Audible Struggle: Phonographs, Records, and Musical Manufactures in the United States, 1899-1939
[draft; do not circulate]

Shadrick Andrew Small
University of California, Berkeley

Abstract

Using a field-theoretic approach to economic sociology, this article provides a revised account of the US record and phonograph industries' rise and consolidation—and their changing place amidst the manufacturing industries of the broader music business—from 1899 to 1939. Drawing primarily on Census Bureau data, I argue that the development of the industry, including the emergence of a semiautonomous recording industry, is largely explicable via contingent field dynamics (i.e., the struggle among actors within the field), first among the other musical manufactures, and then among phonograph makers themselves. Consequently, I also argue that the radio industry, commonly cited as the leading threat to the phonograph and record business' health in the 1920s, has been overestimated as a threat and, furthermore, that demonstrably suspect data has lent credence to this flawed thesis.

On the cusp of a new century, the United States was in the midst of a major economic and cultural transformation. It had escaped the calamity of a mid-1890s depression (see Lindstrom 2001), and "modern mass markets had begun to dominate the economy in the United States," such that "everyday life became increasingly dependent on the mass market" (Swedberg 2005:240). The rise of the mass market was part of what Roell (1989:45) calls "the journey from a producer ethic to a consumer one," a "revolution occurring in American culture" that suffused every aspect of society. The emergent potential for mass consumption unearthed mass commodities where none had previously existed, including sound itself (Taylor 2007; Suisman 2009), and the national economy was poised to enter a lengthy and generally expansionary period, briefly slowed by depressions in 1907-08 and 1920-21 and decisively ended by the Great Depression (see, e.g., Cahill 1992; Lindstrom 2001).

As but one facet of the national economy, the music business (broadly defined) was itself primed for expansion. In keeping with the spirit of the times and subject to the same creeping rationalization that epitomized modern life in general, both piano manufacturing and musical theater had achieved economies of scale in their own ways (Poggi 1968; Sanjek 1988a; Roell 1989). Riding the coattails of its fellow travelers, music publishers supplied the sonic blueprints for vaudevillians and piano teachers alike with increasing effectiveness; between 1899 and 1909, music publishing was the fastest-growing branch of the overall publishing industry in the Census Bureau's (1913b:767) estimation, having doubled its ranks along the way.

Forsaking its abortive aspirations as part of the telecommunications sector (e.g., Brooks 1978; Dowd 2002; Millard 2005), the phonograph industry—within which the record business was embedded—arrived as a branch of the music business in its own right amidst this broader ascendancy. The most aggressive attempts to market the early phonograph (proper) and the offshoot graphophone were made by the short-lived North American Phonograph Company (NAPC), sole authorized distributor of Edison products in the country from 1888 until its bankruptcy in 1894 (see Wile 2004a, 2004b; Hoffmann and Ferstler 2005). The NAPC took the American Bell Telephone Company as its model—that is, *not* an existing music company of one sort or another—and deputized over thirty local affiliates to sell talking machines, primarily as office equipment (Sanjek 1988a:366; Dowd 2002:121; Hoffmann and Ferstler 2005:616-617, 754-755). The phonograph, in the words of an NAPC ad, was "The Ideal Amanuensis for The Business Man [*sic*], The Author, The Editor, The Lecturer, The Preacher, etc." (ad reproduced in Wile 2004b). Founded as one of the NAPC's affiliates by "a group of Washington court reporters and businessmen," the Columbia Phonograph Company attempted earnestly to promote its wares in the administratively dense confines of the capital. Columbia, however, survived and succeeded by selling its own original recordings of musical selections (Brooks 1978:5); meanwhile, the talking machines floundered as a stenography tool among the various NAPC subcompanies because of lingering inadequacies both in reproducing sounds and the still-unrefined process of mass-manufacturing talking machines (Brooks 1978; Dowd 2002; Millard 2005). It's worth considering whether the failure of the industry to cohere up to that point contributed to the NAPC's speedy demise (see Fligstein 1996:665), but the Panic of 1893 and ongoing conflict with Edison certainly didn't help (Brooks 1978; Wile 2004a). Regardless, the industry which survived saw musical offerings as the path to prosperity and self-preservation, and the broader society took up this reframing of the phonograph's place (e.g., U.S. Bureau of the Census 1908:4:264; Brooks 1978; Roell 1989; Dowd 2002). Before aspiring to become, as a 1920 Victor ad would later have it, "the world's largest and greatest musical industry,"

phonograph makers had to decide that they were a musical industry in the first place.

In an epoch in which the pervasive monetization of sound was still new, the industry was still a late arrival in the music business relative to the other industries which were already producing durable and recognizably musical physical objects, namely, sheet music and musical instruments; these were ultimately the industries against which phonograph and record makers defined themselves (Suisman 2009). "New markets are born in close proximity to existing markets" (Fligstein 1996:665), and the (reborn) phonograph business was no exception. Once they recognized the musical potential of their products, phonograph sellers moved to cannibalize the market for domestic music consumption that had largely been nurtured by piano makers, especially the embedded market for automated "mechanical music" ushered in by the player-piano (Roell 1989). Taken together, though, the phonograph industry and the incumbent musical manufactures were not just competitors; they were also crucially dependent on each other. This was obviously true insofar as someone needed to manufacture the musical instruments and write the songs that would feature on a given recording, but this mutual dependence also manifested in more subtle ways. Segrave (1994), for instance, in tracing the varied forms that music payola took over the course of more than a century (both before and after it sparked a mild moral panic in the rock era), depicts a music industry whose center of promotional gravity subtly shifted from using stage shows to sell sheet music, to using records to sell sheet music and phonographs, to using radio shows to sell records (see also Cummings 2013:13-31). Embodying much of the newly modern music business (Suisman 2009), the phonograph business and its alters exhibited the complex layering of dependence and conflict that characterizes social fields, whether at the industry or sector level (e.g., Bourdieu [2000] 2005).

In order to properly contextualize the development of the recording industry prior to World War II, I use official statistics to trace the fortunes of the phonograph and record business in broad strokes between 1899 and 1939—while also comparing it to sheet music and musical instrument manufacturing (and eventually, radio). To borrow Bourdieu's ([2000] 2005) terms, this chapter focuses more on the position *of* the field of (phonograph and) record makers; dynamics *within* the field of (phonograph and) record makers are more squarely in focus in subsequent chapters, but they do indeed figure in the narrative here.

A Brief History of Recorded Time

To foreground all of what follows, I want to offer an extremely brief overview of the recording industry's first epoch, which stretched from its birth in 1888 to the 1942-44 American Federation of Musicians' (AFM) recording ban (also known as the "Petrillo Ban"). The existing record crafted by industry and cultural historians does not lack for a basic account of this period; the broad agreement is more or less as follows. (Unless indicated, the following summation was synthesized from the more finely wrought histories of Sanjek 1988a, 1988b; Kenney 1999; Millard 2005; Sutton 2000, 2008, 2010, 2018).

The field of sound reproduction, of recording, was birthed by the ambitions of the Gilded Age's great inventor-entrepreneurs to augment nascent telegraph and telephone technologies with dictation tools (Millard 2005). During the latter half of 1877, Thomas Edison—through the practical efforts of lab assistants—developed a working phonograph; Edison envisioned a varied number of applications for his invention, including language learning (Read and Welch 1976; see also DeGraaf 1995). The first quarter-century that followed the invention of the phonograph was marked by dogged attempts to perfect the technology for recording and playback. By 1886, Chichester Bell (Alexander Graham's cousin) and Charles Tainter crafted what looked to be an

improvement on Edison's initial cylinder-player with their graphophone, which substituted a wax-coated cylinder for the flimsy tinfoil of the original phonograph. At the time, Edison had back-burnered his work on sound reproduction in favor of other technical pursuits (namely, incandescent lighting), only to return after rebuffing an offer to form a joint venture with Bell and Tainter. Alongside Emile Berliner's disc-playing gramophone, first demonstrated in 1888, the phonograph and graphophone (and their attendant media) formed the technological foundation of the emerging recording industry (Millard 2005; see also Koenigsberg 2005). Furthermore, each machine—or rather, the distinct strains of patented knowledge and procedures they represented—lay at the foundation of one of the industry's three early leaders: Victor and the gramophone, Edison and the phonograph, Columbia and the graphophone (Read and Welch 1976; Sutton 2010).[1] Although the name 'phonograph' originally referred specifically to cylinder record players (particularly those produced by Edison) through at least the first decade of the twentieth century, it became a generic term in American English for *all* record players, regardless of format (Sutton 2010:ix). (Throughout this work I will hereafter use 'phonograph' as a generic term, unless otherwise indicated.) Meanwhile, as early as 1889, sufficient progress in improving the phonograph and its progeny had enabled the earliest attempts to sell recordings alongside the new talking machines (Sutton 2010:xi-xii)—that is, records as a commodity emerged as an "adjunct" to a market for record players (Roy 2004:269).

They may have initially been an industry sideline, but records quickly became an important part of the phonograph business. Whatever its origins, the holders of sound reproduction technology discovered over the course of the 1890s that it was at its most exploitable as a *musical* product and the business uses that Edison had initially imagined were decisively and irrevocably marginalized (Brooks 1978; Dowd 2002). Popular and official perceptions largely followed suit by locating the industry where it stood and where it was headed, not where it had been. Whereas the Census Bureau's then-decennial manufacturing report at the turn of the century addressed phonograph production within "a supplement to the bulletin on electrical apparatus and supplies" (1902c:181), the same institution informs us only six years later that "this class of instrument may not properly be considered as [an] electrical apparatus" since "it is now considerably used in reproducing music" (1908b:264). (In the 1920s the talking machine's fortunes would become intertwined with another offshoot of the telegraphy field—radio—but by then its place as a tool of primarily musical import was firmly established.)

The media of the new market for reproducing music, as it stood, was composed entirely of cylinder records until more workable versions of Berliner's disc appeared on the market. With the turn of the century, the market had consolidated around burgeoning catalogs of primarily musical recordings to accompany rapidly expanding product lines of record players, both of which were increasingly designed (and priced) to suit consumer tastes (Sutton 2010). The 1900s and 1910s marked the rapid expansion of the industry, the swift and sudden ascension of the shellac disc,[2] and the equally swift and sudden decline of the cylinder format. The opposition

[1] Although the name 'phonograph' originally referred specifically to cylinder record players (particularly those produced by Edison) through at least the first decade of the twentieth century, it became a generic term in American English for *all* record players, regardless of format (Sutton 2010:ix). Throughout this work I will hereafter use 'phonograph' as a generic term, unless otherwise indicated.

[2] Technically, the discs were typically only 13.6 percent shellac—a derivative of the resin secreted by the *Kerriidae* family of insects (Hoffmann and Ferstler 2005:988; Raman 2014). These records are also called 78s, after the most common playing speed for these products, measured in revolutions per minute (Ferstler 2005); by the same token,

between discs and cylinders was supplanted by a new opposition among discs (and their complementary phonographs). On one hand were the lateral-cut discs sold by Victor and Columbia, who each controlled an important patent governing lateral production; on the other, vertical-cut discs sold by a host of challengers (which included Edison, which also stubbornly maintained cylinder production into the late 1920s).[3] Throughout this sustained period of industry growth, the three leading firms—Victor, Edison, and Columbia—zealously guarded their positions through aggressive patent litigation; just as crucially, Victor and Columbia's patent-pooling détente (which essentially amounted to cartelization) allowed them to dominate the ascendant disc market in particular. As the 1910s wound down, however, the patent protections undergirding that domination were either expiring or overturned by lawsuit.

By the 1920s, the industry was now firmly entrenched and in full flower, as the end of the incumbents' patent stranglehold created opportunities for new entrants to the field. The industry also decisively expanded its consumer base beyond bourgeois white urbanites to include black and white rural record buyers, echoing and consolidating ongoing attempts to market recording ephemera to recent immigrants. In the process, the interwar recording industry delivered to mass audiences a host of theretofore novel cultural products—jazz, blues, and country music foremost among them. Meanwhile, the mid-decade advent of electrical recording marked perhaps the most significant technological breakthrough in the industry since the turn of the century. Electrical recording, which utilized microphones for the first time (outside of radio, that is), obviated many of the sound quality and studio capacity deficiencies engendered by the mechanical-acoustic processes used to create all recordings up to that point. The industry's various efforts to reinvent itself were ostensibly thwarted as the industry grappled with the introduction of radio and a global depression apparently pushed it to the brink of total failure.

In the 1930s, an anemic recording industry came under the sway of fast-rising radio and motion picture concerns and began to recover as the decade came to a close. By that time, a wave of failures and mergers had left the industry centered around a new and more dominant triumvirate, *RCA* Victor,[4] a reborn Columbia, and British-owned Decca. As it stands, the above represents a fairly straightforward and compelling narrative, and maybe it's compelling enough that the reader might have a few nagging questions at this point, namely: (1) what's wrong with the literature as it stands? (2) what might a sociological approach have to offer in studying this subject matter? and (3) why study this period of the recording industry in the first place (absent a preexisting interest in the history of the recording industry or any of the sorts of music it captured for profit and posterity)?

So Why Bother?

At least two concerns with the current state of the substantive historical literature spring to mind. First, a major weakness of much of the substantive literature is its reluctance to cleave to more

---

the pre-vinyl history of the record industry (before circa 1950) is often known as the "78 era" or the "78 rpm era" (e.g., Hoffmann and Ferstler 2005).

[3] The distinction between the lateral and the vertical cut refers to the placement of the information-bearing surface within the disc record's grooves, which then guides the movement of the record player's stylus (resulting in the sounds emitted by said record player). For a lateral-cut disc, this surface is in the walls of the record groove; conversely, this surface is the floor of the record groove for a vertical-cut disc. (On this and other topics, Read and Welch [1976] offer perhaps the most thorough overview of the technical aspects of early recording technology. Millard's [2005] presentation is nearly as thorough, with the added benefit of accessibility and style.)

[4] The Radio Corporation of America (RCA) acquired the Victor Talking Machine Co. in 1929 (e.g., Suisman 2009).

reliable data sources when quantitatively describing the scope of the industry's output. In describing the trajectory of the early industry, one would naturally want to turn to sales of phonographs and records; consequently, nearly all historians of the industry have done so in their work. Unfortunately, outside of the largest and most venerable or enduring firms, sales data from this period are either obscure, unreliable, obscure *and* unreliable, or simply lost to (the literal dustbin of) history. Thus, authors who make decisive declarations about sales figures—and then use those suspect figures to support arguments (which are then themselves suspect)—often do so either sans attribution or using sources with a discernible lack of reliability, much to the chagrin of the recording industry's more meticulous historians (for sustained lamentations, see Brooks 1990; Gracyk and Hoffmann 2000:8-11; Sutton 2008:307-10). Employing more reliable data, and leveraging it more systematically (as I try to do here), ought to be a goal for any study, regardless of disciplinary background or substantive interest.

Also concerning—albeit considerably less important from the industry historian's standpoint—is a general aversion against placing developments within the recording industry or the music business in context relative to the shifting political and cultural underpinnings of its market (or of markets in general). A common tendency is to instead treat the history of recording as a series of technical (and occasionally artistic) problems surmounted by technical (and occasionally artistic) ingenuity, with periodic interventions by the profit motive (e.g., *Billboard* 1968).[5] There has not been much in the way of social scientific research on the early recording industry, but nevertheless that research has underlined the importance of meaning-making and shared understandings in nominal 'business decisions' on the part of industry actors (e.g., Roy 2004; Phillips and Owens 2004). Those decisions and the dilemmas of commerce they attempt to mitigate—be they severe recessions or menacing lawsuits—are historically contingent and particularized manifestations of deeper political, cultural, and economic structures (e.g., Fligstein 1990, 1996, 2001). In other words, this is a job for sociologists.

Within sociology, the recording industry has long been a generative empirical site for the social-scientific study of culture (e.g. Hirsch 1972; Peterson and Berger 1975; Lopes 1992; Negus 1999; Roy 2004; Phillips 2013). Through these studies we have a better idea of how, for instance, market concentration and organization might shape (available) musical content (e.g., Peterson and Berger 1975; Lopes 1992), and how consumer tastes relate to (or contest) industry-developed product categories (e.g., Negus 1999; see also Dowd 2007). Most of this research, however, has tended to focus on the industry beginning with the immediate postwar period (i.e., the lead-up to the breakthrough of rock 'n roll) and the decades thereafter. It's worth wondering whether any of those findings are more temporally specific, but despite the consistent allure of the recording industry, sociologists have largely neglected the *early* recording industry.[6] This is, I assume, partly a methodological issue: (relatively) reliable sales and airplay charts exist for the postwar decades all the way up through the present day. The period with which this study is concerned generally lacks such data (see e.g., Brooks 1990).

Fidelity to empiricism aside, this neglect also manifests in sociological work even when the early recording industry was not excluded by virtue of the time frame under study. In a

[5] For otherwise useful examples of this technically-shaded historiography see, e.g., Read and Welch 1976; Sutton 2000, 2008, 2010.

[6] Dowd's (2002) account of the phonograph companies' gradual shift toward marketing their wares as "music machines is a delightful exception to the generally short shrift sociologists have accorded the recording industry prior to World War II.

chapter ostensibly devoted to the ascent of jazz during the 1920s, for instance, Lopes (2002:46-95) mentions only *two* record companies by name, Victor and General Phonograph (pp. 50-51), and even then only one time apiece. Though we are told that "[t]he rapid popularity of jazz music led to its equally rapid spread among musicians" (p. 46), and that the non-professional musicians who first brought jazz into the national consciousness "had opportunities for their music to reach a broader audience in a booming record market following World War I" (p. 47), the recording industry is scarcely discussed at all (unlike, e.g., Schuller 1968). A more direct focus on the recording industry and the commercialization of music does not necessarily help matters, either: articles and monographs by otherwise redoubtable scholars are marred by basic errors of fact, inelegant oversimplifications, or a fundamental misapprehension of some important internal dynamics of the early recording industry (e.g., Peterson 1997; Dowd 2003; Roy 2004; Phillips and Owens 2004).

