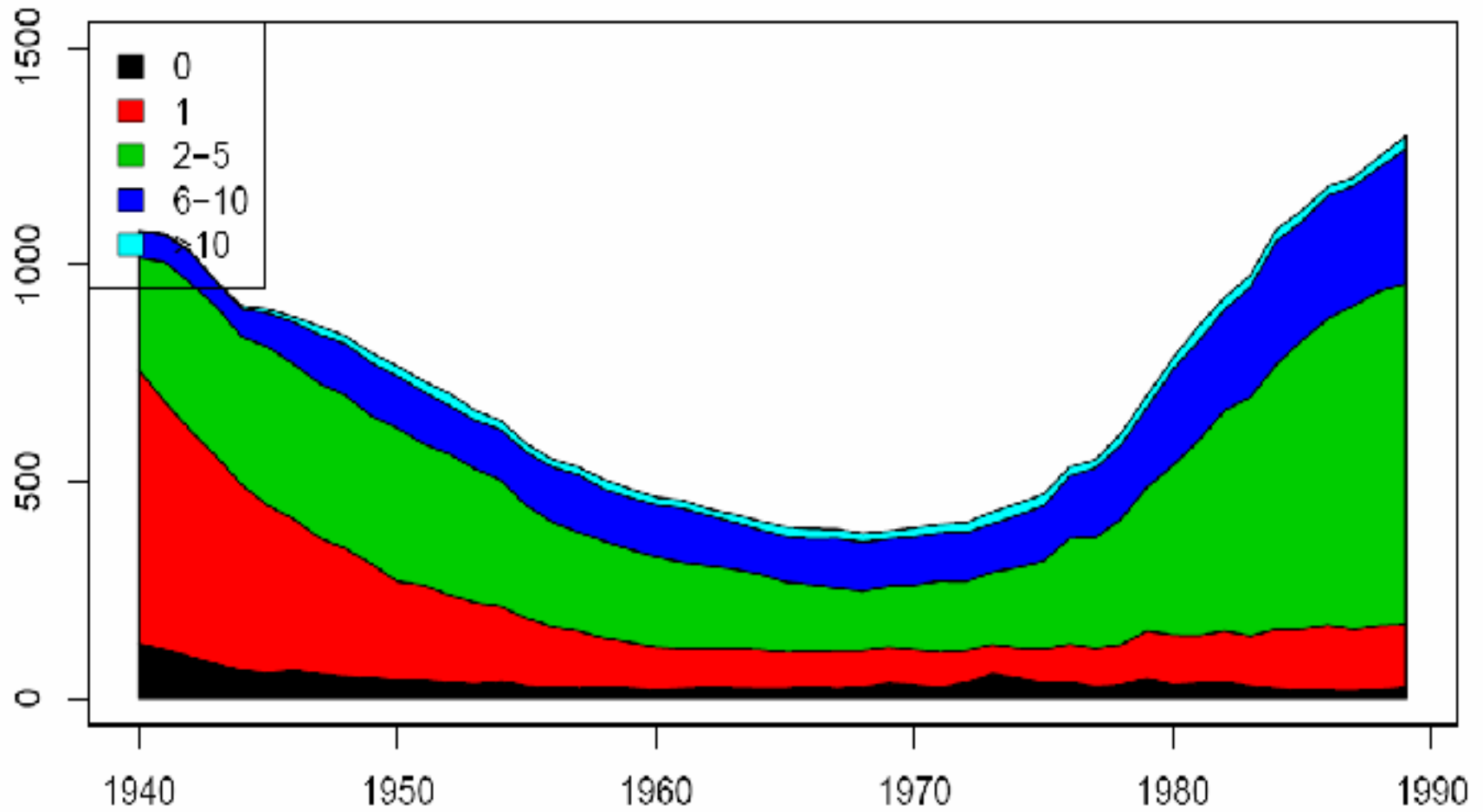


Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
DV: # job titles	3.69	3.09	0	48
DV: # specific functions	2.55	1.98	0	22
DV: # people with multiple titles	0.82	1.12	0	22
Size: ln[storage]	11.1	2.18	4.61	19.6
Size: # plants	1.34	1.34	1	23
Horizontal diversification: # brands	1.76	2.15	0	45
Horizontal diversification: # products	2.08	1.33	0	7
Vertical integration: vineyards (10 ³ acres)	0.19	2.39	0	85.0
Vertical integration: bottling line (yes=1)	0.55	0.50	0	1
Ln[winery age] (years)	2.20	1.00	0	4.04
Imitation: # job titles	3.47	1.15	0	26
Imitation: # titles (mass producers)	5.09	1.47	0	21
Imitation: # titles (farm wineries)	2.44	0.97	0	10
Imitation: # functions	2.42	0.74	0	14
Imitation: # functions (mass producers)	3.28	0.97	0	13
Imitation: # functions (farm wineries)	1.85	0.63	0	7
Imitation: # people with multiple titles	0.76	0.76	0	8
Imitation: # people multiple titles (mass producers)	1.13	0.51	0	7
Imitation: # people multiple titles (farm wineries)	0.52	0.33	0	3
Calendar year	1967	16.6	1940	1989
Form dummy (mass producer = 1)	0.41	0.49	0	1
Entered as an acquisition	0.99	0.30	0	1
Cumulative # acquisitions	0.90	0.48	0	9
# wineries in the state/1,000	0.23	0.21	0.02	0.63

