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The Institutional Context of Industry Consolidation: Radio Broadcasting in the United States, 1920-1934

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Shortly after the first commercial radio broadcast in 1920, the medium's popularity exploded and the number of stations on the dial grew tremendously. By 1930, however, a mere 10 years after the first radio broadcast occurred, the industry was dominated by large, commercial stations who sold advertising time in a variety of forms and were operated to generate profit. Because of the nature of broadcasting organizations and markets, explanations based on competitive dynamics and organizational fitness cannot explain this dramatic change in the broadcasting industry. In the absence of a competitive advantage, I argue that this concentration was the result of institutional shifts in legitimate organizational practices and the political environment in which broadcasters operated.

Shortly after the first commercial radio broadcast on station KDKA in Pittsburgh in 1920, the medium's popularity exploded. By 1923, there were 510 stations in operation with many more under construction (U.S. Department of Commerce 1923). Small businesses, large corporations, churches, educational institutions, radio set manufacturers and other groups realized the potential that lay in this revolutionary form of mass communication and established stations to serve their diverse interests. By 1930, however, only 10 years after the first radio broadcast occurred, the industry was dominated by large, commercial stations that sold advertising time in a variety of forms and were operated to generate profit. Many of the stations founded by non-profit organizations were no longer in existence, and the form diversity that characterized broadcasting's earliest years was gone. While the process of consolidation is not unique to broadcasting, several important features of the early U.S. broadcasting industry, including the structure of broadcasting markets, the nature of competition and newness of the industry, undermine the applicability of theories of form emergence that focus solely on organizational fitness and competitive advantage to the case of broadcasting. I offer an

I gratefully acknowledge the helpful suggestions of Howard Aldrich, Bobby Allen, Judith Blau, J. Scott Brown, Andrew Perrin, Martin Ruef and the anonymous Social Forces reviewers. Direct correspondence to Stephen Lippmann, Department of Sociology and Gerontology, 375 Upham Hall, Miami University, Oxford, OH 45056. E-mail: lippmas@muohio.edu.

alternative explanation that focuses on the institutional and community dynamics in broadcasting that led to this dramatic change in the control of the airwaves.

This research contributes to growing literatures on the social construction of industries and institutional ecology by focusing on the co-evolution of institutionalized organizational practices, new organizational forms and the regulatory environment during the first decade-and-a-half of the U.S. broadcasting industry. In new industries, ecological processes and organizational-level characteristics are less likely to be sources of competitive advantage because new entrants are often small, a variety of institutional logics of organization may exist, and industrial boundaries and competitive dynamics are unstable. The emergence of legitimate organizational forms, boundaries and patterns of competition in new industries often involve cultural and institutional processes. The neo-institutional literature in which these explanatory factors are favored focuses on the cultural and cognitive environments in which organizations operate (Meyer and Rowan 1977; DiMaggio and Powell 1983). It is argued from this perspective that new organizational "forms do not arise automatically in resource spaces but have to be constructed from prevalent cultural materials." (Rao 1998:916) While institutional explanations for the emergence of organizational forms have grown in popularity and theoretical clarity, this perspective has not been adequately applied to larger units of analysis (McGuire and Granovetter 2005).

The institutional approach to industry emergence and form proliferation that developed in this research focuses on the influence that inter-organizational learning and inter-form relations have on the emergence of new organizational practices and forms. Specifically, it poses the following question: how do new organizational practices and the organizational forms with which they are associated become legitimate and diffuse throughout new industries? The answer focuses on aspects of the organizational community: 1.) relationships between organizational forms and 2.) the regulatory environment. "Cross-form" effects have been well documented in a variety of organizational populations (see, for example, Hannan and Freeman 1987; Minkoff 1994; Ingram and Simons 2000). This literature has demonstrated the ways in which the fates of related organizational forms are intertwined through processes of legitimization, cooperation, and/or competition for resources. Using the case of broadcasting, I build on this research by showing that that the relationships between forms and cross-form effects on organizational dynamics in new industries co-evolve with organizational practices.

In addition, this article demonstrates how the radio broadcasting industry became structurally stable in a socio-political institutional sphere

that was largely decoupled from market processes and dynamics. It is argued that the structure of entire industries is often the product of social, political and cultural processes. By tracing these two major changes in the institutional practices and meanings comprising the broadcasting industry, this paper demonstrates that the proliferation of organizational forms and the stabilization of industries can occur in a socially and politically contested and constructed institutional space that operates according to a logic distinct from that of a rational economic market (Spicer 2002; Mezas and Boyle 2005).

After briefly outlining the emergence of the radio broadcasting industry in the United States, I highlight some of the theoretical questions raised by the case of broadcasting that the existing institutional-ecological literature does not adequately address. By examining the co-evolution of organizational practices and organizational forms, in addition to the regulatory environment in which this evolutionary process occurred, this research draws attention to the institutional context in which the emergence of organizational forms and industry consolidation occurs.

The Emergence of Broadcasting

After 1920, an industry emerged which, over the course of the next decade-and-a-half, developed into one with which we are familiar today. Between 1920 and the mid-1930s, there was a dramatic transformation of organizational practices and organizational forms in the industry. The notion of for-profit commercial broadcasting developed from one which almost no one thought possible into the dominant organizational and institutional logic in the industry. As commercial stations grew to prominence in this period, they replaced almost completely the non-profit and part-time commercial broadcasting stations, which comprised virtually all of the stations on the dial in the industry's earliest years.

Between 1900 and 1920, however, radio broadcasting was a dramatically different set of activities than it was in the decades that followed. Although several important individuals provided the technological groundwork for wireless broadcasting and made many important contributions to developments in its application, many histories of the medium agree that it was amateur hobbyists who, on the whole, made the most significant contributions to wireless and radio broadcasting in the first two decades of its existence (Douglas 1987; Leblebici et al. 1991).

From this vast group came a variety of individuals and organizational leaders who realized the value that lie in this new form of mass communication. Indeed, it was an amateur station, 8XK (which became KDKA), which conducted the first commercial broadcast (DeSoto 1936).