A typical difficulty along these lines is the incessant slippage between labels and companies. Label names first and foremost are *brand names* (usually trademarked), although it is common in much of the secondary literature to refer to labels as if they were companies (which is inaccurate in many cases given the variation in vertical integration and record production capacity among brands' and trademarks' owners). The problem is not merely one of inaccuracy: it also implies that the analyst has ultimately displaced the locus of agency away from an actual institution deputized by other social actors to participate in a market (i.e., the firm) onto something far more spectral (i.e., the label).[7] It's only sort of true, for example, that "[t]he Brunswick Record Company in the early 1920s was one of the major producers of phonographs and records" (Roy 2004:275), because there was no 'Brunswick Record Company.' There was, however, Brunswick-Balke-Collender, which wasn't founded in 1919 (as stated in Phillips and Owens 2004:283), but traced its origins all the way back to 1845 (Martin, Lehman, and Malonis 1995:174). And it simply isn't true that "acquisition of Vocalion Records in 1924 gave [Brunswick] a strong presence in race records and hillbilly music" (Roy 2004:275). First of all, there was no business called "Vocalion Records": Brunswick had acquired the phonograph and record making assets of the Aeolian Company, one of the nation's leading piano manufacturers; Vocalion was the name of Aeolian's record label at the time of acquisition (Roell 1989; Sutton 2000). Secondly, as regards race records at least, Aeolian was no leader by any stretch of the imagination, having released "just over two dozen race records on its Vocalion label in 1923 and 1924" performed "by minor artists, such as Lena Wilson, Viola McCoy, Rosa Henderson and Edna Hicks, who went the rounds of the smaller companies" (Dixon and Godrich 1970:32);

[7] In other instances, writers use labels as synecdoches for companies—which is not actually a problem when considered in isolation, but it can be misleading in a context where labels are often treated as companies. It's not really germane to the elements of the industry that this dissertation emphasizes, but my sense is that the source of the problem is a failure to recognize the master supply relationships that enabled the existence of so many different labels (despite a fairly small number of manufacturers). Several companies in the industry's middle tier leased master recordings and/or records they had made for retail use by other companies; in many instances these other retailers were selling recordings that had previously been sold under a different label (see Sutton 2000 for a litany of examples). The Starr Piano Company, one of the more durable firms of the industry's middle stratum during the 1920s, is but one example. Making records for other companies who had no studios or record pressing plants of their own was a vital part of Starr's record business (Kennedy 2013), and like several other companies, Starr marketed a second label (drawing from their existing stock of recordings) as a low-effort means of diversification (again, see Sutton 2000). While continuing to sell their main Gennett label, Starr Piano began marketing the more affordable Champion label in 1925. "The same recordings often were issued on both labels, but on Champion the artists were given pseudonyms so the purchasing public would not realize they could get 75¢ music for 35¢" (Cohen 1971:189).

Brunswick's acquisition did, however, boost their *classical* catalog (Sutton 2008:119).

Some of these are inherited deficiencies from industry historians' lapses (see above), but we are all ultimately responsible for the credulousness with which we interpret our sources, primary, secondary, or even tertiary. The work of Allan Sutton, for instance—whose work is cited throughout this text (e.g., Sutton 2018)—represents a valuable resource for outsiders like myself looking to understand the early record business (even when addressing the casual neglect of social structure that sociologists have come to expect from non-sociologists). His reliance on primary source evidence (e.g., surviving company archives, patent and copyright filings, Census Bureau reports, trade papers, disc and cylinder records themselves) and his ability to leverage the collective accumulated wisdom of sound preservationists and collectors lend considerable reliability to his revisionist accounts of recording history. Sutton, in prolific fashion, epitomizes more recent generations of scholarship on the recording industry in his eagerness to dismantle the mythic cast of earlier histories (for more genre-focused instances, see Wolfe 2002; Wald 2004; Miller 2010). But this work is outside of sociology in particular and academia in general and is far more familiar to specialists. The Association for Recorded Sound Collections (ARSC), the leading organization committed (since 1966) to the "preservation and study of sound recordings—in all genres of music and speech, in all formats, and from all periods" (ARSC 2017:n.p.), awarded Sutton a Lifetime Achievement Award, which ought to signal to scholarly dilletantes the esteem in which he is held by his peers; nevertheless, fairly well-regarded monographs and articles by academics have seldom cited his work.[8] Scholarly work has failed to keep pace with the state of the art among those whose expertise actually centers on the history of sound reproduction.

Crescendo and Diminuendo in Green

The evolving history of any market can be characterized cyclically with three phases: "emergence, stability, and crisis" (Fligstein 2001:75). In the emergent phase, market actors collectively develop notions about the nature of participating firms and the market's core commodities; the extent to which consensus coalesces around such notions (especially conceptions of control) enables a stable market to form and firms manage to compete without ensuring mutual destruction (pp. 75-76). Crisis arrives when the continued existence of those firms is threatened by diminished demand or the erosion of the rules of the market's game; this forces a reconsideration of the relations both between and within firms, and creates major opportunities for transforming the market (pp. 76, 83-86). What follows in these instances is a renewal of the emergent phase. "The reorganization of a market around a new conception of control resembles a social movement and is very much like the formation of raw markets"

[8] In its citation, the ARSC proclaimed that Sutton "has done as much, or more, than any member of ARSC, past or present, to further people's knowledge of the history of the phonograph, discography, and just about any aspect of recorded sound in the cylinder and 78 RPM era" (ARSC 2019:n.p.). His most widely used and broadly useful work has been his 1994 *Directory of American Disc Record Brands and Manufacturers* (1994), which has been substantially revised twice (Sutton 2000, 2018). Consider then, that neither Kenney (1999), Millard (2005), Suisman (2009), nor Miller (2010)—whose (academic) monographs are squarely focused on the music business before World War II (and the first two address the recording industry specifically)—cite Sutton at any point, despite having published their work after (at least) the first iteration of Sutton's most comprehensive work. The fact that Sutton's work since 1999 has been confined to the small independent publisher he runs has no doubt contributed to the limited citation of his work.

(Fligstein 2001:83).

The phonograph industry almost certainly experienced periods of stability and crisis between 1899 and 1939, but pinpointing the moment at which the phonograph industry had fully emerged is difficult; nevertheless, several of its key features had clearly been established by the turn of the century. Most importantly, a collective understanding of the nature of the product had congealed: success in selling recordings (especially by Columbia) and the accompanying underachievement of the expected business applications had demonstrated the musical viability of talking machines and paved the way for phonograph manufacturers' full and self-conscious participation in the music business (Brooks 1978; Dowd 2002). Additionally, this early period's prevailing conception of control—market hegemony via aggressive patent enforcement and patent pooling—was consecrated when, at the close of 1896, Edison and Columbia agreed to share the market for cylinder records and cylinder players (phonographs proper and graphophones) by exchanging patent licenses and dropping pending litigation against each other (Wile 2006; see also Sutton 2010:xiv). In the memorandum that codified the pact, the firms acknowledged that "no commercially competitive machine can be manufactured without infringing the patents of both interests" and agreed to collaborate both in protecting their overlapping patents and in "proceeding against all third persons who may infringe" them (quoted in Wile 2006:205). By the end of the decade, both companies had also managed to produce relatively inexpensive talking machines for domestic consumption (Millard 2005:123-24). The next twenty or so years (circa 1899 to 1919) were largely ones of stability, as Edison, Columbia, and Victor—which had quickly exploited the market for disc records and disc players—thoroughly dominated the industry and beat back the assaults of challenger firms through patent control (Sutton 2010). As a trade magazine baldly put it in 1917, "The talking machine business [is] one of special privilege based upon patents" (quoted in Kenney 1999:49). Those patents, however, were voided or expired by 1920, and a period of crisis ensued (Millard 2005; Sutton 2008, 2010).

The next two decades (circa 1919 to 1939) were far rockier than the two that preceded them. The industry struggled to redefine a new normal for itself and the makings of new consensus—built on expanded musical offerings and improved recording quality—foundered in the face of the Depression. Contrary to most accounts, which frame radio as a near-mortal threat to the survival of the recording industry in the 1920s (e.g., Millard 2005), the evidence supports the more nuanced position which posits a mutualistic relationship between the talking machine and the wireless telegraph (Sutton 2008:131-44). The industry survived the early years of the Depression and managed a robust recovery from the middle of the decade onward by pairing horizontal integration with the innovations (both reportorial and technical) of the prior decade. This period of stabilization was punctuated by another rupture—this time created from within by the 1942-44 Petrillo Ban, coupled with wartime restrictions on shellac (e.g., Sutton 2018)—but the wartime and postwar recording industry is another story for another text.[9]

[9] "In the end, industry experts estimated that the AFM ban had done little damage to most record companies, and might actually have helped some" (Sutton 2018:xx). This "some" included the newer companies, like Decca and Capitol, who cut into RCA and Columbia's market share by negotiating deals with the musicians' union before their peers were willing to do so. These four firms represented 'the majors' of the early postwar period and, as Sutton notes, it surely cost RCA and Columbia (the older pair of the quartet) to reach agreements with the AFM over a year after the other two had made their respective agreements (late 1944 versus late 1943).

Data

Census of Manufactures

The data I rely on here is predominantly drawn from the U.S. Census Bureau's anonymized surveys of manufacturing concerns, which were conducted every five years from 1899 to 1919 and every odd-numbered year during the 1920s and 1930s; for 1899, 1909, 1919, 1929, and 1939, the data was collected as part of the decennial census for the following year (U.S. Bureau of the Census 1902a, 1902b, 1902c, 1907, 1908a, 1908b, 1913a, 1913b, 1917, 1918a, 1918b, 1919, 1923a, 1923b, 1924, 1926, 1928, 1930, 1932a, 1933b, 1935, 1936, 1938, 1939, 1942a, 1942b). World War II delayed the first post-Depression census of manufactures until 1947 (U.S. Bureau of the Census 1949, 1950); data from that year is used only sparingly here to provide additional context (see figures 2.1, 2.3, and 2.4). Save a handful of exceptions, all figures for a given year come from the relevant Census report for said year.

The scope of the censuses of manufactures is broad, intended to cover all manufacturing firms producing goods for general consumption (i.e., market commodities) within the United States over the course of a given year; included firms are then classified on the basis of industry. Despite the broad ambit of this data, only those establishments whose output is valued above an arbitrarily defined threshold are included in tabulated figures. In the period under consideration, that value was $50 until 1919, but it was raised to a noticeably higher level of $5,000 for the first biennial census of manufactures in 1921 (U.S. Bureau of the Census 1924). On its face, this raises important concerns regarding comparability but, in an uncharacteristic moment of helpfulness, the 1921 census's figures include data on the newly-excluded firms, even as their contributions were uncounted in industry totals. Comparing the included firms with their unenumerated counterparts, the change would have only had a significant impact on the number of firms included, but *not* on the size of the relevant industries' attendant labor forces or the valuation of their output. For each of the musical manufacturing industries (including phonographs), inclusion of the smaller firms would have increased the sum product value and number of wage-earners by less than two percent.[10] A census of manufactures is not a compendium of knowledge about specific firms, but instead a repository of industry-level data for the country (and various geographic subunits thereof).

From the perspective of the Census Bureau, industries are classified on the basis of commodities with presumed similarities. Naturally, then, the boundaries of Census-defined industries have changed over time, as perceptions of various commodities changed. Table 2.1 shows how the primary physical commodities of the music business have been classified over time. As can be seen, the categories remained fairly stable until the onset of the Depression, when phonographs and records were annexed by the 'new' radio industry. (The reader will also note that a distinct music publishing category is deprecated after 1931.) Furthermore, *industry-level data is limited to those firms whose "primary products" belong to a given industry*. If we take seriously the notion of industries and markets as fields, however, this isn't an obstacle to a rigorous study of any particular industry—the Census Bureau has merely laid out for us the firms

[10] Even then, the change in the minimum threshold for the 1921 Census of Manufactures only significantly altered the number of firms that were counted for the instrument makers whose primary products were *not* pianos or organs (76.7 percent reduction), phonograph makers (12.3 percent), and music publishers (31.8 percent). Again, as I point out above, the change had virtually no impact on the valuation of each industry's output or the number of wage-earners employed, meaning that the omitted firms were small (suggesting that they practically didn't count both literally and figuratively). For more details on the comparison between included and excluded firms, see table A1.

Table 2.1. Census industry classifications for selected commodities, 1899-1947

	1899	1904	1921	1923	1927	1929	1931	1933	1937	1939	1947
Sheet music	Printing and publishing, music							Printing and publishing, book, music, and job			Miscellaneous publishing
Pianos	Musical instruments, pianos and materials	Musical instruments, pianos			Musical instruments: Pianos					Pianos	
		Musical instruments, piano and organ materials			Musical instruments and parts and materials: Piano and organ					Piano and organ parts	
Organs	Musical instruments, organs and materials	Musical instruments, organs		Musical instruments, organs and orchestrions	Musical instruments: Organs					Organs	
Other musical instruments	Musical instruments and materials, not specified		Musical instruments and materials, not elsewhere specified		Musical instruments and parts and materials, not elsewhere classified						Musical instruments, not elsewhere classified
Records	Phonographs and graphophones		Phonographs		Radio apparatus and phonographs			Radio, radio tubes, and phonographs			Phonograph records
Phonographs											Radio and related products
Radios	Electrical machinery, apparatus, and supplies										

Note: Dashed lines indicate an industry classification was renamed without significant redefinition of its boundaries. (From 1904 until 1927, Census reports considered the phonograph industry as a subset of a broader musical instrument industry group; this supracategory was deprecated beginning in 1947. Additionally, Census figures during the covered period have consistently distinguished among [1] pianos, [2] organs, and [3] piano and organ materials; nevertheless, reports from 1909 until 1914 treated them as a single industry with three distinct subclasses.)

which have the most direct stake in the field for which the industry classification serves as a proxy. For instance, Victor, Edison, and Columbia—the unquestioned leaders of their field for the majority of this early period—were founded (and persisted) as purveyors of phonographs and records. Similarly, the largest piano manufacturers were first and foremost piano makers (Roell 1989), while the leading distributor of radio receiving sets and the owner of the largest broadcast network of the interwar period, the Radio Corporation of America (RCA), was (as its name would suggest) grounded in the radio business (see U.S. Federal Communications Commission 1941).

With the foregoing in mind, my focus in this chapter is on those industries centered around musical instruments, sheet music, phonographs, records, and radios—phonographs and records being most salient to my interests, of course. To account for the absence of a dedicated radio industry classification prior to 1931, I use production figures for the following electrical machinery product categories as a proxy for a radio manufacturing industry: "wireless telegraph apparatus" (1904, 1909), "wireless apparatus" (1914), "radio and wireless" (1919), "radio apparatus, both telephone and wireless apparatus" (1921, 1923), "radio apparatus, including tubes " (1925), and "radio apparatus and tubes" (1927, 1929).[11] To give a sense of how crowded this economic sector and its constituent industries were in 1899 (and for forty years thereafter), figure 2.1 depicts the number of firms (classified by industry) whose primary products were recognizably musical manufactures—sheet music, instruments, phonographs, records, and (from 1931 on) radios—and whose output surpassed the arbitrary, but minimal threshold prescribed by Census Bureau schedules.

Perplexingly underutilized, the censuses of manufactures represent a valuable resource for examining the fortunes of the early recording industry and the phonograph industry that initially encompassed it. As mentioned earlier, reliable sales data is decidedly hard to come by; furthermore, those figures which are trustworthy do not have especially wide availability (e.g., Columbia's company archives, now privately held by Sony). Industry-level production, employment, and compensation figures are, on the other hand, (mostly) reliably represented in the Census data from the time of the industry's solidification at the turn of the century until the eve of the wartime recovery which followed the Depression. Given the kinds of available information and the lengthy period over which they were collected, we are able to properly bookend many of the major developments which took place in the first half-century of recorded music, as well as sidestep the brinksmanship which would inevitably shade businesses' public discourses concerning sales and productivity in trade publications and contemporary news reports. I am in no way claiming that such discourse is useless in a study of the industry; Sutton (2000, 2008, 2010, 2016, 2018), to name but one example, has made great use of these materials as primary sources. I am claiming, however, that the industry considered as a collective body has a reality which is distinct from that of the individual firms which comprise it—and this data is the best way to access that reality. (The idea that collectives have an existence apart from their

[11] The manufactures report for 1929 (U.S. Bureau of the Census 1933b:1124, 1128) includes a series of wholesale revisions for the radio apparatus product value totals for 1923, 1925, and 1927—but no indication is given as to the nature of the recategorization. (I compared the 1923 and 1927 breakdowns with the revised totals, and no clear principle was apparent in distilling the new figures from the old.) Thus, the numbers used here reflect the totals listed in the 1927 and 1925 reports (U.S. Bureau of the Census 1928:1004, 1008; 1930:1056, 1060). The figures from 1921 and 1923 (consistent in both reports) were revised upward in subsequent reports to include the value of radio tubes, and the 1925 totals were subject to a slight upward revision of just over 1 percent (which is not abnormal in my experience with Census Bureau figures for other industries).

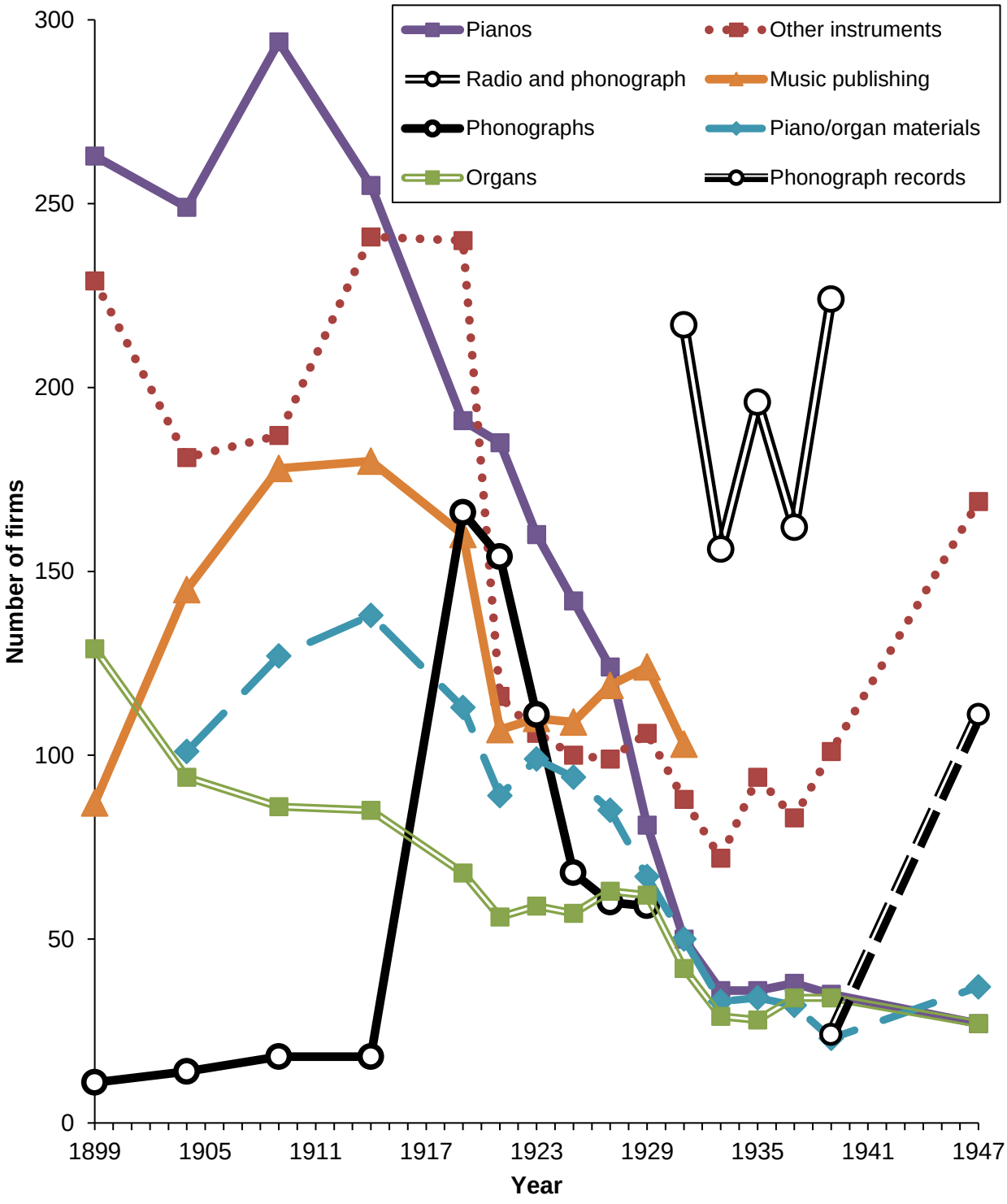


Figure 2.1. Number of firms by Census classification for eight industries, 1899-1947
Source: U.S. Bureau of the Census.
Note: Industry classifications that were the designated 'home' for records and phonographs are plotted using hollow circles, the various musical instrument makers using squares. The "phonograph records" category was not added until the 1947 Census of Manufactures, but the accompanying report (U.S. Bureau of the Census 1949:739) indicated how many such firms would have existed in 1939 had the new classification been applied then.

constituent elements is, of course, one of the most basic contentions of the sociological enterprise.) More specifically, I rely here on statistics related to output and employment (with a particular emphasis on the former).[12]

Production output is measured in a few different ways, three of which I utilize here. In each census-taking, firms reported (1) the cash value of their products for the year, which were then aggregated for the firms' respective industries. The Census Bureau supplemented these totals with specific figures for particular classes of commodities produced (e.g., phonographs, pianos)—regardless of industry—which included (2) the cash value of those commodities and, depending on the year, could also include (3) the number of units produced (volume).[13] Products' value was not an indicator of their cost of production, but their "selling values" (e.g., U.S. Bureau of the Census 1932a:5). In 1929, however, volume and value were typically presented in terms of units *shipped* (i.e., sales), not units produced. (This was also the case in the 1947 report.) There are a handful of tokenized references to production output within the existing literature; even then, writers have avoided paying sustained attention to possible long-term trends in such figures, have rarely controlled for inflation, and have occasionally (and perhaps more distressingly) conflated this data with *sales* data. (These texts are by no means exceptional, but see Millard 2005:49, 72; the otherwise redoubtable Sutton 2008:25, 261; and Mazor 2014:22.)