Note: These statistics were calculated on 26,693 annual observations of 2,295 U.S. wineries operating between 1940 and 1989, inclusive. Form-specific imitation variables are state-level variables; that is, they include the focal winery.

Table 3: Models of Winery Job Structures (All U.S. Wineries)

Model # (DV)	1 (titles)	2 (titles)	3 (funcs)	4 (funcs)	5 (mult tits)	6 (mult tits)
<i>Technical Factors</i>						
Size: ln[storage]	.142*** (.013)	.153*** (.018)	.123*** (.012)	.097*** (.021)	.122*** (.022)	.138*** (.027)
Size: # plants	-.0005 (.012)	-.002 (.010)	.006 (.012)	.004 (.013)	.007 (.022)	.003 (.021)
Horizontal diversification: # brands	.012* (.005)	.013* (.005)	.012* (.005)	.012* (.005)	.032*** (.009)	.033*** (.009)
Horizontal diversification: # product types	.023† (.012)	.024† (.012)	.028* (.013)	.029* (.013)	.020 (.021)	.023 (.022)
Vertical integration: vineyards (10 ⁶ acres)	4.89 (3.03)	4.41 (3.04)	7.29* (3.33)	7.01* (3.36)	4.78 (4.71)	3.96 (4.63)
Vertical integration: bottling line (yes = 1)	.175*** (.025)	.173*** (.025)	.177*** (.027)	.179*** (.027)	.219*** (.050)	.212*** (.050)
<i>Cultural Factors</i>						
Ln[winery age]	.029** (.010)	.120*** (.027)	.021* (.010)	.178* (.030)	.060*** (.017)	.199*** (.035)
Imitation of the typical winery in the state	.029*** (.008)	.114** (.042)	.086*** (.014)	.097 (.070)	.148*** (.040)	.725*** (.176)
Ln[age] × imitation		-.025*** (.007)		-.062*** (.011)		-.167*** (.034)
Ln[storage] × imitation		-.002 (.004)		.011 (.007)		-.015 (.015)
<i>Controls</i>						
Constant	-20.3*** (1.93)	-20.6*** (1.90)	-17.2*** (2.06)	-17.2*** (2.04)	-26.4*** (3.58)	-26.1*** (3.55)
Calendar year	.010*** (.001)	.010*** (.001)	.008*** (.001)	.008*** (.001)	.012*** (.002)	.012*** (.002)
Form dummy (mass producer = 1)	.019 (.049)	.015 (.049)	-.072 (.047)	-.064 (.046)	-.041 (.083)	-.039 (.083)
Entered as an acquisition	-.015 (.036)	-.021 (.036)	-.049 (.037)	-.060 (.038)	-.127† (.068)	-.137* (.068)
Cumulative # acquisitions	.038 (.026)	.044 (.025)	.023 (.025)	.022 (.027)	.112** (.041)	.126** (.040)
# wineries in the state/1,000	-.253*** (.083)	-.255*** (.065)	-.188** (.065)	-.162* (.067)	-.383** (.119)	-.385*** (.118)
Scale parameter	.302	.303	.261	.262	.586	.593
Wald χ^2	1,304.9	1,365.9	921.8	981.2	514.9	548.9

Note: This table presents results of negative-binomial analyses of 26,693 annual observations on 2,295 U.S. wineries operating between 1940 and 1989, inclusive. Standard errors, which are in parentheses below parameter estimates, were clustered by winery. † indicates $p < .10$, * $p < .05$, ** $p < .01$, and *** $p < .001$, two-tailed t tests.