Table 1: Radio Station Forms in Early U.S. Broadcasting

Commercial Forms	
1. Full-time Commercial	Stations involved solely in broadcasting. These stations produced and broadcasted programming while selling advertising time to generate revenue
2. Part-time Commercial	Stations operated by business owners involved in other industries or enterprises. These stations were small, and were intended to generate interested in the other business.
Non-profit Forms	
3. Educational	Stations owned by high schools, colleges and universities. Used for research and educational programming.
4. Religious	Stations owned primarily by churches and other religions institutions. Used for broadcasting sermons, services and other religious programming.

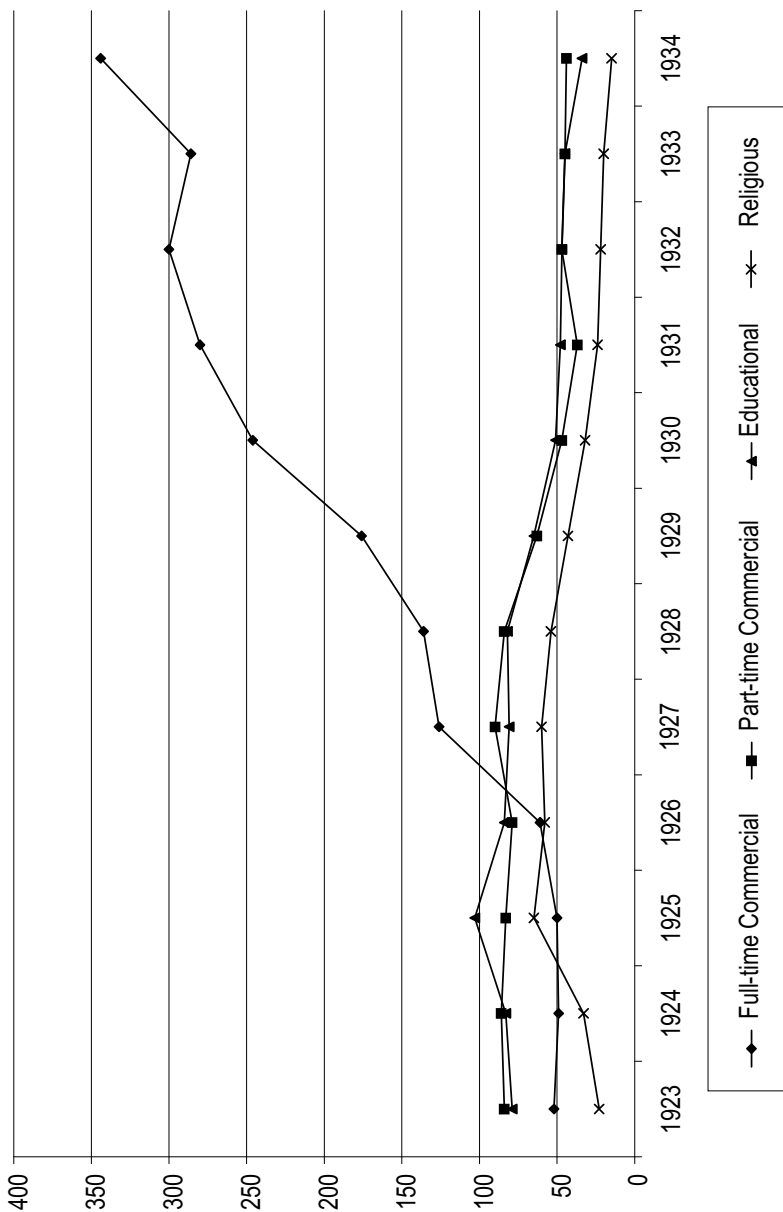
After this first broadcast, other amateurs utilized their radio skills for purposes other than simple tinkering. Churches, schools, businesses, civic and professional associations all tapped into this extensive amateur knowledge in order to open stations.

These stations operated according to a different logic than the one that would eventually underlie all stations on the dial. Many of these stations were simply extensions of the non-profit organizations that had founded them. Church-owned stations broadcast Sunday services and other religiously orientated programming sporadically throughout the week. Stations owned by schools, colleges and universities were operated to bring the academy to the people by broadcasting lectures, or were used for faculty research projects in engineering and physics. Many other stations were operated by other non-profit groups as a new way to communicate with existing members or to reach new ones (Hilmes 1997). The widespread knowledge that existed among the many amateur enthusiasts, coupled with their ingenuity in creating inexpensive transmitters, made the prospect of starting a small station easily attainable. Despite their different missions, these stations all shared an important feature – they were non-profit, non-commercial stations operated by existing organizations in support of those organizations’ original goals.

Even those stations that operated to generate a profit did so in a different manner. In the earliest years of radio broadcasting, most commercial stations were owned and operated by small business owners, and the programming was intended to generate interest in their businesses. Auto repair shops, department stores, theaters and other business all operated stations intended to draw attention to these enterprises. Some early stations were owned by large broadcasting corporations, including Westinghouse and RCA. In their earliest years, though, these stations

were intended solely to grow the market for receiving sets, the production and sales of which was these organizations' source of income. On none of these stations, for the first few years of commercial broadcasting, did paid advertising or program sponsorship from external parties occur (Smulyan 1994). See Table 1.

Figure 1. Station Form Densities, 1923-1934



During broadcasting's first decade, though, the sale of on-air advertising and program sponsorship became widely accepted practices among broadcasters, state regulators and the public. In addition, stations supported by the sale of such advertising and capable of generating profit in their own right proliferated. As Figure 1 demonstrates, these stations comprised virtually all of those on the dial by 1934.

The Institutional Context of Industry Emergence and Form Proliferation

The emergence and proliferation of organizational forms, as exemplified by the rise of commercial stations, has been of interest to organizational theorists for some time, and research on the subject has flourished recently (see Rao 1998; Reuf 2000; Ingram and Rao 2004). However, in entirely new industries this process presents a particular set of problems for both the actors interested in establishing new forms and for organizational theorists interested in explaining where they come from (Aldrich and Fiol 1994). Carving out and securing a niche is particularly difficult in entirely new industries because consumer tastes and preferences are not developed and the fundamental logics upon which organizational forms are built have yet to be institutionalized (Aldrich and Ruef 2006; Carroll and Hannan 2000). The symbolic and cognitive "bridges" that institutional entrepreneurs often make between their ventures and existing organizational forms are problematic when there are few, if any, precedents to draw upon (Aldrich and Fiol 1994).