In lieu of reliable sales data, however, such figures are more than adequate proxies for the health and profitability of the relevant industries and commodities. Indeed, data from censuses of manufactures became a valuable source of information for market actors across industries as they attempted to track relevant developments in the national economy (U.S. Bureau of the Census 1932b:3-4). Since the interests of the firms which dominate the field are "bound up with the overall state of the field, defined, in particular, by the average opportunities for profit it offers, which also define the attraction it exerts (by comparison with other fields)" (Bourdieu [2000] 2005:79), output data can help us identify periods of expansion and contraction in the industry. As firms attempt to match their output to meet observed demand, we would expect production to reflect those firms' near-term economic fortunes (e.g., their production capacity). By that token, *consistent or consistently rising output value (controlling for inflation) should indicate a stable industry; conversely, erratic or consistently declining output value indicates an industry in crisis.*

Census figures measure employment via the number of "persons engaged" in a particular industry, which was tabulated in a consistent manner through 1929. As calculated by the Census Bureau, this figure is the sum of the number of proprietors, the number of salaried employees (officers, managers, and clerks), and the *average* number of wage-earners (which was calculated by determining the number of wage-earners in all establishments at or near the fifteenth of the month and taking the mean of the twelve monthly totals).

---

[12] The Census Bureau (1913a:21) did measure *capital*, defined as "the total amount of capital, both owned and borrowed, on the last day of the business year reported" or "[a]ll the items of fixed and live capital" in the first two decades of the period covered in this chapter. However, a 1916 report openly bemoaned the fact that the capital data "have been so defective as to be of little value except as indicating very general conditions," adding that "it has been repeatedly recommended by the census authorities that this inquiry be omitted from the schedule" (U.S. Bureau of the Census 1916:2)—which it was, but not until a final attempt in 1919.

[13] Phonograph and record output figures are explicitly presented as being tabulated regardless of industry from the 1927 Biennial Census of Manufactures onward (see, e.g., U.S. Bureau of the Census 1930:1219); these numbers are listed seriatim with earlier numbers, which may have been narrower in scope.

Other Official Statistics

The aforementioned information being limited to manufacturing, it was necessary to supplement it with data drawn from the standard sources of various longitudinal series for the United States' economic and demographic history, *Historical Statistics of the United States* (e.g., U.S. Bureau of the Census 1975; Carter et al. 2006). References to the gross domestic product, radio coverage (households with radio and number of stations), and price indices are drawn from the most recently published omnibus edition of national figures, successor to the Census Bureau's *Historical Statistics* (Carter et al. 2006; Field 2006). Meanwhile, estimated numbers of households in the country (to estimate radio coverage as a share of the total) have been taken from an earlier volume (U.S. Bureau of the Census 1975), on account of their curious omission by Carter et al. In keeping with best practice (e.g., Tufte 2001:64-68), I also control for inflation in presenting output values. As Officer and Williamson (2006:103) point out, the consumer price index (CPI) is "a measure best used for 'ordinary' commodities, such as milk, bread, haircuts, and gasoline," making it largely insensitive to significant variances in prices among different markets and "less appropriate for goods subject to rapid technological change" (Officer and Williamson 2006:103). Given the inappropriateness of the CPI's one-size-fits-all approach, I instead use an implicit price index (IPI) for "consumer durables" (Atack and Bateman 2006)—a category which applies to most of the commodities of interest here.[14] All inflation-adjusted figures have been calculated relative to 1899.

The Home Equipment Survey

Lastly, I utilize the Home Equipment Survey (HES) conducted in 1925 and 1926 by the General Federation of Women's Clubs (GFWC). The HES was a nationwide study of American families' access to modern technology, namely, public utilities, telecommunications devices, home appliances, and a specified set of recreational commodities including the piano, the phonograph, and the radio (Sherman 1926a, 1926b, 1927a, 1927b; U.S. Congress 1929: 2439-45; Wells 1953:184-87; Larson 1992:217-29).[15] By its completion, the HES had surveyed almost eight

[14] Sheet music, and published materials more generally, are classified by Atack and Bateman (2006) as "semidurables."

[15] The HES was enabled by a unique confluence of interests. First and foremost, it was the work of the GFWC, which had demonstrable political influence at the time. It represented over 14,000 active clubs and at least three federal departments contributed to the Federation's survey committee (Greer 2014:221, 291n55). According to GFWC president Mary Sherman (1926a:36), who spearheaded the initiative, "The survey had for its original object the creation of public sentiment and an active demand that homemakers and home equipment should be included in the next U.S. Census." Furthermore, the GFWC wanted "to determine the conditions under which American homes are run, their mechanical equipment and cultural opportunities" (Sherman 1926a:36). Unable to fund the massive undertaking on its own (its considerable social capital notwithstanding), the GFWC enlisted financial support from several patrons, the first of which were the *Woman's Home Companion*, then one of the nation's most popular magazines geared toward women, and the National Electric Light Association (NELA), a trade association of various light and power companies (U.S. Congress 1929:2439-45; Wells 1953:184-87; Zuckerman 1995). The *Companion* funded the HES in exchange for the right to be the first to publicize its findings; the magazine's publishers were no doubt also interested in knowing more about its readers' consumption patterns and, thus, how to better advertise to them (Larson 1992; Zuckerman 1995). Similarly, NELA was eager to obtain nationwide data on the consumption of their wares (Sherman 1926a; U.S. Congress 1929:2440-41).

The resulting project was a novel political and economic intervention. The HES clearly made an impact and proffered some useful information, as evidenced by the inclusion of GFWC President Mary Sherman's 1928 report regarding the survey (and subsequent Federation data-gathering initiatives) in the *Congressional Record* and the Census Bureau's decision to treat homemaking as an occupation in the 1930 decennial census (U.S. Congress 1929;

million households (Larson 1992:218). The method of data collection was mostly unobtrusive—armed with the latest estimates of their respective communities' sizes, deputized club officials queried local officials, utility companies, and retailers; only in select cases were household members interviewed directly (Sherman 1927a; U.S. Congress 1929:2440; Wells 1953:186; Greer 2014:223). If only by virtue of its scope, the HES was unprecedented: the practice of market research was still very new and the Census Bureau would not undertake a national survey of retail distribution until the decade's end (Sherman 1926a; U.S. Congress 1929:2440; Larson 1992:204-06, 217-29). The HES also became a recurring reference, both then and now, in studies of interwar household consumption (e.g., Wolman 1929; Kline 2000). Of particular interest here, the HES produced data on piano, phonograph, and radio ownership for over a million households in each instance (*Talking Machine World* 1927).

As with any survey, the HES should be treated with caution; conversely, though, there are signs that point to its utility. The sample was clearly tilted towards urban households, which were roughly nine of every ten reporting ownership (or lack thereof) for pianos, phonographs, and radios (*Talking Machine World* 1927; see also Wells 1953). Furthermore, given the bourgeois tendencies of the women's club movement (e.g., Zuckerman 1995), the rural subsample was likely biased toward households that were more likely to have access to the trappings of modern material comfort that the survey was meant to quantify (Kline 2000:96); Larson (1992:218) further notes that the study "did not branch beyond clustered communities, into the open country." The GFWC was not unaware of the short shrift they'd given to rural America, however, and launched a follow-up survey dedicated to farm households in 1926 after the HES's completion; these questionnaires were sent directly to respondents (U.S. Congress 1929; Wells 1953; Larson 1992). Despite the shift in method and population, relative rates of piano, phonograph, and radio ownership paralleled those in the original HES (Larson 1992:224; see below). Furthermore, there is at least some existing data to which we can compare the HES, and the HES does not suffer for said comparison. Unlike phonograph and piano ownership, widely-used estimates of the number of radio households exist (Field 2006); thankfully, the overall rate of radio ownership in the HES tracks well with those estimates (again, see the discussion of the HES results below).

U.S. Bureau of the Census 1933; Wells 1953:189; Greer 2014). It also provided a model for New Deal-era housing evaluation studies (Greer 2014:220-25). In short, the HES was a large-scale attempt to catalog the state of American households so as to make visible and subsequently improve the lot of American housewives via American-made conveniences (see, e.g., Sherman 1926a, 1926b; Larson 1992).

The GFWC divided its questionnaire into six sections, which Sherman (1926b) summarized as public water supply, garbage disposal, heating systems, gas, electrical equipment, and recreational equipment. The questions of that last section, "Equipment of Homes with Telephone, Educational and Entertainment Facilities," were as follows:

> 1. How many families are shown by the telephone company records to have telephones?
> 2. How many families have automobiles as shown by tag or tax records? […]
> 3. What do the personal tax lists and the combined figures of sales by local merchants show as to the number of families who have (a) Radio sets? (b) Phonographs? (c) Pianos?
> 4. What are the library facilities of your community? (Sherman 1927b:32)

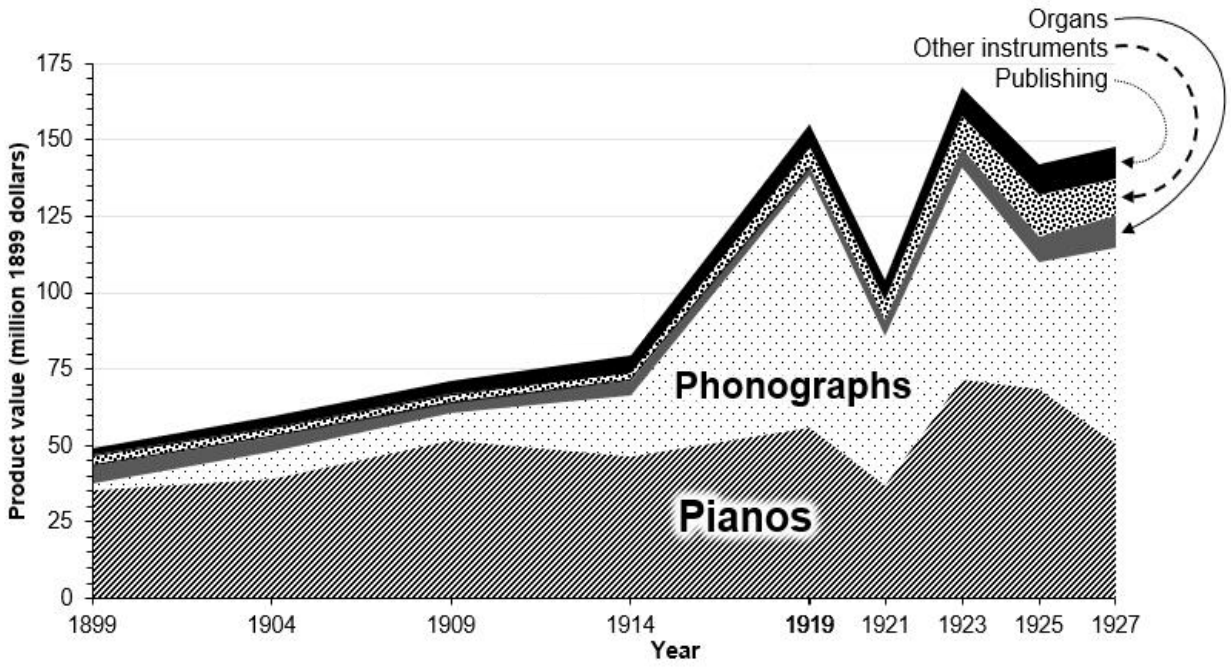


Figure 2.2. Output value for the piano, phonograph, organ, other instrument, and music publishing industries, 1899-1927
Source: U.S. Bureau of the Census.

Pax Victrola

The years between 1899 and 1919 were boom times for the record and record player business (e.g., Millard 2005:65-66). The industry was growing an order of magnitude faster than the economy as a whole: whereas the real GDP 'only' increased by 32.6 percent between 1899 and 1919 (Carter et al. 2006), the (adjusted) value of phonographs and records produced was, respectively, thirty-eight and forty-three *times* greater between those points in time. The industry also demonstrated a remarkable amount of early resilience relative to national economic fortunes during this period. After the 1907 bank panic had become a full-blown depression by the following year (e.g., Cahill 1992), Columbia head Edward Easton slashed employment and payroll at all levels to bring his company back from what seemed to be "the verge of failure" (Brooks 2002:33).[16] Nevertheless, by 1909 the record and phonograph output of the industry was significantly higher than it had been at the previous census of manufactures in 1904.

The expansion and eventual crisis of the phonograph industry are visible in a series of charts—all of which will inform much of the remainder of this chapter. Figure 2.2 depicts the cash value of the industry output relative to the other musical manufactures—pianos, organs, piano and organ materials, other instruments (other than organs or pianos), and music publishing; each layer on the graph corresponds to a particular industry classification. Figure 2.3 depicts the cash *value* of phonograph and record production and also includes the total output of the phonograph industry as a point (or rather, a series of points) of reference. Figure 2.4, parallel to

[16] This premonition of doom is from the archived recollections of Easton's daughter, who remembered "dark days" for her family in that time (quoted in Brooks 2002:33).

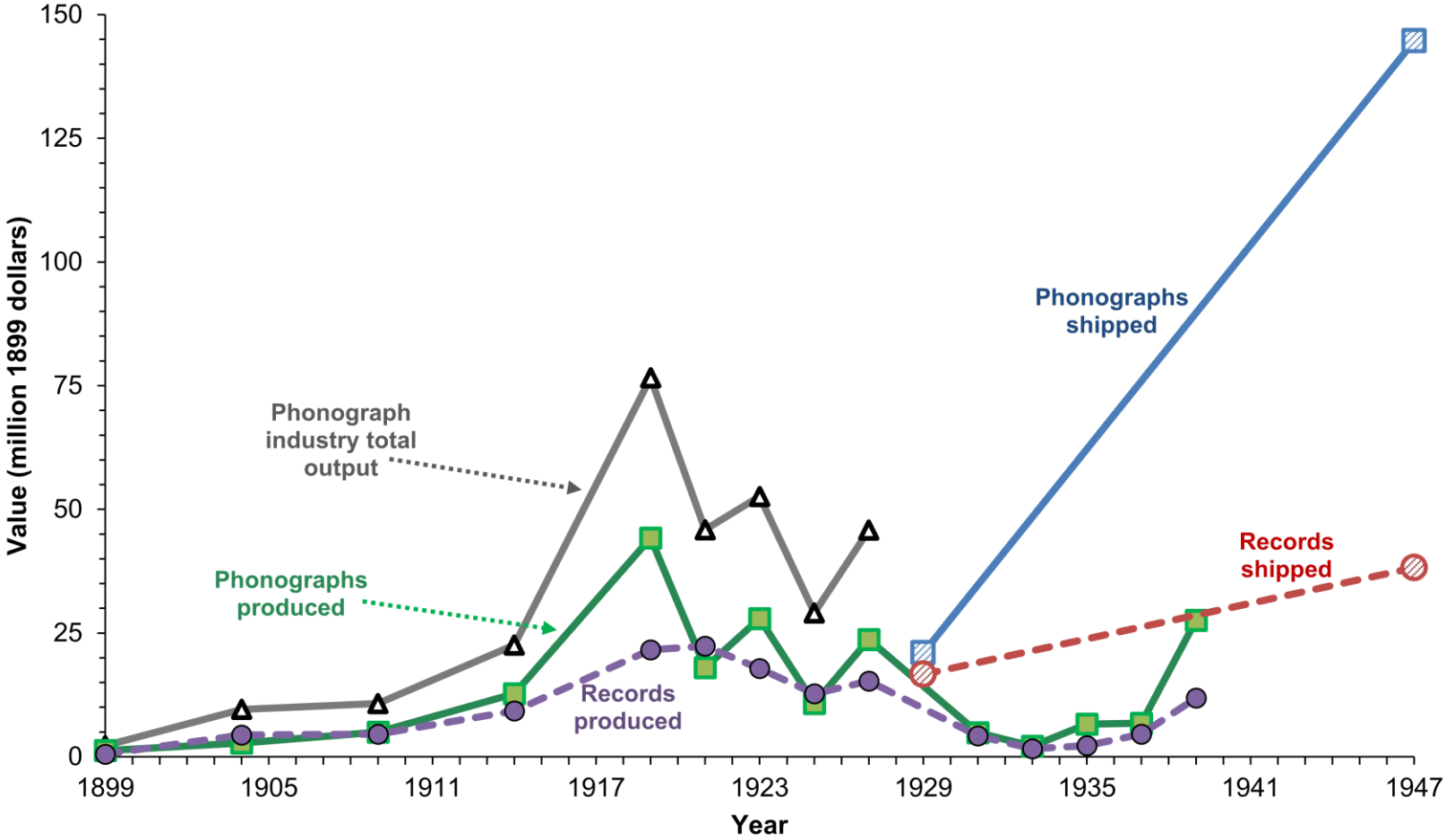


Figure 2.3. Cash value of phonograph industry production output; cash value of phonographs and records (production and shipments), 1899-1947

Source: U.S. Bureau of the Census.