Table 4: Models of Job Structure for Mass-Producer Wineries

Model # (outcome)	1 (titles)	2 (titles)	3 (funcs)	4 (funcs)	5 (mult tits)	6 (mult tits)
Size: ln[storage]	.146*** (.021)	.317*** (.038)	.136*** (.020)	.239*** (.039)	.143*** (.033)	.227*** (.049)
Size: # plants	.006 (.011)	-.001 (.010)	.011 (.013)	.005 (.013)	.012 (.023)	.007 (.021)
Horizontal diversification: # brands	.007 (.005)	.006 (.005)	.006 (.006)	.006 (.006)	.024** (.008)	.023** (.008)
Horizontal diversification: # product types	.029† (.016)	.032* (.016)	.029† (.017)	.032† (.017)	.028 (.027)	.029 (.027)
Vertical integration: vineyards (millions of acres)	5.84 (3.73)	4.40 (3.80)	8.34* (4.00)	7.23† (4.12)	6.91 (5.06)	6.30 (5.02)
Vertical integration: bottling line (yes = 1)	.187*** (.041)	.172*** (.041)	.210*** (.048)	.201*** (.048)	.242** (.079)	.231** (.079)
Ln[winery age]	.042* (.019)	.149*** (.047)	.055** (.020)	.205*** (.048)	.099** (.032)	.208*** (.058)
Imitation of the typical mass producer in the state	.046*** (.012)	.502*** (.082)	.078*** (.017)	.586*** (.127)	.193*** (.051)	1.35*** (.390)
Imitation of the typical farm winery in the state	.027 (.010)	.015 (.021)	.076** (.029)	.055† (.030)	.094 (.051)	.033 (.096)
Ln[age] × imitation of the typical mass producer		-.023** (.008)		-.057*** (.013)		-.105** (.040)
Ln[storage] × imitation of the typical mass producer		-.032*** (.006)		-.029** (.010)		-.068* (.030)
Wald χ^2	525.9	553.2	568.3	563.5	347.1	359.0

Note: This table presents results of negative-binomial analyses of 10,459 annual observations on 634 mass-producer wineries operating in the U.S. between 1940 and 1989, inclusive. All models included control variables, which are not reported to save space: calendar year, a dummy for firms that entered the industry through acquisition (rather than *de novo*), cumulative number of acquisitions, and the number of wineries in the state (apart from the focal winery). Standard errors, which are in parentheses below parameter estimates, were clustered by winery. † indicates $p < .10$, * $p < .05$, ** $p < .01$, and *** $p < .001$, two-tailed t tests.

Table 5: Models of Job Structure for Farm Wineries

Model # (outcome)	1 (titles)	2 (titles)	3 (funcs)	4 (funcs)	5 (mult tits)	6 (mult tits)
Size: ln[storage]	.137*** (.017)	.080 (.050)	.102*** (.015)	-.003 (.048)	.087** (.032)	.067 (.069)
Size: # plants	.064 (.063)	.071 (.064)	.018 (.063)	.027 (.062)	.299* (.135)	.289* (.134)
Horizontal diversification: # brands	.045*** (.012)	.047*** (.013)	.046*** (.016)	.048*** (.011)	.105*** (.025)	.107*** (.024)
Horizontal diversification: # product types	.010 (.022)	.011 (.022)	.022 (.020)	.018 (.022)	-.001 (.041)	.0004 (.040)
Vertical integration: vineyards (millions of acres)	5.58*** (1.32)	6.44*** (1.31)	5.24*** (1.54)	5.57*** (1.47)	4.76* (1.91)	5.76*** (2.12)
Vertical integration: bottling line (yes = 1)	.178*** (.033)	.183*** (.033)	.167*** (.031)	.172*** (.031)	.197** (.075)	.200** (.073)
Ln[winery age]	.012 (.012)	.259*** (.047)	-.003 (.011)	.266*** (.054)	.032 (.022)	.272*** (.069)
Imitation of the typical farm winery in the state	.107*** (.019)	.068 (.155)	.129*** (.025)	-.095 (.181)	.411*** (.089)	.658 (.779)
Imitation of the typical mass producer in the state	.011† (.006)	-.003 (.056)	.035** (.011)	-.001 (.083)	.028 (.032)	.060 (.257)
Ln[age] × imitation of the typical farm winery		-.041** (.015)		-.068*** (.021)		-.174* (.083)
Ln[age] × imitation of the typical mass producer		-.025*** (.005)		-.037*** (.010)		-.101*** (.029)
Ln[storage] × imitation of the typical farm winery		.011 (.017)		.035† (.019)		.009 (.085)
Ln[storage] × imitation of the typical mass producer		.005 (.006)		.009 (.009)		.014 (.028)
Wald χ^2	507.5	594.8	398.2	506.9	241.2	277.0

Note: This table presents results of negative-binomial analyses on 13,838 annual observations on 1,459 farm wineries operating in the U.S. between 1940 and 1989, inclusive. All models included control variables, which are not reported to save space: calendar year, a dummy for firms that entered the industry through acquisition (rather than *de novo*), cumulative number of acquisitions, and the number of wineries in the state (apart from the focal winery). Standard errors, which are in parentheses below parameter estimates, were clustered by winery. † indicates $p < .10$, * $p < .05$, ** $p < .01$, and *** $p < .001$, two-tailed t tests.