It was into such an uncertain, varied and multiplex environment that all radio broadcasters entered in broadcasting's earliest years. This uncertainty was reflected in the varieties of understandings, uses, structures and forms that comprised the stations on the dial before the mid-1920s. Over time, new practices were introduced, and different radio station forms existed along side one another in particular broadcasting markets and in this newly defined institutional space. As the industry persisted, actors constructed a new organizational form out of the variety of organizational repertoires that existed in broadcasting's early years, and began a multi-level institutionalization project in order to legitimate the new organizational form and the practices upon which it was based.

Community-level Learning and Organizational Innovation

An organizational community is a set of coevolving populations linked by ties of cooperation, competition or interdependence (Ingram and Simons 2000; Aldrich and Ruef 2006). Despite differences in organizational goals and identities, which are two important dimensions of an organizational

form (Carroll and Swaminathan 2000), broadcasting stations were part of the same community and their fates were intertwined. According to the community ecology approach, the emergence of new organizational forms depends in large part on their position in relation to other, similar organizational forms (Ruef 2000). Such “cross-form” effects have been documented in a variety of communities. Several studies (i.e. Minkoff 1994; Barnett and Woywode 2004) show that the density-dependent processes of legitimation and competition, which have been studied at length in single populations, also work across closely related organizational populations in the same community. Minkoff (1994) found that among women’s and minority organizations, growth in the number of service and protest organizations helped to legitimate more “middle-of-the-road” advocacy groups. After their numbers grew, they bested the two earlier organizational forms that helped to lay the institutional groundwork for them.

While the nature of cross-form effects are determined by the particular institutional, ecological, and economic conditions under which organizations come into contact with one another, two patterns characterize the relationship among forms in the radio broadcasting industry. First, competitive dynamics between firms are often asymmetrical (Baum 1995). Larger organizations typically out-compete smaller organizations, and recent research has shown that the structure of markets influence the competitive dynamics between organizations (Haveman and Nonnemaker 2000). In the case of broadcasting, the structure of the station forms themselves resulted in competitive asymmetries. Second, the nature of cross-form effects changed over time, as broadcasting evolved. A similar pattern has been found in a variety of industries, as cooperative and mutualistic relations between forms give way to competition as resources become scarce (Hannan and Freeman 1977; Ranger-Moore et al. 1991). Baum and Ingram (1998) found that as populations evolve, increased levels of shared experience among similar organizations reduce failure rates. These results indicate that learning is crucial to the evolution of communities.

Organizational Practices

A community ecological approach to understanding the proliferation of full-time commercial stations focuses our attention on the position of those broadcasters in relation to closely related part-time commercial stations. I broaden the focus of this perspective from the relationships between organizational *forms* to organizational *practices*, arguing that form emergence is embedded in a “community of practice,” or the patterned interactions and threads of meaning that define organizational

identity and knowledge. These facilitate the reproduction of organizations and practices over time and across organizations (Aldrich and Ruef 2006). As new organizational practices emerge, the relationships between forms change, and new competitive pressures are created for existing forms, while new opportunities arise for new ones. This dynamic, multi-level view of cross-form effects builds on the recent work on cross-form effects on new form emergence (Schneiberg 2002; Haveman and Rao 1997). Knowledge is often shared and borrowed across forms, and practices can diffuse throughout a community of distinct organizational forms.

In the first years of the broadcasting industry, different organizational forms founded on a variety of underlying practices existed on the dial. However, the innovation of indirect advertising – the sale of commercial spots, program sponsorship and product placement – changed the institutional bases of commercial radio broadcasting in the United States. Early on, no one envisioned that radio broadcasting could be a profitable venture.¹ A conceptual breakthrough came late in 1922, when AT&T established station WEAF in New York. AT&T established a system of “toll broadcasting” in which individuals or groups would pay to use WEAF as if they were making a toll call to the radio audience. While this represented the first significant commercial use of the airwaves themselves, at this point in broadcasting’s history there appears to have been little market for such a system (Starr 2004). Despite AT&T’s efforts to make broadcasting a profitable venture, it was from another less powerful group of broadcasters from which the commercial potential of broadcasting emerged (Leblebici et al. 1991).

A large group of stations emerged early in the 1920s that were owned and operated by business owners whose primary commercial interests lie well outside of broadcasting per se. Instead, owners of car dealerships, furniture stores and other small businesses founded radio stations in order to generate interest in their businesses. In essence, these stations were full-time, dedicated commercials intended to create publicity for the products that the station owner was interested in selling. Over the course of the early 1920s, these stations became increasingly common. By 1925, when RCA took over AT&T’s station WEAF and the network of radio stations connected through its telephone lines (and created what would become the National Broadcasting Company), David Sarnoff had taken inspiration from these small, part-time commercial stations and realized that broadcasting could indeed be a profitable enterprise in its own right.

Many of these part-time commercial stations simply played phonograph records and talked at length about the products their stores had to offer. What Sarnoff and others realized was that by offering higher-quality, standardized and regularly scheduled programming, they could attract

a larger and more regular audience for their programs than part-time commercial stations were able to. These large, full-time commercial broadcasters borrowed the idea of advertising in broadcasting from these smaller businesses, legitimized it in the minds of the listening public, and sold it back to those businesses in the form of advertising time, program sponsorship and product placement (Leblebici et al. 1991; Douglas 1999). Not only did broadcasters now have a way to pay for broadcasting, they had a way to make broadcasting pay. This development helped to solidify full-time commercial broadcasters' interests, given the tremendous growth in radio audiences during the 1920s. The emergence of on-air advertising and its embodiment in the full-time commercial form changed the relationship between full-time commercial, part-time commercial and non-profit stations.