Note: To ensure comparability, David and Solar's consumer price index (Lindert and Sutch 2006) was used to control for inflation in this figure, since the implicit price index for consumer durables (Atack and Bateman 2006) used elsewhere in this chapter ends with the year 1939.

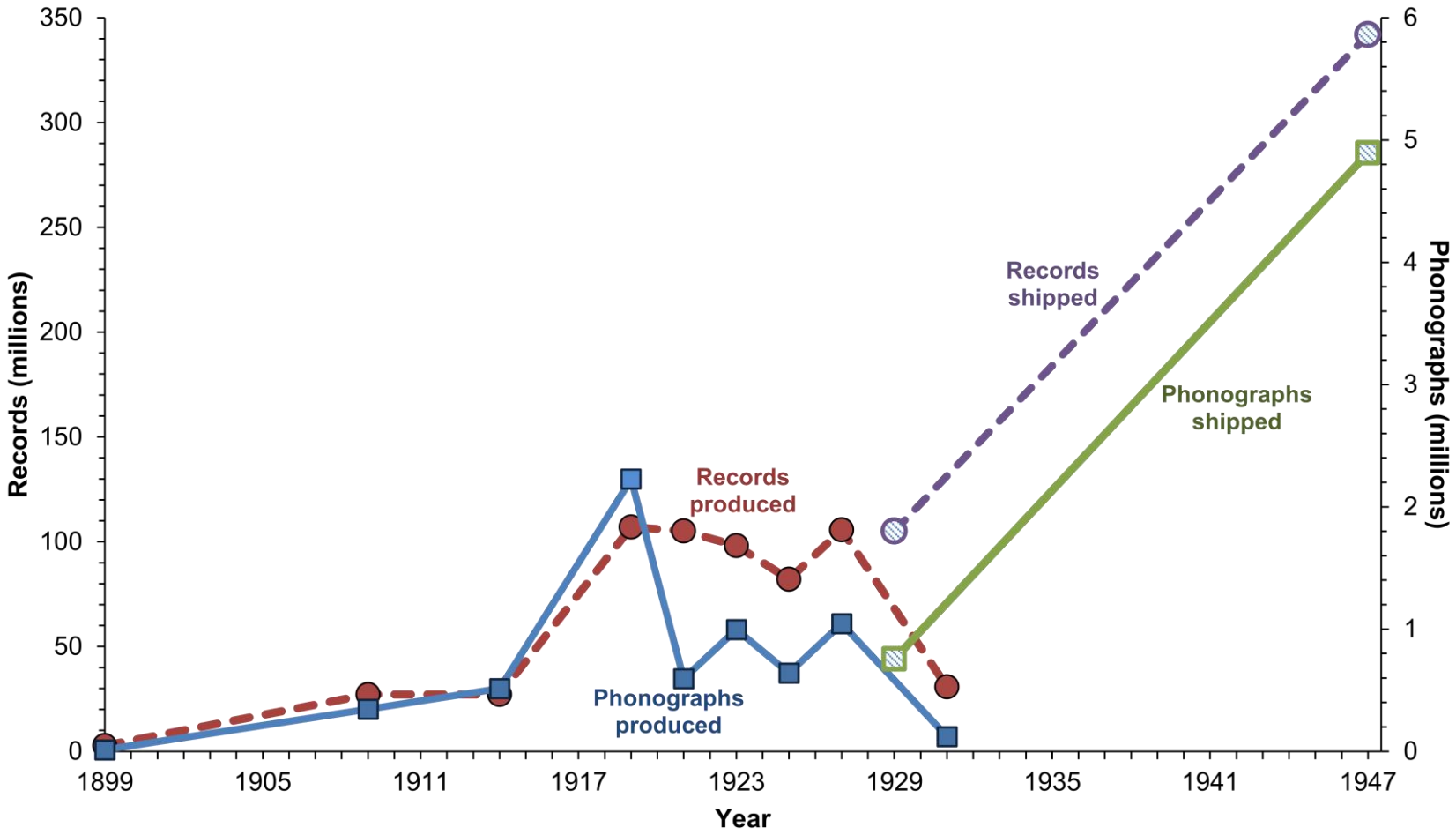


Figure 2.4. Unit volume of phonograph and record output (production and shipments), 1899-1947
Source: U.S. Bureau of the Census.

figure 2.3, plots the *volume* of phonograph and record production. Both charts also allow us to track the primary products of the industry after the Census Bureau deprecates the dedicated phonograph industry category in 1931 (see table 2.1). Figures 2.3 and 2.4 also incorporate phonograph and record *shipments* expressed, respectively, in terms of cash value and volume for 1929 and 1947 (to compensate for the absence of production figures in 1929 and the wide gap between the censuses of manufactures in 1939 and 1947) (The 1929 numbers are especially important since they can help us avoid exaggerating the still-adverse effects of the Depression given that there would be no data point between 1927 and 1931 otherwise.)

The phonograph industry's early growth was reflected in its standing amongst musical manufactures. As depicted in figure 2.2, the value of these industries' collective output (in constant dollars) steadily increased after the turn of the century, more than tripling by 1919. (The piano and organ materials industry, well represented in Census figures and included in figure 2.1, has been omitted here because of its explicit role as a before-market supplier for the piano and organ industries. Its output was input for its counterparts, which suggests that including it in a graph of output value would inflate the collective total, since the value of the piano industry and the organ industry's respective outputs reflect in part the costs incurred buying from firms in piano and organ materials [e.g., U.S. Bureau of the Census 1918a:3].) As figure 2.2 also shows, most of this growth was driven by the phonograph industry. In 1899 it had the smallest output in terms of value, but by 1919 its output's value had completely outstripped that of its would-be neighbors. The clear leader at the outset of these two decades was the piano industry, and it consistently represented a significant share of the value of musical manufacturing, but only the phonograph industry's output consistently grew in value when controlling for inflation. In 1899, the output of the piano industry was sixteen times that of the phonograph industry; it was roughly two-thirds as large three decades later. By the same measure, the other industries among the musical manufactures were nearly stagnant in the same period (which, among other things, belies the nominal pace of growth in music publishing). In comparing output for specific commodities, 1909 was the last year that (according to Census figures) that more pianos were made than phonographs (and here, it was only a 1.06 to 1 ratio; see figure 2.8 below). In sum, all of the preexisting musical manufactures were declining relative to the phonograph industry. Suisman (2009:200) credits the phonograph industry's startling rise in 1914-19 in particular to a "dramatic expansion of music across the soundscape during the war," but if that was so, phonographs nearly monopolized the spoils.

The complex and contingent interplay of competition, cooptation, and cooperation both within and between the various industries—and the rising significance of the phonograph business among them—was perhaps best exemplified during this period by the landmark Copyright Act of 1909 (Suisman 2009:159-60). The debate centered on music rolls (for use in player-pianos) and recordings, namely, whether the musical works they reproduced obligated their manufacturers to pay royalties to songwriters and publishers. The new law did ultimately mandate such royalty payments—the so-called "mechanical royalties"—and thus "put the power of the state behind a particular definition of 'making' music [i.e., manufacturing musical commodities]" (Suisman 2009:175). The 1909 copyright revision was shaped by "the atmosphere of the times, when Theodore Roosevelt had won reelection because of his trust-busting activities and general antimonopoly legislation" (Sanjek 1988a:398), but it also owed its genesis to an evolving body of jurisprudence struggling to come to terms with new technologies, the efforts of music publishers to institutionalize a new property right, and the countervailing struggle of instrument and phonograph manufacturers to curtail said property right and preserve

existing profit margins (Sanjek 1988a; Roell 1989; Cummings 2013).

Consequently, a number of interests were at play. Initially unconcerned by the initially marginal technologies of piano rolls and records, publishers became concerned mechanical reproductions could reduce consumer demand for their songs by overexposing them—or, at minimum, they saw the boom in roll and record sales and wanted what they saw as their fair share for producing a key ingredient of that success (e.g., Cummings 2013:21; Suisman 2013:160). In response to songwriters' and publishers' complaints (especially the most successful among them), who had theretofore unenforceable demands for compensation from mechanical music, record companies asserted that copyright holders ought to be grateful for the free promotion, which (somewhat ironically) presaged later debates on the rights of record-makers vis-à-vis radio (Suisman 2009:163, 170, 175; Sutton 2010:207).[17] John Phillip Sousa, one of the country's most popular and prominent composers, testified at a 1906 hearing in support of increased copyright protections—despite having led some of the early recording industry's more prolific ensembles (Warfield 2009).[18] Sousa drew explicit parallels with existing protections for other kinds of intellectual property, criticizing the arguments of the maker of a "reproducing apparatus" who favored the status quo: "Asked if he was not protected in his patents, his answer was promptly in the affirmative, but he seemed wholly unable to grasp the proposition that a composer should ask for similar protection in his creative work" (quoted in Sutton 2010:209). After a music publisher had filed suit against a roll manufacturer, the Supreme Court eventually ruled in *White-Smith v. Apollo* (1908) that rolls and records were not copyrightable under then-current law and were instead mechanical components. The argument embraced by the Court was that, unlike sheet music (which was covered by copyright law at that point), human beings were incapable of interpreting rolls or records without the aid of specially-constructed machines (Cummings 2013:21-23; Suisman 2013:165-67). Meanwhile, the Aeolian Company, a leading player-piano maker, had—anticipating legislation which could enshrine publishers' licensing rights for rolls—secretly drafted agreements with the country's largest music publishers to obtain exclusive rights to their songs; smaller publishers (e.g., 'insurgents' in the music publishing field) and the rest of the player-piano manufacturers were outraged, while record companies feared that their days of recording any song without the added expense of royalty payments were numbered (Sanjek 1988a:398; Suisman 2009:165). Lawmakers were subject to intense lobbying by constituencies both in favor of and opposed to the status quo; furthermore, some legislators argued that artistic works, including songs, constituted a public good of sorts, inveighing against the guarantee of licensing rights in perpetuity (Cummings 2013).[19]

---

[17] Following the final passage of copyright reform, the American Society of Composers, Authors, and Publishers (ASCAP) was formed in 1914 to ensure that composer and publisher received their due compensation, becoming the leading organization representing publishing interests in the music business (Suisman 2009). Confronted by the new problem of radio broadcasting, the ASCAP would recapitulate the pre-1909 period's expressed desire for compensation coupled with mistrust of the effects of new media: "at the same time that ASCAP was patrolling the airwaves in hopes of garnering royalties from the radio stations, it was voicing concerns [in 1927] about overexposure of its members' compositions on the air" (Sutton 2008:265).

[18] That same year Sousa penned an infamous essay, "The Menace of Mechanical Music," which has often been framed as an antimodernist rallying cry against the threat phonographs and player-pianos posed to musical culture (see, e.g., Roell 1989:54-55; Taylor 2007:302n4; Miller 2010:163)—instead of as a facet of Sousa's broader campaign for expanding composers' legal prerogatives (Suisman 2009:163-65; Warfield 2009).

[19] Cummings (2013:2) points out that "American law has long recognized, first informally and later by statute, that a certain degree of copying, categorized as 'fair use,' is acceptable," but that copyright-holders have typically been bitterly opposed to such copying—and any legal protections for that copying—nonetheless.

The law that resulted was a grand compromise, but it ultimately strengthened the hand of the phonograph industry. Under the new legislation, roll and record manufacturers owed a fixed royalty (two cents) for the songs they repurposed, while the copyright-holders of a given song had the right to license (or refuse to license) a recording of a song to a record-maker, but once they did so, any subsequent recordings by additional companies would not require such a license, though the flat royalty payment was still in effect (e.g., Sutton 2010:210; Cummings 2013:14).[20] That the phonograph industry had managed to avoid becoming entirely subject to the whims of the (much older) music publishing industry was perhaps another indicator of its clout. It was not until the 1920s, however, that entrepreneurs associated with the recording industry—most notably scout-turned-publisher Ralph Peer (Peterson 1997:37-39; Mazor 2014)—were able to "grasp the financial potential, not just the liability, inherent in the rights established by the 1909 law" (Suisman 2009:175). The "liability" on the other hand, such that it was, was not enough to stem the rising tide of the phonograph industry, and over the ensuing decade, it became the leading branch among musical manufactures (measured by the value of its output). Meanwhile (as mentioned above), the output of the publishing industry remained more-or-less constant. By mandating royalties, the state created a vested interest in records on the part of songwriters and publishers—and in creating a potential source of income, Congress created the possibility of economic dependence. In a pair of 1923 articles, *Variety* observed that "the music men are making their two-cent royalty income from the mechanical reproductions major to the sheet music sales" and highlighted a cohort of "negro [*sic*] music men cleaning up from mechanical royalties with the sheet music angle almost negligible and practically incidental" (quoted in Abbott and Seroff 2017:265, 266). Moreover, by codifying the precise terms of the ownership of musical compositions and the legal means of appropriating them, the law resolved an important question of property rights, which further clarified the stakes of the field of phonograph makers and increased its potential for stability (see Fligstein 2001:33-34).

The literal reversal of fortunes among musical manufacturing industries must be at least partially due to differences in social organization. Figure 2.5 charts the rates of incorporation across musical manufactures. The piano and phonograph industries (the overwhelming leaders in output value from 1899 to 1919) were overwhelmingly corporate, and only became more so as time passed; the same could be said of the piano and organ materials industry, which is likely due to its necessarily close ties to the piano industry. And given that piano and phonograph manufacturers were self-consciously gearing themselves toward mass production and mass consumption, it was unthinkable that they could do otherwise (e.g., Roell 1989; Fligstein 1990; see also Kenney 1999). The other industries eventually began to catch up in rates of incorporation, but it was more so that the individual- and partnership-owned companies were being squeezed out (and either failing to produce more than minimal output or failing altogether), given the decline in the number of (countable) firms for these businesses (see again figure 2.1); the declining number of firms without a comparable decline in output also points to increasing consolidation.

In examining the phonograph business in particular—again, the only industry among the musical manufactures to see consistent and significant growth through 1919—we can also point to the relative stability of the phonograph industry in particular. Some measure of stability is a

[20] Records themselves (or rather the unique soundprint encoded or engraved onto a record) would not be copyrightable until 1972; before then, the unauthorized duplication of another company's masters *was* illegal, but only because it represented "deceptive and unfair conduct" (Cummings 2013:14)

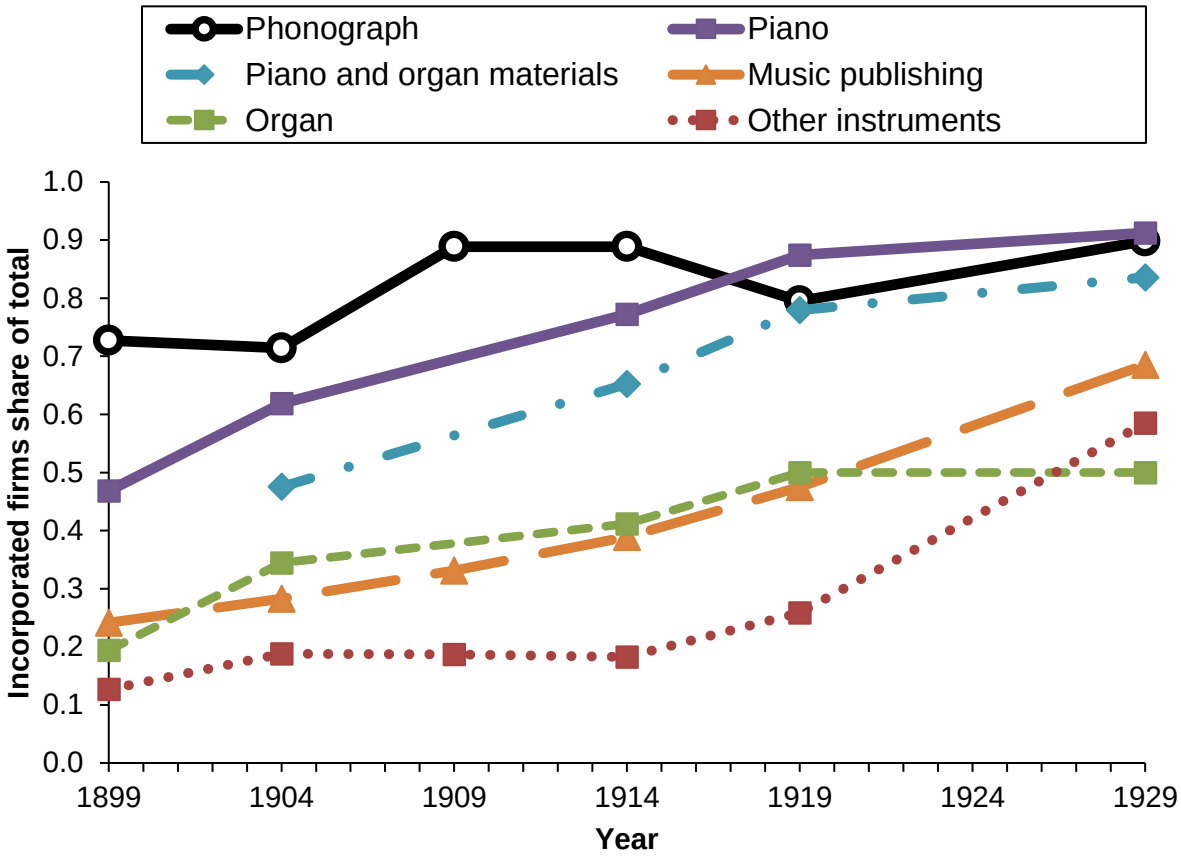


Figure 2.5. Rates of incorporation by industry, 1899-1929
Source: U.S. Bureau of the Census.

necessary precondition of economic growth, and at the industry level, this implies a stable conception of control (Fligstein 1996, 2001); the industry's conception of control was never more consistent than in this early two-decade span. The period was marked by the hegemony of the Victor Talking Machine Co., which quickly became the largest purveyor of phonographs in records after its 1901 incorporation. Victor did more to ensure the acceptance of the phonograph than any other company, so much so that its "Victrola" trademark became a generic term for talking machines in general (Suisman 2009:92, 94, 101-04).[21] It paired its aggressive marketing efforts with an even more aggressive approach to patent litigation, and it zealously guarded its intellectual property (Sutton 2010). Having thus vanquished their competitors in the disc market by 1909 (Brooks 2002:38)—the same year that Congress resolved some key questions of musical property rights—Victor and its patent-pool ally Columbia effectively curbed competition but also made the battle lines clear for new entrants.

Under the enforced stability of the patent duopoly, "the average opportunities for profit"

[21] The key feature and selling point of the Victrola was its enclosure of the phonographic apparatus inside fine wooden cabinetry, thus integrating it more seamlessly into the contemporary domestic aesthetic (Barnett 2006; Suisman 2009). This new industry standard enabled furniture manufacturers' entry into the phonograph business—including Brunswick-Balke-Collender and the Wisconsin Chair Company, both of whom would figure prominently in the 1920s recording industry.