Because the notion of indirect advertising was relatively slow to emerge and take hold in the broadcasting industry, part-time commercial and non-profit broadcasters existed for several years before full-time commercial broadcasters did. After the notion of indirect advertising became viable and understood by several important groups, including large broadcasting organizations and small businesses owners interested in generating publicity, it likely changed the logic upon which broadcasting was based. Therefore, the rise of full-time commercial stations may have been the result of a mutualistic relationship in which an organizational innovation (indirect advertising) led to the legitimization of on-air advertising, which in turn led to the creation and proliferation of the closely related, but distinct full-time commercial form.

H1: The presence of part-time commercial broadcasting stations led to an increase in the founding rate of full-time commercial stations.

Asymmetrical Competition

The emergence of on-air advertising spurred the growth of the full-time commercial form. It also created new dynamics of competition between different station forms within individual broadcasting markets and altered competing forms' rates of growth and decline across the entire industry. The non-commercial and part-time commercial stations that dominated the airwaves in the first few years of the broadcasting industry were inexpensive to start and maintain, and faced few, if any, competitive pressures. They were typically small, and were extensions of the founding organizations' original endeavors. These stations could be operated for large or small audiences without regard to revenue or profits.

The full-time commercial stations that emerged in the mid-1920s and were built around the practice of on-air advertising, however, faced new pressures for survival associated with their performance. The full-time commercial stations selling advertising needed to attract enough listeners in order to satisfy those businesses who were buying sponsorship rights and advertising time. If those businesses were not realizing benefits from advertising on the new medium, they could sever the relationship and station revenues would fall. Even in the earliest years, there was competition for listeners among full-time commercial stations and other station forms with focused and targeted programming.

Because of these different pressures, the competitive dynamics in the unregulated broadcasting industry were asymmetrical across organizational forms. Because of their need to generate revenue and appease advertisers, full-time commercial stations are more likely to be sensitive to market competition than non-profit stations, with limited operating costs and no performance pressures. In addition, their "first-mover" status may have helped them to attract and retain listeners while the new full-time commercial form established legitimacy.

H2: Higher non-profit station densities increased the likelihood of full-time commercial station failure.

H3: Non-profit stations' failure rate was unaffected by competition from other station forms.

Socio-political Legitimacy and the Decline of Non-profit Broadcasters

Despite the shift in organizational practices that facilitated the rise of full-time commercial stations supported by the sale of indirect advertising, the lack of organizational selection mechanisms created a considerable degree of clutter on the airwaves. The growing group of full-time commercial broadcasters, despite their growing numbers, size and resources, were unable to realize a competitive advantage over the non-profit stations that remained on the dial for most of the 1920s. Instead, the well-organized full-time commercial broadcasters realized an advantage in a decidedly non-market institutional sphere – the political process (Lippmann 2005).

Research on the effect of regulation on organizational forms and populations has shown that punctuated policy change can undermine existing institutional arrangements and set the stage for the emergence of new forms (Dobbin and Dowd 2000). In the wake of such an institutional change, groups struggle to define alternative paths of organizational and institutional development. In doing so, they typically look to the past, and

pick and choose among underdeveloped or underutilized elements of the previous institutional order to create new logics of organization and legitimate organizational forms (Schneiberg 2007). Other research has focused on the policy formation process itself as a site of struggle among groups attempting to define norms of appropriateness in organizational communities (DiMaggio 1988; Fligstein 2001).

The political process is vitally important to the fate of organizational forms and to the structure of organizational populations. Key to the rise of organizational forms from this perspective is socio-political legitimacy, which is defined as “the process by which key stakeholders, the general public, key opinion leaders or governmental officials accept a venture as appropriate and right, given existing norms and laws.” (Aldrich and Fiol 1994:648) Socio-political legitimacy is often a socially constructed outcome resulting from the concerted efforts of organizational actors and institutional entrepreneurs. By gaining the support or endorsement of key political or regulatory agents, new organizational forms can receive favorable treatment in government legislation or otherwise exert influence on the policy formation process (DiMaggio 1988; Aldrich and Ruef 2006).

The political process played a vitally important part in radio broadcasting (McChesney 1993; Starr 2004). In particular, one would expect the major shift in the federal regulation of the industry that occurred in its first decade to affect the organizational composition and dynamics in the broadcasting industry. Regulation is often the result of a legitimacy crisis in developing industries or organizational fields (Schneiberg and Bartley 2001). It is under such conditions that organized actors undertake field building activities in order to create or restore order, or to pursue some competitive advantage where none exists (Fligstein 2001).

Radio broadcasting was virtually unregulated from 1920-1927. In the absence of an effective market mechanism to regulate firm entry, the airwaves quickly became overcrowded, threatening both order and legitimacy in the fledgling industry. Stations in the same market would operate simultaneously on the same frequency, and when the interference became too great, it was not uncommon for one station operator to jump to another frequency without warning (Krattenmaker and Powe 1994). In many broadcasting markets, the number of stations in operation exceeded the available frequencies. Several solutions were proposed, including auctioning frequencies to the highest bidder, granting “squatters rights” to existing stations, and a complete moratorium on the construction of new stations. All of these solutions had limitations, and were opposed by broadcasters, radio set manufacturers or the courts (Starr 2004).

The solution that won out was the Federal Radio Act of 1927. The process that led to the drafting and passage of the FRA reflected a new

“institutional logic” in broadcasting. “Institutional logics refer to the axial principles of organization and action based on cultural discourses and material practices prevalent in different institutional or societal sectors,” and color the ways individual perceive problems, make decisions, and carry out action (Thornton 2004:2). Institutional logics determine norms of appropriateness and order in organizational fields, and can affect processes ranging from the cognitive – including attention paying and decision making – to the macro-structural. In times of crisis or great uncertainty, institutional logics can shift in a punctuated manner, as powerful or innovative actors may successfully push their version of order into markets, regulatory regimes, or both (Dobbin and Dowd 2000).