(Bourdieu [2000] 2005:79) offered by the production of phonographs and records had outpaced those offered by the manufacture of the other nominally musical commodities which had preceded it. In fact, it was only after the early patent skirmishes had been decided that the industry saw its most significant period of expansion between 1914 and 1919. During that half-decade, the value of its inflation-adjusted output more than quadrupled and surged ahead of the piano industry (see figure 2.2). Meanwhile, the collective and individual actors most directly invested in the phonograph industry, firms and their employees, decisively peaked. From its humble beginnings in the prior century—the Census Bureau (1895) only recorded two phonograph firms in 1889—it now included a whopping 166 firms, about fifteen times what it was in 1899 (eleven), and more than ninefold from five years prior (eighteen; see figure 2.1); the number of people working for these core firms of the industry grew proportionately with those firms' numbers, and by 1919, the Census Bureau counted 33,826 "persons engaged," of which 28,721 were wage workers. In this peak year Otto Heineman, founder and president of a phonography supply company that bore his name, proclaimed that "'A Phonograph in Every Home' will be no mere slogan, but a wonderful fact" (*Talking Machine World* 1919b)—and it would be hard to fault him for his optimism in light of recent history. If contemporary observers weren't typically controlling for inflation (and the Census Bureau, for one, clearly wasn't), then the growth of the phonograph industry must have seemed all the more impressive.

Challengers and Invaders

The bloom of the phonograph industry did not go unnoticed elsewhere. Lured by the rising tide, a wave of 'invaders'—firms with roots outside of the industry—entered the talking machine trade (Millard 2005:72-74). In terms of longevity, these firms dominated the cohort of the effective challengers who joined the industry in the 1910s. Invaders tend to come from neighboring industries (Fligstein 2001:84), and two of the most impactful latecomers were well-established firms in what had been the largest branch of musical manufactures, the piano industry. In the mid-1910s, both the Aeolian Co. and the Starr Piano Co. were among the nation's most productive piano companies (Roell 1989:94-95). Starr had been making pianos since 1872 (Kennedy 2013), while Aeolian was a core member of a multinational piano conglomerate and had the distinction of pioneering the player-piano market (Roell 1989; Suisman 2009). Despite their late start in the industry, they used their preexisting distribution ties to sell their new products alongside their more familiar pianos (Kennedy 2013). These companies whose primary products were neither phonographs nor records would not (by definition) be reflected in the Census Bureau's industry statistics, however, though their output would be counted in the commodity-specific figures for records and phonographs (see figures 2.3 and 2.4). The reader can see that the overall trends in record and phonograph production parallel those for the phonograph industry proper (figure 2.2)—marked expansion through 1919 and more equivocal outcomes thereafter.

Other noteworthy entrants had more tenuous (but still very real) ties to musical manufactures. Brunswick-Balke-Collender, ultimately the greatest of the challengers who entered the fray in the 1910s, followed a path into the phonograph business that was superficially similar to Aeolian's and Starr's. Brunswick's primary products were billiard supplies, bowling equipment, and furniture, and the company had eventually began making piano cases. According a retrospective written by its then-president in 1925, "a slump in the piano business caused a shift to the making of phonograph cabinets" in 1913, and the new venture soon encompassed "the making of the complete instrument" (quoted in Laird 2001:1). (A discernable downturn in

the piano industry between 1909 and 1914 is indeed visible in figure 2.2.) Brunswick clearly perceived an adjacency between pianos and phonographs, just as the piano invaders had. The New York Recording Laboratories (NYRL), whose Paramount label figured heavily in the early history of blues records, was founded in 1917 as a subsidiary of the Wisconsin Chair Company. Wisconsin Chair was, as its name so clearly suggests, a furniture maker and (similar to Brunswick) supplemented its existing furniture business with phonograph cabinets in 1914 before launching the United Phonograph Corp. in 1916 to make complete record players of their own (van der Tuuk 2012).

As stated, most of the effective challengers were grounded in other industries, but not all of them: three members of this cohort were founded as phonograph firms. Two of the three, Pathé Frères and General Phonograph, were enabled by their supply and fiscal relationships as offshoots of bedrock firms in the European phonograph industry (Sutton 2008:21). The General Phonograph Corp., which would eventually become a pioneer in recording both blues and country music via its Okeh label, was founded as the Otto Heineman Phonograph Supply Company (Laird and Rust [2004] 2016a). Heineman had initially emigrated to the United States as an operative of Carl Lindström AG, the leading phonograph company in continental Europe at the time (Martland 2013:112-17). Forced to remain in the U.S. by the World War, he founded his own phonograph parts company with Lindström's support in 1915. When Heineman began selling records, he was able to supplement American recordings with imported masters from Europe (Laird and Rust [2004] 2016a; Sutton 2008). Pathé had an exclusive licensing agreement to sell the records and phonographs of the eponymous French firm—one of the oldest European phonograph firms—and had managed to raise $3 million to secure that support (Sutton 2014:vii). The Emerson Phonograph Co. was home grown, the namesake venture of Victor Emerson, who had run Columbia's studios from 1896 until his defection in 1915 (Brooks 2002:66). The new company's founder had "made many friends in the entertainment world" after nearly two decades at Columbia (Sutton 2008:20), meaning it could bank on social and cultural capital where it may have wanted for foreign capital. Like the invaders, the most durable intra-industry challengers had minimized startup costs and mitigated risk in one way or another.

And while these companies may have been explicitly joining the phonograph industry, they all became important parts of the market for *records* in particular. Several (like Pathé and Starr) began marketing records at the same that they introduced their own phonographs. For the companies that had initially just been producing phonographs and phonograph parts for years at that point (like Aeolian, Brunswick, or Heineman), it was probably inevitable that they would also try their hand at records. Brunswick, at least, did manage to establish itself as a legitimate threat to the incumbents for both records and phonographs, adding records to its repertoire circa 1918 (in Canada at first, and then domestically in 1920) and becoming one of the industry's dominant firms circa 1923—all within a decade of its entry (Sutton 2000:253). Nevertheless, records were clearly still a sideline to phonograph production at the outset. According to a Heineman dealer hawking his supplier's new record label in Toronto, "Before the OkeH records came to herald aloud the merits of the Heineman phonograph products I had 'silent' merchandise to sell—Heineman motors, tone arms, needles, etc., and they had to be bought and used before people became convinced….the Heineman motor and phonograph supplies couldn't talk for

themselves, but the OkeH record does" (*Talking Machine World* 1919a).[22]

Death of a Duopoly

All of the newcomers to the phonograph and record business were at persistent disadvantage, however. During the aughts, the early challengers in the market for disc records and disc players were using the lateral-cut technology protected by the pooled patents.[23] The influx of challengers in the 1910s used the *vertical*-cut alternative to avoid the same litigious demise of their predecessors, but they were ultimately hamstrung by the incumbency of the lateral disc-players that had flourished before their arrival (Sutton 2010). Furthermore, the industry leaders had well-established distribution channels in the phonograph and record trade, including exclusive dealerships in some cases (Kennedy 2013). This unhappy state of affairs did not last long, however, and the status quo was soon upended by one of the invaders.

The year 1919 marked the apex of a rapid period of growth and represented a peak in the value of the industry's output in general (see figure 2.2) and, more particularly, in the volume and value of phonographs and records (see figures 2.3 and 2.4); it was also the year that Victor's hegemony over the disc market was finally punctured. Having "failed to excite much interest" in their vertically-cut records up to that point, Starr Piano began selling a laterally-cut version of their Gennett label in 1919 (Sutton 2010:281). Starr was, of course, motivated by the prospect of improving its position in the phonograph and record market, but as Kennedy (2013:24) rightly points out, they also had the advantages of enough capital and stability (built over a long time in another industry) to endure an extended legal battle. Knowing the stakes, companies like General Phonograph supported Starr in their uprising (Kennedy 2013:25). This was, in effect, a challenge from without: these were advantages that small firms born in the phonograph industry could never hope to have. Victor, as was its wont, filed suit citing a patent for laterally-cut wax master recordings; while several of its (and Columbia's) key patents had expired—federal law limited the life of a patent to seventeen years—this particular patent had been granted in 1908 (Koenigsberg 2005; Millard 2005:72; Sutton 2010:287n12). Victor requested an injunction and in October 1919 that request was denied by the U.S. District Court (Sutton 2008:282, 287n12).

With the denial of Victor's injunction request—and the subsequent failures of each of its appeals—the other challengers could seize upon lateral cut records and lateral phonographs without fear of legal reprisal (Sutton 2010:282; Kennedy 2013:27). General Phonograph (1919), for one, wasted no time, trumpeting their "latest move" in a full-page *Talking Machine World* ad the very same month of that first Victor defeat. The advantage in adopting lateral-cut discs was common sense for the industry: *every* new label that arrived in the 1920s market was lateral-cut and *every* preexisting label that survived past 1921 either switched to the lateral-cut or gradually phased out vertical-cut records in favor lateral-cut records—everyone except Edison (see Sutton 2000). A marked uptick in trademark applications for new record and phonograph brands occurred (Sutton 2010:282), and the number of active commercial labels more than doubled, rising twenty-nine or so in 1919 up to roughly seventy in 1921.[24] For Victor's part, the

[22] The label's name was styled, variously, as "OKeh" or "OkeH" by its proprietors (see, e.g., Mazor 2014:34); for my part, I use 'Okeh' throughout—to do otherwise would offend my delicate typographical sensibilities.

[23] Having dispatched the lateral-cut upstarts, the industry rapidly shifted record production almost entirely toward discs and away from cylinders (e.g., U.S. Bureau of the Census 1918a:21; see also figure A1 in the appendix).

[24] The number of active labels was calculated in the author's census of the labels listed Sutton's (2000) omnibus volume. The numbers should be regarded as approximate given that start and/or end dates were not available for every known label on the market at that time.

doggedness of its continued appeals underlined precisely how important patent control was to its (own understanding of its) business model. Victor would eventually suffer a final unsuccessful appeal at the Supreme Court in late 1922 (Sutton 2008:10n19), but following a favorable ruling in the U.S. Circuit Court Appeals earlier that year, Starr head Fred Gennett proclaimed in a statement that "the manufacture of records became public property" (Kennedy 2013:27; see also *Richmond Item* 1922). This was not the storming of the Bastille by any means, but it proved to be fairly momentous in industry terms, a fact consistently acknowledged in various historical accounts of the industry (e.g., Kenney 1999; Roy 2004; Kennedy 2013; Sutton 2018).

The intervention of the State via the court system, coupled with the preexisting rules governing patent expiration, fundamentally altered the "conception of control defin[ing] the social relations between incumbent and challenger seller firms" (Fligstein 2001:35) by preventing the former from simply excluding the latter from the most lucrative corner of the record and phonograph business. In removing (or rather, by refusing to protect indefinitely) the techno-legal advantages that Victor (and Columbia) had so jealously maintained and by implicitly lowering the cost of doing business, the federal government had altered the "relations of force within the field" (e.g., Bourdieu [2000] 2005:81). Generally speaking, fields with low barriers to entry are more susceptible to rapid and far-reaching changes (Greenwood and Hinings 1996). However low the record business's bar to entry had been—and it had generally been fairly low throughout its history up to that point, even as incumbents restricted access (Barnett 2014:124)—it had assuredly been lowered.

The Terrible Twenties?

During the 1920s, a period of sustained economic growth bookended by economic depression (e.g., Lindstrom 2001), the fortunes of the phonograph industry were in severe flux (the righthand portion of figure 2.2). While real GDP and real GDP per capita increased 23.6 percent and 13.4 percent, respectively, between 1919 and 1927 (see Carter et al. 2006), the inflation-adjusted cash value of phonographs and records produced decreased 30.5 percent and 8 percent, respectively. Moreover, this volatility was largely confined to the phonograph industry when comparing it to the other musical manufactures. As with the prior era, growth among the non-piano instruments' industries and publishing was modest and much of the overall variance of the musical manufactures' collective output over time was attributable to the phonograph industry. If production figures are any indication, the only period of relative stability in the early history of the industry ended with the preceding decade.

A Crisis Phase

The first half of the 1920s indicated that the phonography industry was in crisis. At its very outset, the prevailing conception of control had been swept away with the end of the Victor-Columbia patent duopoly, but the dissipation of the operative conception of control in the phonograph industry was merely the first step toward destabilizing the market. By mid-decade ensued, all of the indicators of market crisis appeared: the state "undermine[d] the market by changing [the] rules" of the market, invading firms had (successfully) levied their own assaults on those rules, and seemingly invulnerable incumbents showed striking signs of mortality (Fligstein 2001:83).

The influence of state power continued to undermine the incumbents' hegemony. In August 1920, the government sued seven large New York-based music publishers—who collectively controlled about four-fifths of the songs on record and piano rolls—for Sherman

antitrust violations. The publishers had been fixing prices for licensing agreements; the government's intervention thus effectively reduced the cost of making records and further enabled price-cutting by newer firms (Sutton 2008:36). Victor and Columbia, who had been price fixing for years, were forced to lower their record prices in the early 1920s as a wave of budget-price labels emerged—and as the various challenger firms effected the collective switch to lateral-cut production that had begun in 1919 (Kenney 1999:49; Brooks 2002:41, 42-44; Sutton 2008:35).

Amidst these imminent threats to the status quo, the 1920-21 depression struck and the industry's output obligingly declined (figures 2.2, 2.3, and 2.4; see also Lindstrom 2001; Sutton 2008). For the next several years, the industry's output was thoroughly volatile, rebounding by 1923, but sinking again as 1925 came. Even industry giant Columbia found itself teetering on the edge of bankruptcy (Brooks 2002). In *Moody's Industrials*, Columbia reported negative net income and a year-end deficit of $15.6 million in 1921, down from a $1.2 million surplus in 1919 (Mergent 2004-19). Sutton (2008:28-29; 2018:117) argues that Columbia's troubles were triggered by overproducing in 1920, a problem then exacerbated by the sudden influx of competitors; the august phonograph firm posted another deficit in 1922, and was placed in receivership in 1923. Some notable newer firms, Emerson and Pathé, also found themselves in receivership by mid-decade after aggressive expansion campaigns that were probably especially ill-timed given the state of the national economy (Sutton 2008, 2014). Ever the exception to the rule, Victor in 1921 had working capital of nearly $22 million and its record sales peaked at 54.9 million units (RCA [1943] 2002; Mergent 2004-19). Victor was not immune to the industry's collective struggles, however, and its record sales declined in both relative and absolute terms. Victor was selling 23.1 records for every General Phonograph record in 1919; in 1924, Victor was selling 'only' 7.2 records per General Phonograph record—still quite the advantage but considerably less so (see Martland 2013:261 for selected General Phonograph sales figures). Meanwhile, it sold less than half as many records in 1925 than it had in 1921 (25.2 million, a 54.2 percent drop); its phonograph sales over the same period (1921-25) fell 18.1 percent to 262,127 machines (Aldridge [1964] 1983; RCA [1943] 2002).[25]

The latter half of the decade, however, was a different story and the industry appears to rebound. Output value increased in 1927 relative to 1925, and the evidence suggests that times were good between 1927 and 1929. Census data is equivocal as to whether phonograph production prospered at the close of the decade, but the value of records shipped (i.e., sales) in 1929 exceeded the value the of records *produced* two years before (figure 2.3); had the Census Bureau tabulated the value of records produced in the 1929, the total would have been higher than in 1927. Similarly, while the unit volume of 1927 record production exceeded the unit volume of 1929 record shipments, it was only by 616,260 records—less than six-thousandths of the 1927 total (figure 2.4). Though the industry would not surpass the heights of 1919 until after the worst of the Depression, the 1920s was clearly not a period of sustained decline.

In the meantime—perhaps as a response to a period of prolonged uncertainty—the industry was becoming increasingly consolidated. The number of (enumerated) phonograph industry firms declined consistently, but the value of those firms' collective output did not. Thus, the inflation-adjusted value of industry output rose 41.2 percent between 1921 and 1923, as the

[25] This was merely the lowest total since 1920 for phonograph sales, but 1920 phonograph sales were already a whopping 42.6 percent lower than in 1919 (Aldridge [1964] 1983; see figure A2 in the appendix for a fuller picture of Victor sales).

number of firms dropped 27.9 percent. Between 1925 and 1927, inflation-adjusted output value rose 55 percent, coupled with a 11.8 percent decline in the number of firms. From the mid-1920s onward, a number of notable intra-industry mergers occurred, including Brunswick's acquisition of Aeolian's record and phonograph division in 1924; the purchase of General Phonograph by Columbia in 1926; and the merger of Cameo, Pathé, Regal, and the Scranton Button Company (an independent pressing plant) into the American Record Corporation (ARC) in 1929 (Sutton 2018:77, 567-68).

Decoupling the Record Business

An important development occurs amidst the uneven and intermittent decline: rates of *record production become decoupled from phonograph production for the first time*. Through 1919, rates of record production were highly correlated with those of phonographs, but this pattern ended with the 1920-21 depression (figure 2.4). Despite the severe economic downturn, the value of records produced in 1921 actually increased slightly compared to two years prior. At the same time, record production did decrease in terms of unit volume, but the change was nowhere near as drastic as the drop in phonograph production: only 1.7 percent fewer records versus 73.2 percent fewer phonographs.[26] Following the disproportionate decline of phonograph production, the value of records suddenly represented nearly half (48.7 percent) of the industry's output. In 1919, it had been less than a third (28.2 percent), down from 40.9 percent in 1914 (U.S. Bureau of the Census 1924:1163, 1165). And despite dropping 23.2 percent between 1919 and 1925, unit record production had almost rebounded to 1919 levels only two years later (105.7 million records produced in 1927 versus 107 million records in 1919) during this time of unprecedented volatility for the industry. (Record value did not rebound to the same degree because of price cutting [see, e.g., Sutton 2008:35-41].)

The same sort of recovery was absent for the old lynchpin of the industry, and the erratic variance in the overall value of industry output between the Great War and the Great Depression is almost wholly attributable to the extreme variance in phonograph production (figure 2.3). These changes indicate the emergence of a relatively autonomous record business, where records are sold as commodities in themselves and not as accessories for record players. Millard (2005:74) traces a new emphasis on records and newfound uncertainty in the phonograph market to more than "20 years of mass-producing and marketing basically the same product," such that "the market for machines was saturated" circa 1920. Another, more subtle shift in emphasis occurred among new record-making firms in particular. Whereas nearly all the record manufacturers (besides invaders) founded prior to the 1920s styled themselves as "phonograph" or "talking machine" companies, the new ones that emerged were predominantly "record" or "recording" companies (see Sutton 2000). From this period forward, the idea of a 'recording industry' is far more concrete, even if it attained its seeming maturity under crisis conditions.

Whether the industry was inspired by the apparent instability of the market for phonographs or not, it unmistakably and increasingly prioritized record production as the 1920s progressed. Industry firms were far more aggressive in seeking out new performers and performance styles to put on record, and a more expansive approach to musical repertoire

[26] One of the major causes of the 1920-21 depression was the rebound in European production after the war and the subsequent decline in demand for American goods abroad (Lindstrom 2001). According to the Census Bureau (1924:1146), the ratio of the value of exported phonographs (including parts) to imports declined from 17.1 in 1914, to 4.3 in 1919, and then to 2.7 in 1921. (Comparable statistics for records as a separate class were unavailable.)

became the industry norm (e.g., Kenney 1999; Millard 2005; Sutton 2008; Miller 2010). Records that ostensibly catered to black and white rural audiences (often referred to as race records and hillbilly records, respectively) became permanent fixtures of the catalogs of large and midsize record companies alike (Dixon, Godrich, and Rye 1997; Russell and Pinson 2004; Roy 2004; for a more extended discussion of this development, see the following chapter). These offerings were also increasingly promoted via what Russell (2004:7) calls "sectional catalogs," specialized record lists parsed by demographically-defined market segments (see also Roy 2004:272). These practices were introduced and adopted gradually during the 1920s, but they were clearly industry-standard by the end of the Depression. Decca (part of the industry's third triumvirate by the time of the Petrillo Ban), had introduced race and hillbilly series upon its arrival in 1934 (Russell and Pinson 2004:16), while the smaller United States Record Corporation felt compelled to include both race and "hill billie" catalog series in a 1939 memo outlining its intended range of product lines (Sutton 2016:310).[27]

When commercial electrical recording arrived as the newest technical distinction among record makers in 1925, it was the first such distinction that wasn't primarily rooted in the form and function of record players (unlike lateral-vertical or disc-cylinder distinctions).[28] The development of recording microphones offered unprecedented sonic fidelity and dramatically expanded the possibilities of record making as a [sonic / technical] and musical exercise. It was also a fundamentally exogenous factor in remolding record production. The first electric recording system to see wide commercial usage was developed by Western Electric, a subsidiary of AT&T, and the second such system was developed by General Electric; this was an initiative created within telecommunications and electrical equipment firms and imported into commercial recording studios (Wurtzler 2007; Sutton 2008). Victor and Columbia led the way by leasing Western Electric's new recording system, and by the end of the decade all but the most destitute of record producers were making (or at least distributing) electric recordings of their own (Sutton 2008:184-91; van der Tuuk 2012:149).[29] By offering initial access to the industry's two most

[27] Another potential trend (gleaned from gathering label data in Sutton 2000) that warrants further investigation is what appears to be an increasing emphasis on label brand names as a source of symbolic (and then subsequently economic) capital or as a means of internal product differentiation. For most of the industry's history up to this point, each manufacturer usually only marketed one label. Several firms, including NYRL and Starr, *manufactured* multiple labels, but the consumer-facing brand identity of any given company was generally tied to a single label name. (The other labels were usually produced on behalf of a client company, department and general stores being the most common.) But it wasn't until the 1920s that companies used multiple labels to occupy multiple segments of the record market. After purchasing Aeolian's recording assets, Brunswick continued to market the former's Vocalion label, and eventually concentrated most of its race and hillbilly releases there. Both labels were kept alive after falling under the control of the American Record Corporation in the 1930s. On a similar note, ARC phased out the Okeh label after buying Columbia in 1934, but after CBS bought and reorganized ARC in 1939, the Okeh brand was resurrected to replace Vocalion. Brand conservation among record companies calls to mind the survival of a panoply of brand names in the piano industry despite rampant mergers (see Roell 1989). Alternately, companies simply introduced new labels to the market, as Columbia and Victor did with their budget-priced Velvet Tone and Bluebird labels, respectively.

[28] Though the push to incorporate electrical recording in the mid- to late 1920s was clearly record-focused, it still impacted the phonograph market since the older phonographs were ill-equipped to handle the heightened frequency response and dynamic range of the new records (Sutton 2008:191).

[29] Orlando Marsh, who operated a small but fairly prolific studio in Chicago, apparently invented a viable electric recording system of his own—the first to be put to consistent *commercial* use within the recording industry—employing it from late 1924 onward (Sutton 2008:157-60). (Marsh's studio hosted a number of sessions organized for and released under the Paramount label [see van der Tuuk 2012].) The Western Electric system, which was

powerful firms, Western Electric reaffirmed the old hierarchies of the field, but Western's ownership of the technology ensured that the [same manner of hegemony / ham-fisted domination] that defined Victor and Columbia's former relations with their competitors (direct control of indispensible patents) would not be reinscribed.

These technical and reportorial transformations were building blocks of a new status quo in the record business and shaped firms' decisions going forward. The late 1926 merger of General Phonograph and Columbia (or rather the purchase of the former by the latter), for instance, served the interests of both parties. General Phonograph had so far been shut out of the electrical recording revolution, while Columbia wished to coopt General Phonograph's standing as a first-mover in the race and hillbilly markets (Mazor 2014:72; Sutton 2018:207). This was not merely diversification between classes of commodities (e.g., selling phonographs alongside pianos), but also within said classes. Again, this was not especially novel, but the degree of emphasis was—a shift premised on the devaluation of technological and juridical capital in favor of commercial capital. Parallel to the larger national economy, market dominance premised on product differentiation was the new normal, as opposed to the more "direct control" of competition wielded under the patent duopoly (Fligstein 1987, 1990).[30]

Wave Interference[31]

In spite of obvious exogenous and endogenous stressors on the industry at the outset of the 1920s (i.e., a severe nationwide economic downturn and the end of the techno-legal strictures which undergirded both the rule of the prevailing phonograph powers and the challenger firms' sense of the industry) industry histories—often enabled by suspect data—have typically indicted another culprit in explaining the crisis phase: radio manufacturing and broadcasting.

Call the examples of this narrative legion, for they are many. The narrative is at least as old as the oldest published history of the phonography industry (Kramer n.d.), Leroy Hughbanks's 1945 *Talking Wax*:

> The early 1920's brought a real menace to the phonograph industry, with the advent of radio broadcasting. People sat in their homes and listened to an entire musical program without the inconvenience of changing records every three to five minutes. . . . People simply did not want phonographs and records any more. Radio was the thing. (Hughbanks 1945:79)

Hughbanks suggests that he wasn't the first to believe this line of thinking, and it's clear that he wasn't the last. The claim has been rearticulated in a variety of ways over the years, and a

---

leased to Columbia and Victor the following year, produced better quality recordings (Sutton 2008:159); given the scale of Marsh's operation compared to Columbia's and Victor's, however, he still would have been at a competitive disadvantage even with superior sound quality: "technological capital is effective only if it is associated with other kinds of capital" (Bourdieu [2000] 2005:80).

[30] Generally speaking, for the largest industries "direct control" was succeeded by "manufacturing control," whereby leading firms used mergers to control the supply chain and enlarge their market share; "sales and marketing" was the successor conception of control, e.g., what the recording industry appeared to turn toward in the 1920s (Fligstein 1987, 1990). Record companies did not avoid mergers, of course (see, e.g., the main body of this chapter).

[31] The combination of two waves is known as interference, which can be either 'constructive' or 'destructive' depending on whether or not the waves are in phase; in the extreme case of the latter, waves that are perfectly out of phase will cancel each out (see Berg [1998] 2019).

number of texts far more recent than *Talking Wax* have embraced this explanation for the phonograph industry's crisis phase of the early 1920s.

> "Classic blues recordings helped pull record companies out of the early twenties slump produced by radio competition" (Ogren 1989:91).
>
> "The introduction and quick acceptance of a new medium, radio, which gave listeners fidelity superior to that of acoustic records and which provided constantly changing live programming, was responsible for the sudden decline in record sales at the beginning of the 1920s" (Titon 1994:200).
>
> "Phonograph record sales boomed nationally from 1919 through 1921, but the fledgling industry was in a serious decline by 1923. Radio stations were being launched in all the major cities, and live music broadcast over the radio sounded better than did music heard on the acoustically recorded phonographs of the time" (Peterson 1997:16).
>
> "[T]he largely unexpected 1921 entry of radio on the market for home musical entertainment machines drove down the sale of phonographs and records. Columbia went bankrupt even though it continued to make records. Victor's sales dropped by half" (Kenney 1999:116).
>
> "The industry was hard hit by radio: in the U.S. sales of all talking machine products reached $158 million in 1921, but fell to $98 million in 1922" (Hoffmann and Ferstler 2005:303).[32]
>
> "[In June 1922], the *Times* reported a sharp drop in sales. . . . As this reversal continued over the following two years, the popularity of radio emerged as the clearest explanation" (Suisman 2009:233).

A number of themes recur. The first and most common is the observation that the rise of radio as a mass medium coincided with a substantial decline in the fortunes of the phonograph industry. This argument is reasonable enough, since the observable and unmistakable rise of radio's prominence roughly coincided with the first signs of crisis in the phonograph and record business. The second theme is the assertion of a substitution effect: consumers withdrew their disposable income from record and phonograph purchases and put them toward radio sets; their new radios then obviated whatever desire they might have for new records and did so with better sound quality to boot. True enough, radio broadcasts could provide music for free once one had access to a receiver set, and more technically minded authors have been clear that the fidelity gap between acoustically-recorded discs and radio broadcasts was not simply a figment of listeners' imaginations (e.g., Millard 2005; Sutton 2008). (A third theme, less common than the other two,

[32] Hoffmann and Ferstler (2005:303) do offhandedly note "the economic recession of 1921," but in the context of bookending a "boom period" that ostensibly occurred beginning in 1919(!). In the same figurative breath, they imply that Columbia's slide into receivership was a product of radio's haymaker. (Also, as the reader might justly infer as they continue to read, I am deeply suspicious of the sales statistics presented in the above quoted passage.)

is that radio's incursions inspired the record industry to begin scouting and recording blues and country music [e.g., Ogren 1989; Peterson 1997; Kenney 1999]. This last claim is perhaps the least plausible, as the *next* chapter ought to demonstrate.) Faced with sustained scrutiny, however, the overarching claim of radio as a primary threat to the record and phonograph business is, at best, an oversimplification of the situation (Sutton 2008:131); radio's rise is neither necessary nor sufficient as a cause of a crisis among phonograph and record manufacturers.

Oversimplifications notwithstanding, the increasing prominence of radio during the 1920s was undeniable (e.g., Millard 2005; Suisman 2009), and this is clear even when focusing on official statistics. A subset of manufacturing in electrical equipment with a fairly small footprint as of 1919 ($7.8 million unadjusted), radio manufactures ballooned in the next ten years and the inflation-adjusted value of production increased by 6,541.6 percent. In terms of radio receivers specifically, there was another striking increase. In 1923, the first year the Census Bureau collected data on the value and volume of receivers produced, 413,677 were made. Six years later, just under 5 million receiver sets (not including combination phonographs) were produced—a roughly twelvefold increase (see U.S. Bureau of the Census 1926, 1933b). With regard to broadcasting, the Federal Radio Commission licensed only one commercial broadcast station in 1921; in 1929, 606 licensed commercial broadcast stations were in operation (Field 2006).

With regard to manufacturing, the value of radio products quickly outpaced those of the phonograph industry. To illustrate these trends, I turn to a series of diagrams—figures 2.6, 2.7 and 2.8—which employ a similar graphing strategy. These diagrams depict production relative to either the phonograph industry (figure 2.6) or phonographs specifically (figures 2.7 and 2.8). (Because of wide variance among these ratios, these diagrams are plotted on a base-two logarithmic scale. This means that the comparisons are plotted such that they indicate how many times greater [or beneath] the relevant volume or value amount is relative to phonographs. Thus, for instance, where trend lines are at or near one [indicated by the horizontal dotted line], the figure is roughly equal to phonographs; at one-half along the y-axis, the figure is half as much; similarly, at sixteen, the figure is sixteen times as much.) Figure 2.6 charts radio manufacturing—and for comparison's sake, the piano and music publishing industries—against the phonograph industry in terms of product output value. One can see the extent to which piano industry output dwarfed that of the phonograph industry in 1899 and the steady erosion of that gap; here, however, it is worth noting the rapid rise of radio manufacturing output value relative to its humble origins in the aughts. Between 1923 and 1925, the value of radio products became more than twice that of the phonograph industry's output. Figure 2.7 compares the output value of specific commodities—pianos, records, and radio receiver sets (*not* including combination radio-phonographs)—to phonographs. As with the industry-level statistics, the specific value of radio receivers surpasses phonographs' value between 1923 and 1925. Lastly, a similar pattern appears when we compare the volume (units) of production (figure 2.8). In both figure 2.7 and figure 2.8, however, we can see the value and volume of radio receivers relative to phonographs decreases somewhat between 1925 and 1927, likely owing to the increased production of combination phonographs.

If historians have made hay of the supposed threat posed by radio to the (phonograph and) record business, they had it on good authority: just as outside observers keenly noted the swift ascent of the phonograph business years earlier, some phonograph industry actors themselves were anxious about the upstart medium. One such actor was Harry Pace, whose Pace

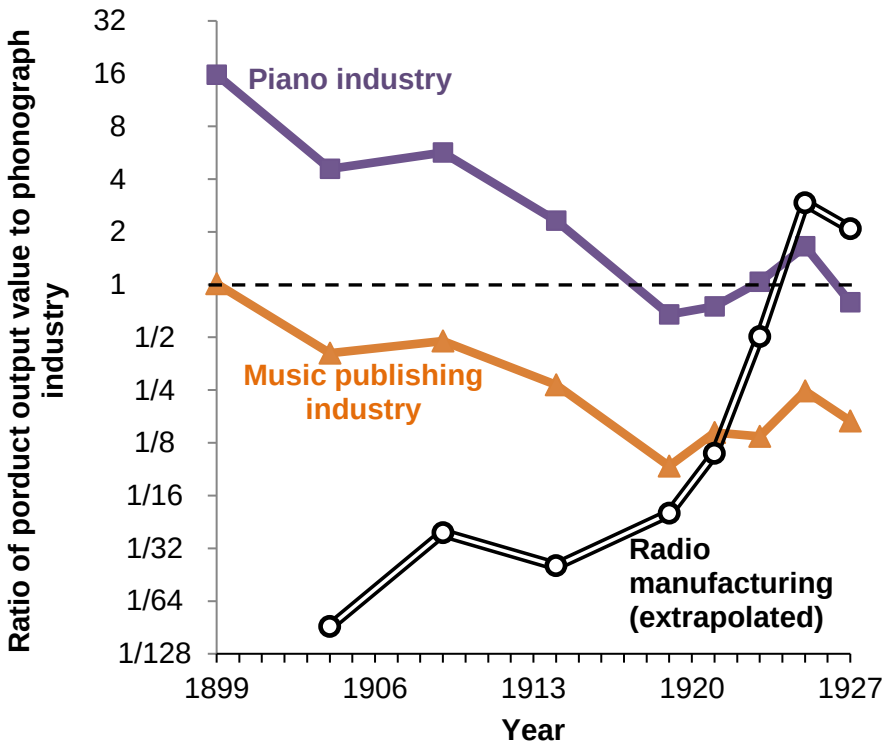


Figure 2.6. Ratio of cash value of piano industry, music publishing industry, and radio industry to phonograph industry, 1899-1939
Source: U.S. Bureau of the Census.
Note: Radio 'industry' extrapolated from wireless telegraph apparatus ('04-'09), wireless apparatus ('14), radio and wireless ('19), radio apparatus, both telephone and wireless apparatus ('21-'23), radio apparatus, including tubes ('25), and radio apparatus and tubes ('27-'29).

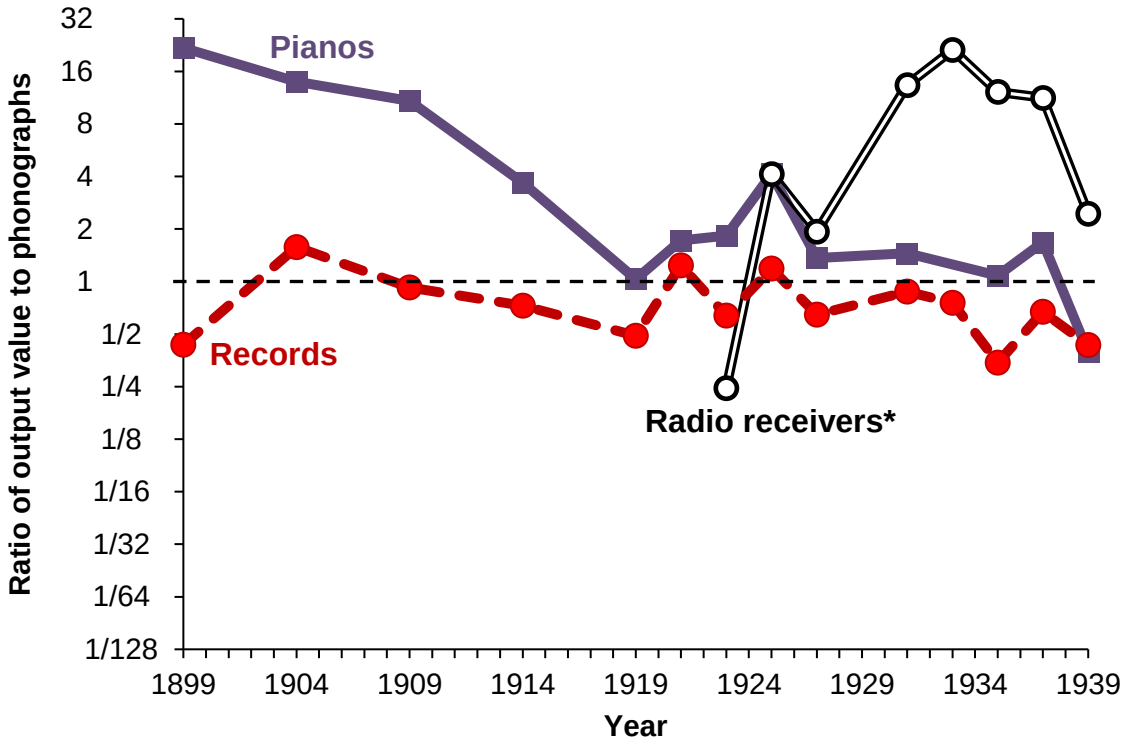


Figure 2.7. Ratio of cash value of pianos, records, and radio receivers produced to cash value of phonographs produced, 1899-1939
Source: U.S. Bureau of the Census.
Note: Receiver numbers do not include combination phonographs.