With the increasing numbers of full-time commercial broadcasters, their form became more visible and legitimate and they exerted more influence in regulatory circles, leading to a change in the socio-political bases of legitimacy reflected in the FRA (Lippmann 2005). In the absence of a competitive advantage in early broadcasting markets, these broadcasters made use of the prevailing cultural and ideological discourse that legitimated their organizational form and helped them garner favorable treatment in the first piece of meaningful regulatory legislation. Indeed, as Spicer (2002) demonstrated, the political process can lead to the emergence and legitimization of particular organizational forms in situations where economic efficiency and competitive advantage alone may not. It quickly became clear in broadcasting that a market logic was untenable. Station proliferation created a chaotic situation on the airwaves. Further, those full-time commercial broadcasters with well-defined interests and increasing financial investments in the industry were threatened with extinction by the market crisis. By institutionalizing a new logic of order and appropriateness in the chaotic broadcasting industry, they achieved socio-political legitimacy for themselves and their full-time commercial form. Although they were late-comers onto the dial and many non-profit stations were very popular with audiences (Hangen 2002), large commercial broadcasters argued that their form best served the public interest, and in fact were the highest quality and most efficient, despite their lack of a competitive advantage.

The shift from a market logic to a public-interest logic in broadcasting happened quickly and formally. The market logic, which had emerged *de facto* in the fledgling industry, was replaced by the public interest logic that was codified in the FRA. The Federal Radio Act also created the Federal Radio Commission, which had the authority to make decisions regarding the legitimacy and fates of individual broadcast stations. Under the new system, station applications had to be reviewed by the Federal Radio Commission and approval hinged on whether or not the station

would serve the “public interest, convenience, or necessity” (U.S. House of Representatives 1927). Large commercial broadcasting organizations exerted significant influence on the newly created FRC and on the Commission’s definition of the “public interest” in broadcasting. Four of the first six members of the Federal Radio Commission had careers commercial radio broadcasting either before or after their service as commissioners, many others had direct ties to commercial broadcasting, and Louis Caldwell, the influential General Counselor to the Federal Radio Commission, had as clients several large commercial broadcasters (Lippmann 2005; McChesney 1991)

This legislation changed the structural bases of the industry in favor of a new kind of broadcasting, but for some time, the meaning of the “public interest” standard was poorly understood. The attachment of meaning to the new requirements of the FRA – or, in more abstract terms, the institutionalization of a new logic in the industry – involved the collective action of the advocates of the commercial broadcasting form. By 1929, however, the FRC developed official station classifications including “public service” stations on which “entertainment...religion, education and instruction, important public events, discussions of public questions, weather, market reports and news, and matters of interest to all members of the family” were broadcast, and “propaganda” stations operated “exclusively by or in the private interest of individuals or groups so far as the nature of the program is concerned.” This category included all non-profit stations with a narrow mission (Federal Radio Commission 1929b:34). Through regulatory capture and the activation of social and political network ties, those advocating the commercial broadcasting form successfully linked the practices and identities underlying their forms with the public interest, convenience and necessity, while marginalizing competing forms (See McChesney 1993; Streeter 1996; Lippmann 2005).

H4: The passage of the Federal Radio Act decreased the failure rate of full-time commercial stations.

H5: The passage of the Federal Radio Act increased the founding rate of full-time commercial stations.

H6: The passage of the Federal Radio Act increased the failure rate of non-profit stations.

H7: The passage of the Federal Radio Act decreased the founding rate of non-profit stations.

Data and Methods

The data for the analysis come from annual station lists released by the Department of Commerce (1920-1926), the Federal Radio Commission (1927-1933) and the Federal Communications Commission (1934). These lists included information on the stations' ownership, form, power, location and any operating restrictions. From these lists, I constructed life histories of every radio station in the 100 largest U.S. broadcasting markets from 1920-1934, including the number of years each station was in existence, important station characteristics and the year of station founding and disbanding. This analysis targets two organizational processes – founding and disbanding – which operated according to two different logics in the radio broadcasting industry. During the unregulated period, station founding was a relatively simple process with few outside impediments. Anyone with the knowledge and resources who wanted to start a station could do so. Over time, however, pressures for revenue may have increased for some existing commercial stations. Full-time commercial stations needed to attract advertisers, and those that underperformed were threatened with failure. In addition, these processes involve two different analytical methods, described below.

Foundings

Organizational foundings are treated as the number of radio broadcasting organizations that entered the radio station population in a particular market in a given year. Therefore, the unit of analysis for this section is the market year, or one observation per market, per year. This allows investigation of how a particular set of market characteristics and circumstances influenced the emergence of new organizations in that market. Given this framework and the count data it utilizes, Poisson regression is the methodology of choice, and is appropriate for these data as they do not exhibit overdispersion.

Dependent Variable

The dependent variable in the Poisson model is a count of radio station foundings in a given market area in a given year. Due to great variation and overlap in radio station markets, it was virtually impossible to construct discrete market areas for every station on the dial. Therefore, this analysis is limited to the largest 100 broadcasting markets in the United States, which allows for the construction of discrete markets. These markets contained more than two-thirds of all stations in operation in the years under consideration, and many of the stations not included were the only ones in operation in a given area.

Independent and Control Variables

Form Densities: Measures of cross-form densities based on the number of stations of competing forms in the focal organization's market are included. Second-order terms control for possible non-linear effects of density.

Regulatory Period: To test the effect of the institutional change that occurred with the passage of the Federal Radio Act on the dynamics in the industry, a dummy variable for institutional period is employed. The years prior to and including the passage of the Federal Radio Act, 1920-1927, were coded as 0. The remaining years (1928-1934) were coded as 1, beginning with the first full year the regulations were in effect.

Economic and Social Controls: A series of controls are included to capture industry size (total number of stations on the air in the United States), log-transformation of the population of the station's market, demand for broadcasting programming (the percentage of households in each market owning a radio set), and the diffusion of the industry from the East Coast and Midwest to the South and West (with East region the omitted category), which may account for variations in station foundings and failures.

Station failures: because the failure of stations in a broadcasting market frees resources, the station founding rate in a particular market should be related to the failure rate in the previous year. In order to control for these effects, the failure rate (lagged one year) for each station form in each market is utilized.