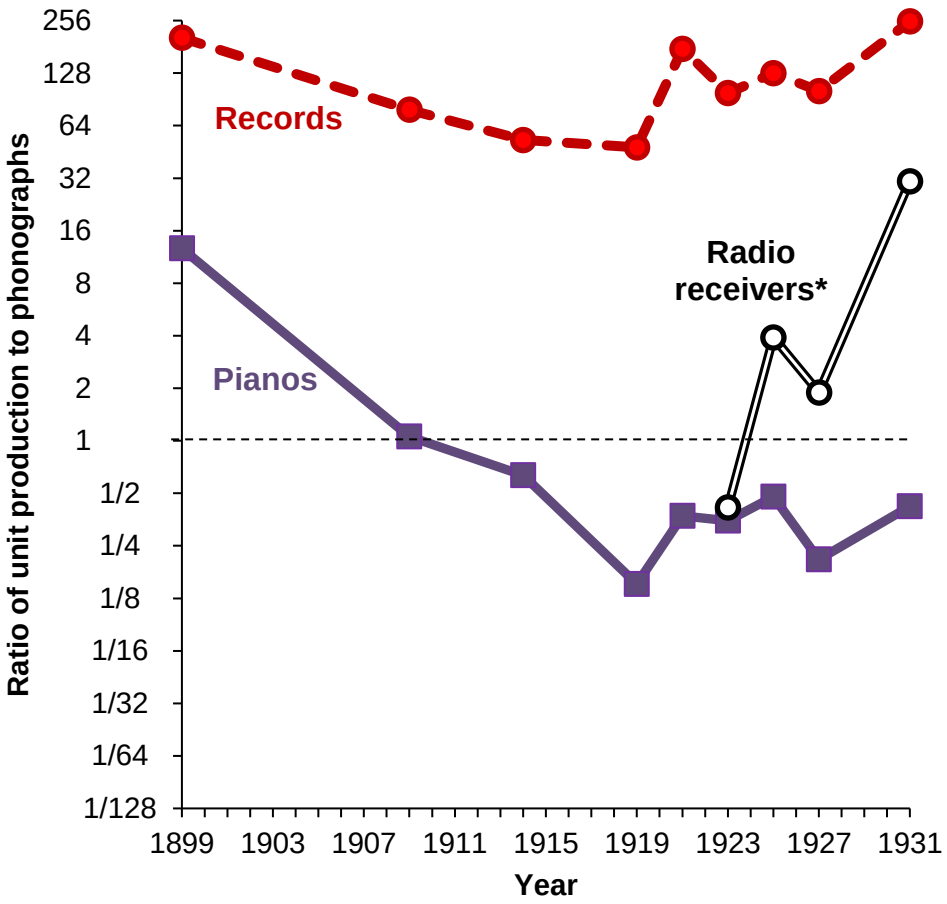


Figure 2.8. Ratio of pianos, records, and radio receivers produced to phonographs produced (unit volume), 1899-1931
Source: U.S. Bureau of the Census.
Note: Receiver numbers do not include combination phonographs.

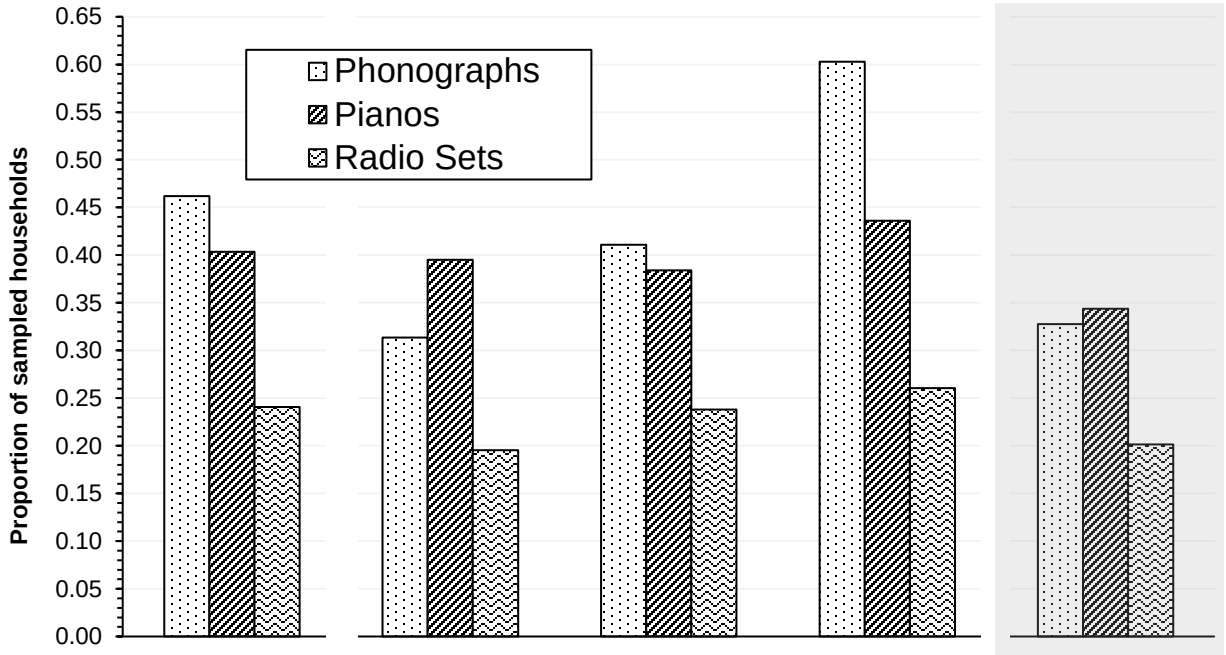
Phonograph Corporation (active 1921-23) was the first black-owned record company of note (no pun intended) and whose Black Swan label (active 1921-24) was the first black-owned record label of note (see e.g., Sutton 2000:21-23, 310-11; Suisman 2009:204-39). In assessing the untimely demise of his company, Pace asserted that "radio broadcasting broke and this spelled doom for us," even claiming that "many record stores became radio stores" (quoted in Suisman 2009:233). Aeolian secretary H.B. Schaad was another avatar of concern, though his fears were not of radio supplanting records. In a 1923 interview, *Wireless Age* paraphrased his concern that if records were played *too* often on the radio, then consumers would "get so much music that they become tired of it and do not want music in any other form or from any other source" (quoted in Sutton 2008:136).

The perception of a threat, however, was not unanimous among Pace's and Schaad's contemporaries, and radio industry actors were never uniformly hostile. More broadly, phonograph firms' stances vis-à-vis radio circa 1923-24 were heterogenous, and largely reflective of their positions or trajectories in the field. Upstart General Phonograph and the hobbled Columbia encouraged their artists to adopt radio as a promotional medium; the latter quickly saw radio as an additional promotional medium for its records, and even went so far as to

use its own studios to broadcast Columbia artists two times a week via WEAF-New York (Sutton 2008:133, 135). General Phonograph even recruited some new talent on the basis of their local radio draw, and set up its own radio-manufacturing subsidiary (Peterson 1997; Sutton 2008). On the other hand, Brunswick, Victor, and even Edison (only recently lapped by Brunswick, but whose position was eroding much more slowly than Columbia's had at that point [see ENHS (1929) 2008]) tended toward skepticism. In a February 1924 letter to his son, Victor founder and head Eldridge Johnson doubted that "the scheme of broadcasting music will replace talking machines" because phonographs and records offered "the feature of privacy, selection, repeat and the sense of proprietorship" (quoted in Sutton 2008:140). Brunswick's decision to manufacture and market a combination radio-phonograph in partnership with RCA in early 1924—a partnership zealously pursued by RCA brass—forced it to relax its stance regarding broadcasting; Brunswick's resultant successes soon forced Victor's reconsideration of its stances on combination machines and promotional broadcasting (Sutton 2008:134-37, 140-41; Sanjek 1988b:64).[33] In November of that year, Johnson publicly declared that "radio is not a Victor competitor nor a substitute for talking machines" (quoted in Bastin and Lornell 2012:36). Edison was unmoved, refusing to consider radio-phonographs until 1927 (Sutton 2008). For its part, the radio industry recognized the value of music as a basic source of content for broadcast programming, and records formed the backbone of much radio programming (e.g., Segrave 1994; Pecknold 2007; Sutton 2008). And as RCA's vice president admitted (also in 1924), "We broadcast primarily so that those who purchase [RCA radios] may have something to feed those receiving instruments with" (quoted in Suisman 2009:251).

The second subsidiary claim for positing radio as the primary threat to the record business—in essence, that a substitution effect allowed radios to supplant records' place of pride in the hearts and minds of consumers—is not well supported. Firstly, the underlying logical proposition ('if consumers have consistent access to music for free on the radio, then they will buy fewer records'), despite often being presented as self-evident, fails as a general principle describing consumer choices. Recording Industry Association of America (RIAA) figures indicate that record sales climbed steadily throughout the rock era (*Billboard* 1968:12), when radio was indispensable in the music business (e.g., Hirsch 1972; Segrave 1994). At that time (and in all the years since), a given song or artist's radio presence has not been inversely proportional with their record sales, but in fact quite the opposite. Second, in both eras (interwar and postwar), there were plenty of industries competing for consumers' disposable income. Millard (2005:163), for example, lists "talking films, speakeasies, miniature golf, and amusement parks" in addition to radio; he also asserts a general principle: "A successful new entertainment often caused a depression in an older one." One of his examples of this substitution principle is the rise of Hollywood musicals and the accompanying decline of Broadway. What Millard neglects to observe, however, is that the film industry expropriated the venues and the personnel of stage shows (e.g., vaudeville theaters were converted into movie houses, and stage performers

[33] This opposition paralleled the industry's varying attitudes toward so-called 'race records' during the same period (see the following chapter)—or rather, the respective initial stances regarding race records and radio were *homologous* (see, e.g., Bourdieu [2000] 2005). That being said, there was heterogeneity of opinion within (as well as between) companies. The same month that Johnson wrote shared his radio skepticism with his son, his company's in-house trade magazine, *The Voice of the Victor*, floated the idea of timing sales promotions to coincide with radio broadcasts of its artists (Suisman 2009:266)—although in the summer previous, Victor brass had publicly announced (in the pages of *Wireless Age*, no less) that they intended to keep their exclusive artists from broadcasting (Sutton 2008:137, 143n27).



N (phonograph)	1,839,313	180,913	1,077,055	581,347	40,266
N (piano)	1,940,183	187,014	1,063,437	689,732	40,266
N (radio)	1,996,421	199,771	1,184,292	612,358	40,266

Figure 2.9. Rates of phonograph, piano and radio ownership by community size in GFWC surveys
Sources: *Talking Machine World* 1927; Larson 1992.
Note: The *N*'s represent the total number of households with data reported (by commodity and community size). The 'large cities' have 100,000 people or more; rural places have less than 2,500.

forsook their theatrical homes for studio lots) and provided a similar product while minimizing the costs of labor and materials that had steadily eroded theater producers' margins since the aughts (Poggi 1968). The threat that Hollywood posed to Broadway was not merely on the demand-side, but it was thoroughly *institutional*. To endanger the record business the same way that commercial theater was endangered, the radio industry would have needed to, say, coopt recording studios at increasing and irreversible rates and secure the services of record stars such that broadcasting activities precluded extensive recording activities (neither of which was the case).

Available data regarding radio and phonograph ownership sheds further light on the question of the relative status of the former vis-à-vis the latter. The 1925-26 Home Equipment Survey (HES) in particular indicates that the integration of radios into American households was still incomplete at mid-decade. *Talking Machine World* (1927) would later report the results of the last portion of the HES (complete with data table), in which respondents indicated their ownership or access to a telephone, a car, a radio, a phonograph, or a piano. Figure 2.9 compares the rates of phonograph, piano, and radio ownership among HES-sampled households. The numbers were broken down by commodities and by community size; in addition to the total sample, here the populations have been collapsed into three broad categories. (The chart also

contains the relevant sample sizes for each subgroup by commodity.) Generally, radio and phonograph ownership were positively associated with community size. This was especially true for phonographs. Overall, nearly half of the 1,839,313 households with 'responses' for the phonograph question owned a phonograph; that number was closer to one-third for households in what the Census Bureau would have regarded as rural areas at the time (places with fewer than 2,500 people), whereas about three-fifths of sampled households in cities with 100,000 or more people ("large cities") had a phonograph.[34] Regardless of how many sample households owned a phonograph, and irrespective of community size, the rate of radio ownership lagged behind.

In trying to assess the import of these numbers, we can compare them to other contemporaneous sources. Noting the underrepresentation of rural households in the HES sample (note the sample sizes in figure 2.9), the GFWC conducted a second survey exclusive to farm households. The relative rates of piano, phonograph, and radio ownership in the farm survey of 40,266 households—which are also depicted in figure 2.9—paralleled those for the rural communities in the HES: 13,844 homes (34.4 percent) had pianos; 13,191 (32.8 percent) had phonographs; and 8,111 (20.1 percent) had radios (Larson 1992:224). Fewer people seemed to own pianos in this second sample, but like the HES's rural households, more pianos were owned than phonographs—and respondents were still significantly less likely to own a radio than a phonograph (roughly one-in-five versus about one-in-three for both sets of rural households). The reported percentage of households owning a radio in the survey (24.1) isn't so far off from the number obtained (23.6) when dividing the National Broadcasting Company (NBC) estimate of radio households in 1927 (Field 2006) by the estimated number of households nationally (U.S. Bureau of the Census 1975).[35] If we take the NBC estimates seriously, though, it may be the case that the HES overestimated radio ownership: the former imply that only ten and sixteen percent of households had a radio set in 1925 and 1926, respectively. Even presuming limited generalizability given the possible bias within both the original HES sample and the follow-up farm sample toward more affluent and upwardly-mobile households (Kline 2000:96), one could argue that among the households that were likely to own a radio in the first place, those households were even *more* likely to own a phonograph.

Damned Lies and Sales Statistics

Part of the reason I think the belief in radio's efficacy over and against the recording industry has been so enduring—despite the complexity of the historical situation—is that observers have overestimated the extent of the decline that the industry experienced in the early 1920s. That

[34] I was constrained by the ordinal bins used to tabulate the results (e.g., Sherman 1927b), but for what it's worth, only the nation's sixty-eight largest cities had more than 100,000 people as of 1920 (e.g., U.S. Bureau of the Census 1921). Readers interested in the data table used to create the bar charts should consult table A5 in the appendix.

[35] Before becoming a pioneer in shows about nothing, NBC was the first, and by far most dominant, broadcasting organization of the interwar period (see Federal Communications Commission 1941). There's good reason to believe that the NBC estimates were themselves high, however. Beginning in 1930, the Census Bureau (1933a:52) collected data on American families' possession of radios. At that time, it counted 12 million families (of 29.9 million total families) with a radio set—a rate of 40.3 percent. (The 1930 census identified four household types that were classified as families: "a group of persons, related either by blood or by marriage or adoption, who live together as one household"; "[s]ingle persons living alone"; "a few small groups of unrelated persons sharing the same living accommodations as 'partners'"; and "[t]wo or more related persons occupying permanent quarters in a hotel" [U.S. Bureau of the Census 1933a:5-6].) Based on the NBC count of radio households (and the corresponding estimated number of total households), the rate was 45.8 percent. (See figure A3 for more of the radio household estimates during this time period.)

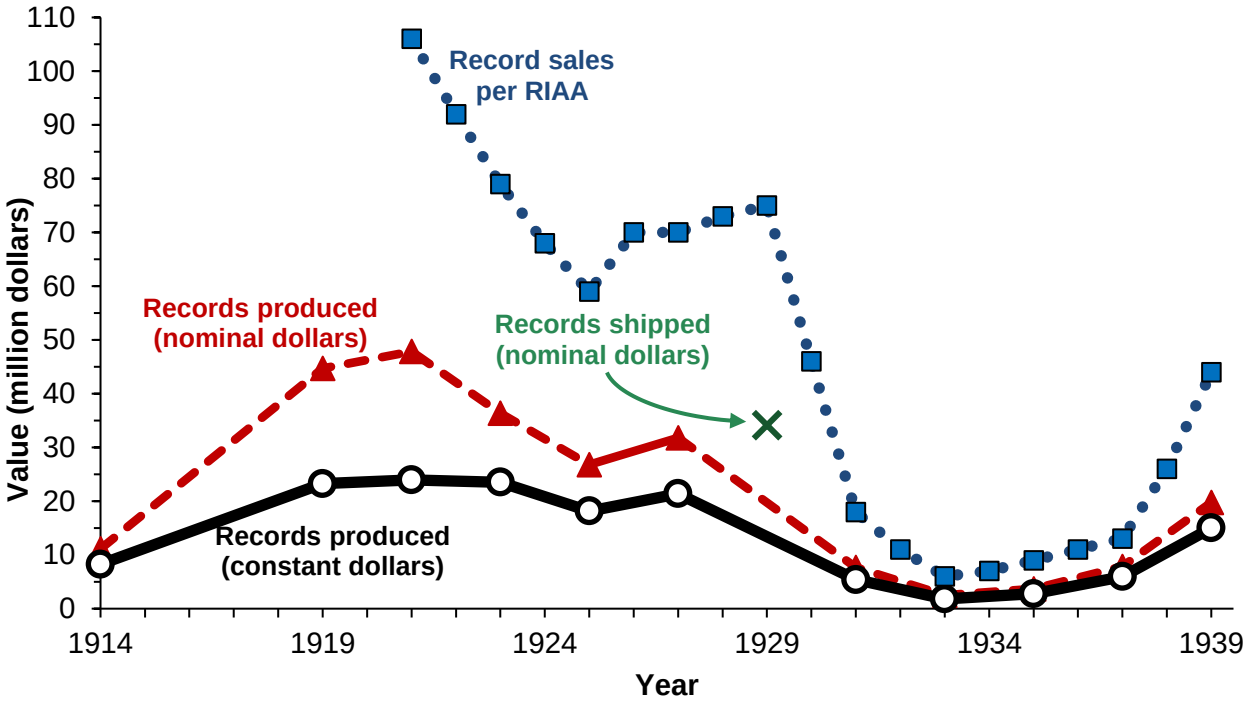


Figure 2.10. Census Bureau statistics for the value of record production and record shipments with RIAA estimates of record sales
Sources: U.S. Bureau of the Census; *Billboard* 1968.

overestimation in turn is an inevitable conclusion if one draws upon a particular data series (and I hesitate to refer to it as 'data'), a misinformative virus that has pervaded too much industry historiography. For several years, *Billboard* magazine presented a capsule overview of the recording industry's history in its annual overview of the domestic and international record business (e.g., *Billboard* 1968), and for each of those years, the reader was able to see the (alleged) dollar amount of record sales for every year from 1921 until whatever the last year prior to publication happened to be. Ostensibly, this data was supplied by the Recording Industry Association of America (RIAA), which has long been the recording industry's leading trade organization. Three well-cited works published across three decades (Sanjek 1988b; Peterson 1997; Millard 2005) use the questionable RIAA-*Billboard* data for national record sales, and there are a host of other instances across the secondary literature (e.g., Gronow 1983:63; Segrave 2002:49; Dowd 2003:166; Hoffmann and Ferstler 2005:303; Miller 2010:306n64; Mazor 2014:151). For their part, Segrave (2002) and Hoffman and Ferstler (2005) explicitly invoke these figures and attribute their downward trend in the 1920s to the influence of radio. Unfortunately, this data is highly suspect.