Disbandings

Organizational disbandings are analyzed using event history analysis (Allison 1995). Because these lists were released in annual intervals and the exact date of founding or failure is not known, discrete time methods model radio stations' survival chances. The unit of analysis is the station year, so each station comprises a number of observations equivalent to the number of years it was on the air. The original set of stations was divided into a dataset containing 2,729 station years. This method is suited to this analysis because it allows for the inclusion of time-varying covariates.

To explore the effects of the discontinuous institutional change, the probability of radio station death, denoted as P_{it} , is estimated as a function of the explanatory variables using a complementary log-log transformation.

This model is suitable to the data here because actual station deaths could occur at any time during the year, but could only be measured in yearly intervals. In the discrete-time logistic regression framework, specifying time dichotomously necessarily implies a piecewise exponential hazard by modeling two different hazard rates, one for each period (Allison 1982). The basic model is:

$$\log[-\log(1-P_{it})] = \alpha + \beta x_{it} + Mz_{it}$$

where P_{it} is the probability of death for station i occurring at time t given that an event has not already occurred, βx_{it} is a vector of time-constant independent variables for each station i at each time t , and Mz_{it} is a vector of time-varying independent variables for each station i at each time t .

Dependent Variable

The dependent variable for the analysis is the likelihood of station failure. Stations were coded as failing at the end of the final year in which they appeared on the official Commercial Radio Station lists.

Independent and Control Variables

In addition to controls for competitive density (for each station form) social and economic characteristics, and the regulatory period, described above, the event history analysis of organizational failures includes the following control variables:

Age: Organizational age has been found to affect fitness and survival chances in a variety of ways (Stinchcombe 1965; Ranger-Moore 1997). To control for these possible effects, I have included a measure of organizational age. Second order effects are also included to control for possible non-linear effects of age.

Size: To control for the effects of organizational size, station power is used as a proxy measure for size. Watts provide an indication of a station's coverage area, which use a useful operationalization of organizational size in the broadcasting industry. Watts are also a useful measure for station size because they are accurately measured in the station lists and are comparable across stations and over time.

Network Affiliation: A dummy variable is included to capture the possible competitive advantage that network affiliation may have had on full-time commercial stations' survival chances.

Station Form: Separate models were run for the three radio station forms of interest. *Full-time commercial stations* were devoted solely to radio broadcasting or organizations engaged in the production of radio equipment. *Part-time commercial broadcasters* were those stations owned and operated by commercial ventures other than broadcasting, such as furniture, auto or grocery stores. *Nonprofit Broadcasters* were stations owned and operated primarily by organizations and institutions affiliated with churches and other religious organizations, schools, colleges, universities and other educational institutions, and other nonprofit organizations.

Results

The presentation of the results of the Poisson regression results for radio station emergence is followed by the event-history analysis of radio station failure.

Table 2 presents the results of the Poisson models of radio station foundings. Analyses of each station form were conducted separately. Models 1 and 2 show the results of the full-time station founding analyses. The only market characteristic that is significantly related to full-time station foundings is the year of full-time failures in the previous year. Full-time commercial failures appear to free market resources for new stations. Hypothesis 1 is not supported, and there appears to have been no market-specific mutualistic relationship between part-time and full-time commercial stations. Both market size and industry size are positively and significantly related to full-time station foundings. Stations were more likely to be founded in larger markets and as the industry grew. The West had significantly more station founding events than the East, perhaps due to low levels of station density there in the industry's earliest years compared to the crowded conditions on the East Coast that occurred very quickly after the first broadcast. Model 2 introduces a control for the regulatory period. The FRA had a significant negative effect on full-time commercial foundings, and Hypothesis 5 is not supported. However, given the purpose of the FRA for clearing the extreme congestion on the airwaves, this finding is not entirely surprising.

Models 3 and 4 show the results of the analyses for part-time stations. In Model 3, the number of full-time stations in the market is negatively related to part-time commercial foundings, while the number of full-time failures is significantly and positively related to part-time commercial foundings, indicating that part-time stations were competing with full-time stations for the same resources. As in the full-time commercial models, form-specific failures, market size and West region are all positively related

Table 2: Poisson Models of Radio Station Foundings

Independent Variable	Full-time Stations			Part-time Stations			Non-commercial Stations										
	Model 1			Model 3			Model 4			Model 5			Model 6				
	b	S.E.		b	S.E.		b	S.E.		b	S.E.		b	S.E.			
Intercept	-10.543***	(1.533)		-10.945***	(1.509)		-9.589***	(1.859)		-11.208***	(1.768)		-10.142***	(2.822)		-13.638***	(2.797)
Market Characteristics																	
Full-time Density	-.029	(.084)	.014	(.085)		-.259***	(.059)		-.107	(.062)		-.206*	(.083)		-.092	(.090)	
Full-time Density ²	-.011	(.007)	-.011	(.007)		—			—			—			—		
Part-time Density	.014	(.061)	.010	(.061)		.224	(.146)		.182	(.148)		.117	(.109)		.040	(.108)	
Part-time Density ²	—		—			-.053*	(.027)		-.054*	(.027)		—			—		
Nonprofit Density	.091	(.076)	.053	(.077)		.112	(.096)		-.013	(.097)		.596	(.353)		.533	(.349)	
Nonprofit Density ²	—		—			—			—			-.192	(.116)		-.203	(.115)	
Full-time Failures	.428***	(.103)	.387***	(.103)		.643***	(.129)		.549***	(.132)		.128	(.238)		-.072	(.258)	
Part-time Failures	.128	(.173)	.131	(.098)		.331**	(.114)		.330**	(.117)		.038	(.191)		.044	(.199)	
Nonprofit Failures	.190	(.173)	.218	(.171)		-.174	(.241)		-.060	(.234)		.639*	(.266)		.711**	(.249)	
Social, Economic and Political Variables																	
Market size (ln)	.535***	(.103)	.520***	(.102)		.734***	(.122)		.648***	(.120)		.818***	(.134)		.839***	(.192)	
Industry size	.003**	(.001)	.005***	(.001)		-.005***	(.001)		.001	(.001)		-.008***	(.002)		-.001	(.002)	
Radio set ownership	.010	(.009)	.009	(.009)		.022	(.121)		.020	(.012)		.019	(.018)		.014	(.019)	
Midwest	.051	(.162)	.050	(.161)		.038	(.205)		.060	(.203)		.926**	(.344)		.935**	(.340)	
Southeast	.298	(.332)	.308	(.331)		.685	(.437)		.735	(.436)		1.733**	(.360)		1.791**	(.622)	
West	.964***	(.214)	.917***	(.214)		1.004***	(.258)		.847***	(.256)		1.603***	(.440)		1.593***	(.438)	
Regulatory Period (1927-1934)			-.478***	(.145)		—			-.1656***	(.213)		—			-.1791***	(.342)	
Log L			-480.8457			-338.732			-308.073			-201.805			-187.719		

Note: * p < .05 ** p < .01 *** p < .001

to part-time foundings. Industry size is negatively related to part-time commercial foundings, a surprising finding although it is quite small in magnitude. In Model 4, the passage of the FRA has a significant negative effect on part-time station foundings. Although this is in line with the goal of the FRA, when the magnitude of the coefficient is compared to that for full-time commercial stations, it becomes apparent that the FRA did not affect all station forms equally.

Results for non-profit stations are presented in models 5 and 6. In Model 5, it appears that the number of full-time commercial stations in a market has a significant and negative effect on non-profit foundings, suggesting that market mechanisms favored the full-time commercial form. Form-specific failures also appear to have freed resources for the founding of non-profit stations, as they are positively and significantly related. Market size is positively related to non-profit foundings, as it is for the other forms, but as the industry grew, non-profit stations were significantly less likely to be founded. All regions of the country had higher rates of non-profit foundings than the East did, likely due to the active engagement of religious stations in the South and West, and colleges and universities in the Midwest. In Model 6, a control for the FRA is introduced and the results change dramatically. First, the effects of full-time density become non-significant, indicating that the apparent competitive advantage of full-time stations over non-profit stations was actually a result of the regulatory shift, and not market forces. Second, the effects of the FRA on non-profit foundings are negative and highly significant, lending support to Hypothesis 7. Model 6 makes it clear that the passage of the FRA composition of the airwaves. Taken with the effect that the Radio Act had on the failure rates of the various station forms, we can see that the passage of the Federal Radio Act, net of other station and market characteristics, was largely responsible for clearing the way for the rise and proliferation of the newly legitimate commercial broadcasting form.

Table 3 presents the estimates for the models of failure rates of broadcasting organizations. As in Table 2, separate analyses of each station form were conducted. Odds ratios are presented for their ease of interpretation. Models 1 and 2 analyze full-time commercial failures. Model 1 includes organizational-level covariates and market characteristics. In this model, both station size and age have a significant effect on radio station failure. Thus, larger stations were less likely to fail than smaller stations, indicating that they may have been at a competitive advantage. In addition, for every year full-time commercial stations existed on the dial, they became approximately 25 percent less likely to fail. Many of the other variables measuring organizational- and market-level characteristics that provide competitive advantages in other industrial contexts, including

Nonprofit Density	.147* (0.070)	1.158	.232** (.074)	1.261	.000 (.071)	1.000	.000 (.071)	1.000	.162 (.313)	1.176	.294 (.316)	1.342
Nonprofit Density ²	-	-	-	-	-	-	-	-	-.027 (.088)	.973	-.051 (.087)	.950
Social, Economic and Political Variables												
Market size (ln)	.054 (.081)	1.055	.050 (.082)	1.051	.081 (.078)	1.084	.081 (.078)	1.084	.016 (.013)	1.016	-.003 (.137)	.997
Industry size	-.002 (.002)	.998	.001 (.002)	1.001	-.003* (.001)	.997	-.003 (.002)	.997	.000 (.002)	1.000	.020 (.023)	1.020
Radio set ownership	.012 (.014)	1.012	.008 (.014)	1.008	-.005 (.009)	.995	-.005 (.009)	.995	.022 (.023)	1.022	-.234 (.306)	.791
Midwest	.402* (.204)	1.495	.332 (.205)	1.394	.072 (.263)	1.075	.072 (.263)	1.075	-.233 (.305)	.792	-.605 (.375)	.546
Southeast	.503 (.380)	1.654	.402 (.377)	1.495	-.043 (.321)	.958	-.044 (.322)	.957	.192 (.688)	1.212	.092 (.683)	1.096
West	.309 (.228)	1.362	.214 (.230)	1.239	-.014 (.281)	.986	-.014 (.281)	.986	-.598 (.374)	.550	-.605 (.375)	.546
Regulatory Period (1927-1934)	-	-	-.884*** (.219)	.413	-	1.014	.014 (.231)	1.014	-	-	1.236* (.499)	3.442
Log L	-471.765	-463.911	-405.097	-405.095	-204.006	-200.530						

Note: * p < .05 ** p < .01 *** p < .001

network affiliation (economies of scale) or competition from other station forms do not predict full-time commercial failure. However, the number of non-profit stations in a market is positively and significantly related to full-time commercial failure, indicating that non-profits posed a competitive threat, supporting Hypothesis 2.

Model 2 introduces the regulatory period covariate. In addition to making the negative effects of age on station failure insignificant, controlling for the passage of this legislation increases the magnitude of the relationship between non-profit competitors and full-time station failure, lending stronger support to Hypothesis 2. It is also clear that the Federal Radio Act had highly significant negative effect on the failure of full-time commercial stations. In the period regulated by the FRA, full-time commercial stations became almost 60 percent less likely to fail than in the period before the passage of the Act. Hypothesis 4 is supported.

Models 3 and 4 analyze the failure of part-time commercial stations. Among these stations, station size has no effect on failure. Industry size is negatively related to part-time station failure. As they industry grew, the rate of failure for these stations declined. Model 4 includes the regulatory period covariate, which is not significant. The passage of the Federal Radio Act did not alter the likelihood of failure of part-time commercial stations.

Nonprofit station failures are analyzed in models 5 and 6. With the exception of size, none of the coefficients in Model 5 are significant, lending further support to the claim that there were few market pressures on radio stations early in the industry's history. Further, and in particular, the lack of significance between full-time competitors and non-profit station failure lends strong support to the idea that market competition in broadcasting was not symmetrical – non-profit stations were under no competitive pressure from for-profit stations, while full-time commercial stations were threatened by the presence of non-profits. In Model 6, the Federal Radio Act has a significant and positive effect on nonprofit station failure. After the passage of the FRA, nonprofit stations became 2.4 times *more* likely to fail than in the period before its passage, and Hypothesis 6 is supported. Taken together, the models presented in Table 3 demonstrate the dramatic effect that the passage of the Federal Radio Act, more so than market forces, had on the failure rates of full-time commercial and nonprofit station forms and, in turn, on the composition of the airwaves.

Discussion and Conclusion

This research builds on a growing body of sociological research that examines the emergence and social construction of new industries (see

McGuire and Granovetter 2005). According to this literature, the boundaries and competitive dynamics in industries are not simply the result of efficient market mechanisms. The unregulated broadcasting industry, as it was in the early 1920s, lacked an effective market mechanism to “regulate” station entry and exit. First, there were low barriers to entry for potential broadcasters. The equipment needed to start a station – albeit a small one – was not prohibitively expensive. Stations were often constructed from junk, scrap metal and discarded household materials (Douglas 1987). Second, there were few, if any, performance pressures on non-profit radio stations. Because of its low cost, it placed little burden on organizations and individuals that were already involved in their primary functions. After a station was on the air, it could generally remain there until it decided to stop (Coase 1959). In addition, concentration among full-time commercial broadcasters was not simply a transaction-cost economizing process in which alternative station forms bought a service (from full-time commercial stations) that they once “made” (by operating their own stations). Many non-profit broadcasters, especially religious ones, worried about the content being broadcast on new commercial stations, and felt that they would offer watered down, non-controversial programming (McChesney 1987, 1993).

Instead, legitimate organizational forms and industry boundaries are often the result of social negotiation. Members of key intra-industry networks early in an industry’s existence can define appropriate production processes, products, and industry-wide divisions of labor which, over time, became solidified into meaningful industrial boundaries and communities of practice. Legitimate organizational forms and industry boundaries are socially negotiated outcomes, and regulatory legislation can alter the competitive dynamics in an industry and contribute to the institutionalization of certain organizational practices and particular organizational forms.

In the case of broadcasting, two major institutional changes allowed for the emergence and proliferation of the full-time commercial broadcasting form that remains the dominant station form to this day. The first was the conceptual breakthrough of indirect advertising. Full-time commercial broadcasters borrowed an increasingly prominent organizational practice from part-time commercial broadcasters, and built a new station form based on the sale of advertising and programming intended to reach as large an audience as possible. The second was the passage of The Federal Radio Act. As on air-advertising became legitimate organizational practice, and as the numbers of full-time commercial broadcasters increased, their form and the income-generating practice upon which it was based were treated favorably in the new legislation. The programming

offered by these stations, initially intended to reach as broad a market as possible, was deemed to best serve the “public interest convenience, and necessity” by the newly formed Federal Radio Commission (U.S. House of Representatives 1927). This political-institutional shift had two important effects on the fledgling broadcasting industry. First, it acted as a selection force by raising the hazard of failure among nonprofit stations. Second, it created more favorable conditions for the founding of new full-time commercial radio stations than for part-time commercial and nonprofit radio stations. It also created a more favorable environment for existing full-time commercial stations by reducing their risk of failure. Taken together, these two processes dramatically altered the terrain of the broadcasting industry, which until the passage of the act had been as much medium for religion, education, and public service as it was for commercial purposes. Afterwards and to this day, it remains a predominantly profit-generating medium.

This relationship between legitimate organizational practices and legitimate organizational forms sheds light onto the socio-political environment in which new industries emerge and become stable. Theories about the legal environments of organizations often focus on the unidirectional ways in which competition is shaped by a particular regulatory regime or institutional arrangement (Edelman and Suchman 1996). In Dobbin and Dowd’s (1997) study of the Massachusetts railroad industry, the passage of regulations are considered to be important because they provide a framework within which competition among railroads and the ecological dynamics of organizational foundings take place. In this and many other studies (i.e. Campbell et al. 1991; Roy 1997; Mezas and Boyle 2005), policy is treated as an exogenous force that shapes competition.

However, the case of broadcasting reinforces the fact that the legitimization of organizational practices, competitive dynamics, and institutional change are also endogenous processes (see Haveman and Rao 1997; Thornton 2004). Although full-time commercial broadcasters were a well organized and resource-rich group, they lacked a competitive advantage in a new industry with few, if any, market-based selection pressures on organizations. Affiliation with a station network did not bestow any competitive advantage upon individual stations, nor did the wider array of programming typically offered by full-time stations. In the absence of such a competitive advantage, full-time commercial broadcasters instead pursued a legal-institutional solution to their problems when they embarked on a project to influence the drafting and passage of the Federal Radio Act in their favor (Lippmann 2005). This legislation changed the institutional logic of radio broadcasting by

bestowing legitimacy on station form supported by advertising, which only a few years prior were looked upon unfavorably by many important individuals and groups.

In addition to shaping competitive dynamics, regulatory institutions and institutional change can themselves be shaped by competition. Organizational dynamics can motivate organized efforts towards institutional change, which in the case of radio broadcasting, took the form of regulatory content. A punctuated institutional shift then influences those very organizational dynamics that gave rise to it. After the regulations were enforced, the organizational dynamics of entry and disbanding changed dramatically. However, by focusing on competitive dynamics before the legislation and the individual and organizational motivations for pursuing institutional change, we can see that competitive dynamics may themselves lead to institutional change, which in turn can alter the structure and trajectory of emerging industries.

Note

1. One executive with a division of AT&T felt that "advertising...will never be successful in radio broadcasting. People who are listening to [advertising on] a radio set can simply switch to another wave length." (U.S. Department of Commerce 1922b:46) These sentiments were echoed by other influential figures, including Secretary of Commerce Herbert Hoover and RCA president David Sarnoff (Department of Commerce 1922b; Sarnoff 1922).

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