The Census data is generally useful, and here it serves to show just how unlikely the RIAA's interwar statistics are. Figure 2.10 plots the RIAA estimates of record sales against the cash value (the sum selling price) of records produced in both nominal and inflation-adjusted dollars. It should go without saying that sales cannot exceed production and yet sales (per the RIAA) exceed production by an order of magnitude for all of the 1920s. The 1921 figure—and honestly, one could go all the way down the line with this until the Depression—is preposterous relative to the Census totals. The recorded output value in *nominal* dollars is $47.8 million dollars, which is a far, far cry from the RIAA's estimate of $106.5 million. (Bear in mind that the

Census total includes blanks, so even if one assumed that the industry sold out its entire inventory, the retail total would be less than the given number.) Figure 2.10 also includes the nominal value of records shipped in 1929 and a similarly grotesque discrepancy between RIAA and official totals is present. Under official estimates, the inflation-adjusted cash value of record production declined 24.2 percent from 1921 to 1925—no mean sum, but nowhere near the 63.1 percent drop in sales posited by the RIAA.[36] When one relies on Census data, it's hard to imagine the record business's decline as being quite so drastic.

Unfortunately, the problem with these numbers is an iterative one: misinformation breeds more misinformation. Peterson (1997:97, 254n1), for instance, appears to cite Sanjek (e.g., Sanjek 1988b:62); Segrave (2002) credits *Billboard*; and Miller (2010) cites Gronow (1983), who in turn cites the RIAA. Founded in 1952 (Hoffmann and Ferstler 2005:903), I imagine that the RIAA is a reliable enough source for postwar record sales; I am less certain that we can trust its tabulation of sales prior to its founding, however. The RIAA ostensibly derived its historical sales figures from "[e]xcise tax payments" and "estimates from other data" (*Billboard* 1968:12). The only thing that's clear about this nebulous sourcing is that this "other data" doesn't include Census data. I shall remain extremely skeptical that anyone could adequately estimate sales post hoc using excise tax payments, least of all an organization founded decades after the fact, and the Census figures bear out that skepticism.

It ought to be clear from the preceding discussion that the industry was no stranger to trouble after 1919, but the RIAA numbers seriously inflate the scale of the trouble. But the old narrative—'radio killed the shellac disc star'—has persisted (much like these dubious interwar sales statistics). The apparent downturn in the industry's fortunes has been overstated, and it was also overdetermined (e.g., given the timing of the early-decade depression relative to the erosion of the theretofore dominant conception of control). Either way, the focus on radio takes valuable attention away from the more readily observable dynamics of the industry—as a field and as a field embedded in a cluster of fields—which offer a much less precarious basis for assessing the industry's health and what shapes that health over time. Radio is unnecessary for explaining the struggles of the industry in light of the shifting bases of hegemony among its leading firms.

Questions of Boundaries

Given the meteoric rise in the production of radios and in light of the Census Bureau's classification of radios and phonographs within a single industry for the entirety of the 1930s, it is tempting to give into the sort of narrative that places radio as the final victor of a dialectic whereby the piano was supplanted by the phonograph, only to be dethroned by the radio. But the 'succession narrative,' though persuasive, is ultimately an artefact of the triumphalist and determinist cast of most histories of commercial-technological development. More recent histories have offered a less hyperbolic rendering of the unavoidable growing pains that arose as new media confronted each other (see Roell 1989; Millard 2005). As I hope to have argued above, the notion that radio posed a mortal or near-mortal threat to the record business is poorly supported, and the evidence paints a more complex picture of the 1920s (Sutton 2008).

[36] Here, as elsewhere, I controlled for inflation using an implicit price index for consumer durables (Atack and Bateman 2006); if I instead used Solar and David's consumer price index (Lindert and Sutch 2006), the corresponding drop in output value would be 42.9 percent, which is close to the unadjusted decline of 44 percent. The Census-measured decline in output, regardless of how or whether one controls for inflation, is well below the RIAA-estimated drop in sales for 1921-25.

It's worth asking whether the threat posed by radio, such that it was, represented more of a challenge for the *phonograph* market in particular. Recall that record production (relative to 1919) had mostly recovered by the end of the decade, before that recovery was scuttled by the Depression; the same was not true of phonographs. The proliferation of combination radio-phonographs attests to, at minimum, phonograph manufacturers' insecurities regarding record players as an ongoing investment (see, e.g., Hoffmann and Ferstler 2005:303). The Census Bureau did not publish detailed statistics regarding combination phonographs prior to the 1927 Census of Manufactures (prior breakdowns had distinguished between disc and cylinder players). In 1927, only 5.6 percent of phonographs produced were combinations; four years later, amidst a general decline in phonograph manufacturing, combinations were 60.4 percent of the total produced. Leaning on the hoary clichés of succession narratives, too many writers have failed to see the combination radio-phonograph for what it was—a excessively literal metaphor for the organizational future of the business. Conversely, we could view the combination phonograph as an instance of *cooptation*, where phonograph makers stem a perceived challenge by incorporating the challenger's technology.

Just as the combination phonograph was a manifest response to the advent of mass radio production and consumption (see also, e.g., Hoffmann and Ferstler 2005:303; Suisman 2009:267-68), the industry's adoption of electrical recording has typically been framed as a response to the rising popularity and superior sound quality of radio (e.g., Peterson 1997; Millard 2005; Sutton 2008; Suisman 2009)—as if the limitations of acoustic recording were not already well-known to the studio engineers who had made an art of compensating for them (e.g., Schmidt Horning 2013).[37] Issues around temporal order undermine this particular argument. Western Electric engineers (who would eventually enable Victor and Columbia to get a head-start on the rest of the industry) had developed a workable electric recording process by 1919, and Brunswick was conducting its own experiments as early as 1921 (Sutton 2008:147-56)—all before the apparent beginning of the radio boom circa 1923 (see figure 2.6). The introduction of electrical recording in 1925 has also been credited with stemming the record business's decline the face of radio (e.g., Ogren 1989:101; Hoffmann and Ferstler 2005:303), but I would note that the data for the HES was gathered around the same time; radio ownership among the sampled households generally lagged behind phonograph ownership, which suggests that records by extension hadn't quite been supplanted. The combination radio-phonograph was in large part an adaptation on the part of phonograph makers to the rise of radio, versus an attempt by radio producers to absorb another industry (e.g., Suisman 2009:267-68): it represented integration, not succession. Similarly, electrical recording represents the application of radio, telegraphy, and telephony experimentation to another industry with a vested interest in sound reproduction.

If one is concerned first and foremost with the evolution of social fields, an important question presents itself: are these phenomena evidence of a new field, or perhaps of invasion of the field of phonographs by radio producers? Earlier, I pointed out that the changing placement of phonograph statistics within the census of manufactures was aligned with its growing significance in the world of music. Contra their stated rationale in that first instance, Bureau officials' stated justification for deprecating the phonograph industry and instituting a new "radio

[37] Millard, Sutton, and Suisman all proffer some variant of this (problematic) framing of the connection between the radio boom and the adoption of electrical recording, as well as a discussion of the ample challenges in making early recordings. The most in-depth discussion of those challenges (as well as how they shaped the development of the studio engineer as an institutionalized role) is likely in Schmidt Horning 2013.

Table 2.2. Total Product Value by Industry Classification and Product Class, 1909-29

	Phonograph industry					Other industries	
	Total product value	Phonograph-related product value	Other product value	Pct. of product value unrelated to phonographs	Total phonograph-related product value	Total product value, phonograph-related	Pct. of phonograph-related product value in other industries
1909	11,725,996	11,258,419	467,577	4.0	11,290,318	31,899	0.3
1914	27,115,916	26,758,844	357,072	1.3	26,825,375	66,531	0.2
1919	158,547,870	152,036,897	6,510,973	4.1	159,210,040	7,173,143	4.5
1921	98,212,784	94,177,030	4,035,754	4.1	95,281,424	1,104,394	1.2
1923	107,311,265	105,511,324	1,799,941	1.7	106,813,111	1,301,787	1.2
1925	61,057,147	55,225,684	5,831,463	9.6	58,829,062	3,603,378	6.1
1927	95,296,137	91,134,640	4,161,497	4.4	94,223,938	3,089,298	3.3
1929	96,849,048	77,709,040	19,140,008	19.8	86,597,444	8,888,404	10.3

Source: U.S. Bureau of the Census (1923b:991, 1924:1165; 1930:1219; 1933b:1343).
Note: Product values are in millions of (nominal) dollars and refer to the cash value units produced, except for 1929, where it refers to units shipped. 'Other product value' here also includes the Census Bureau calls "custom work and repairing," which was not typically disaggregated from "other products."

Table 2.3. Total Product Value by Industry Classification and Product Class, 1931-39

	Radio apparatus & phonograph (RAP) industry							Other industries	
	Total product value	RAP-related product value	Other product value	Custom, contract, and repair work	Misc. products not specified	Pct. of product value unrelated to RAP	Total RAP-related product value	Total product value, RAP-related	Pct. of RAP-related product value in other industries
1931	193,142,845	187,717,880	4,479,966	944,999	—	2.8	195,382,156	7,664,276	3.9
1933	121,801,611	115,350,111	5,148,110	1,303,390	—	5.3	119,234,930	3,884,819	3.3
1935	200,972,523	187,396,251	12,675,938	900,334	—	6.8	206,973,570	19,577,319	9.5
1937	277,807,140	260,984,593	15,597,315	507,745	717,487	6.1	288,619,884	27,635,291	9.6
1939	275,870,165	264,030,370	10,983,703	515,104	340,988	4.3	284,476,109	20,445,739	7.2

Source: U.S. Bureau of the Census (1935:1007; 1938:1111; 1942b:388).

apparatus and phonographs" grouping was much more mundane: "the increasing production of radio apparatus by manufacturers of phonographs and the introduction of the combination radio-phonograph made it desirable to establish the present classification [of a radio and phonograph industry]" (U.S. Bureau of the Census 1935:1006). This explanation indicates that reclassification is not prima facie evidence of a new field. It is, however, evidence of census bureaucrats attempting to preserve a notion of 'industry' premised on the rapidly-fading norm of undiversified firm with tightly focused product lines (e.g., Fligstein 1990)—all while laboring in deference to preexisting notions of distinct product classes through which phonographs and radios are seen as strange bedfellows (whereas nowadays either might merely be a component of a sound system) despite their shared roots in nineteenth-century telegraphy and telephony. A peculiar manifestation of this apparent taxonomical dilemma appears in the prior census-taking of 1929, when *identical* volume and value figures for radio-phonographs appear in both the electrical machinery and phonograph industry reports (U.S. Bureau of the Census 1933b:1128, 1343).

Thin rationales for reclassification aside, though, the boundaries of the phonograph industry (as defined) were indeed becoming more fluid with respect to production as the 1920s progressed. The investment of phonograph firms outside of their home industry increased, while firms outside the industry enlarged their respective stake therein, as table 2.2 indicates. In terms of product value, nearly a fifth of overall shipments by nominal phonograph industry firms in 1929 were 'extramural,' so to speak. As table 2.3 shows, the share of product value generated outside of the new radio and phonograph classification was, on the other hand, was consistently low indicating that the new grouping was a more apt description of its included firms' activities.

Consolidation and Colonization

Interviewed mere months after Starr had trained its slingshot on Victor's last standing lateral-cut patent, Otto Heineman was more than effusive in his praise for Yankee initiative and his optimism for the future of records and talking machines. "It is most fortunate that America should be the leader in the phonograph and record industry, for it will strengthen the world's tribute which has been paid to American inventive genius and to American workmanship" (*Talking Machine World* 1919b:128). In the next decade-and-a-half, though, the American recording industry (and the phonograph industry which birthed it) had been thoroughly colonized, either by British firms or by firms in other industries. The leading firms for most of the industry's pre-Depression history—Edison, Columbia, and Victor—were American-owned and operated heading into the interwar period. By the end of the Depression, Victor was owned by RCA (which also controlled leading broadcast network NBC), the Columbia record business was controlled by the second-place network Columbia Broadcasting System (CBS), while the newest firm among the industry leaders, Decca, was merely the American beachhead for its parent company across the pond. There were other firms of course, but by the arrival of the Petrillo Ban these three accounted for what the Justice Department alleged was roughly 99 percent of record sales (U.S. Congress 1943:100).

There are many routes to trace the declining independence of American phonograph and record manufacturers and the increasing consolidation among them, but Columbia experienced what was likely the most labyrinthine series of ownership changes. In 1925, having only emerged from receivership and reorganization the year prior, the Columbia Phonograph Company, Inc. was bought out by the British Columbia Graphophone Company, Ltd., which had been the American company's subsidiary until the early decade tailspin forced divestment

(Sutton 2008; Martland 2013). (The following year, American Columbia acquired Heineman's General Phonograph Corporation, which had spearheaded the induction of blues and country into the industry.) It managed well enough until the Depression, when its British owners sold it to the Grigsby-Grunow Company, maker of radios and refrigerators.[38] When Grigsby-Grunow failed in 1934, the Columbia assets were purchased by Harold Yates, who owned Consolidated Film Industries (CFI). By that time, CFI also owned ARC, which had been leasing the Brunswick radio assets from Warner Brothers.[39] (Radio firms were not alone in seeking to claim a piece of the record business—the film industry had its own designs as well.) The right to use the Columbia name on records finally became the property of CBS in 1939 after it purchased ARC and rechristened it as the Columbia Recording Corporation (e.g., Suisman 2009; Sutton 2018). CBS had cunningly assembled a radio-record media fiefdom to rival the one RCA created when it purchased Victor a decade earlier.

Meanwhile, record and phonograph manufacturing had recovered in the middle and latter part of the 1930s, in part via the advent of the jukebox as public entertainment (e.g., Sanjek 1988b; Segrave 2002; Sutton 2018). The Depression had undercut the domestic consumption that was the cornerstone of the industry, but the repeal of Prohibition had (re)created a new venue where music could be publicly consumed cheaply (Sanjek 1988b:132-33; Segrave 2002:127). Ostensibly, "[n]o self-respecting drinking establishment was without" its own jukebox (Millard 2005:169), and the frequent turnover of box selections buoyed demand for records (Sanjek 1988b:133). Where records had once been a means of selling phonographs, jukeboxes were now a means of selling records. The makers of these machines were already embedded among musical manufactures. When the novelty of the player-piano hadn't yet worn off, Wurlitzer was by consensus "the largest manufacturer of mechanical instruments, including player pianos" (Roell 1989:292). By the end of the Depression, Wurlitzer had refashioned itself somewhat in becoming the nation's largest manufacturer of jukeboxes (Sanjek 1988b:137; Segrave 2002:48). Estimates of how many jukeboxes were in operation during this period vary wildly, with little obvious compatibility between them. Garofalo and Waksman (2014:56) state that 150,000 were in use in 1935, but Sanjek (1988b:132) puts the number in 1936 at 150,000; citing earlier jukebox historians, Segrave (2002:48) pegs the 1937 total at 210,000. For the following year, Sanjek (1988b:137, 138) reports that Wurlitzer had estimated the figure at "no more than 175,000" while "more informed [and mysterious] sources" placed the total at 225,000; the ASCAP believed the 1938 total was just south of 500,000.[40] Millard (2005:169), echoing the

[38] The sale of American Columbia occurred because of the Depression-triggered merger of Britain's two biggest record companies, Columbia and Gramophone, into Electrical & Musical Industries (EMI). Victor had long held a substantial interest in Gramophone (which became RCA's upon its own acquisition), and thus owned a stake in EMI. Fearing antitrust action, since the country's biggest record company would suddenly have a stake in its chief competitor, the American branch of the international Columbia conglomerate was sold off (Martland 2013; Sutton 2018).

[39] ARC was formed from the merger of the Pathé, Cameo, and Regal record companies, along with the Scranton Button Company, an independent record pressing operation (e.g., Sutton 2018). Before being sold to CFI, ARC was partly owned by the British Crystalate Gramophone Manufacturing Company (Martland 2013:247-48). As for Brunswick-Balke-Collender, it divested itself of its phonograph and record assets in selling them to Warner Brothers in 1930. Control of the Brunswick brand (on records) eventually fell to Decca after CBS purchased and reorganized ARC (e.g., Sutton 2018).

[40] Contending that "the selling of drinks is almost synonymous with the mechanical talking machine," Wurlitzer made their estimate using the number of active liquor licenses, which was ostensibly around 170,000 at the time (Sanjek 1988b:137-38).

ASCAP, supposes that half a million was the decade's high-water mark. In 1941, the *Wall Street Journal* cited an estimate of 300,000 in 1941—up from 20,000 "a few [and awfully unclear number of] years" before (Segrave 2002:50). Regardless of precisely how many jukeboxes there were, the Census-reported value of phonograph and record production increased steadily after 1933 (see again figure 2.3).

Enabled by unceasing horizontal integration, the entertainment business (including the music business) became especially adept at selling what Wurtzler (2007) has called "intermedia commodities" (see also Suisman 2009). These commodities, the cultural heirs of which are still being marketed to us today in various guises, were not meant to be consumed for their own sake, their own individual use-value, but as a gateway to other related commodities linked in an unending chain of consumption. As Suisman (2009:270) pointedly observes,

> once music fused with cinema and radio, the substantial distinction between the music business and other entertainment industries ceased to exist. Indeed, here was the capstone in the architecture of the soundscape of consumer capitalism. . . . To claim that this corporate integration matters is not to romanticize the discreteness of the individual arts or to fetishize their autonomy in relation to one another, but rather to call attention to the fact that it was interlocking corporate ownership, not intellectual or aesthetic affinity, that bound them together.

With this mutual dependence among particular products, it's easy enough to sympathize with the legal arguments that, prior to the Copyright Act of 1909, framed music rolls as part of the mechanical apparatus of a player piano. After all, what good was one without the other? What we now call 'cross-promotions' are, more precisely, strands in vast webs of *reciprocal* promotion wrought by diversified and integrated firms (Wurtzler 2007; Suisman 2009). Thus, records could be used to sell phonographs and provide a reservoir of content for radio broadcasts; broadcasts could in turn be used to promote the records and generate demand for radio sets—which could receive those broadcasts and were increasingly integrated into combination phonographs, machines that could play records. But these chained connections were never inevitable; rather, they were the accumulated results of firms' collective efforts to amass market power and maintain it.

Bibliography

Abbott, Lynn and Doug Seroff. 2017. *The Original Blues: The Emergence of the Blues in African American Vaudeville*. Jackson, MS: University Press of Mississippi.

Aldridge, B.L. [1964] 1983. *The Victor Talking Machine Company*. Pp. xxxiii-lxiii in Fagan and Moran

Askin, Noah and Michael Mauskapf. 2017. "What Makes Popular Culture Popular? Product Features and Optimal Differentiation in Music." *American Sociological Review* 82:910-9 44.

ARSC (Association for Recorded Sound Collections). 2017. "About the Association for Recorded Sound Collections (ARSC)." Accessed August 3, 2019 (http://www.arsc-audio.org/about.html).

ARSC (Association for Recorded Sound Collections). 2019. "ARSC Awards for Lifetime Achievement & Distinguished Service to Historical Recordings." Accessed August 2, 2019 (https://www.arsc-audio.org/awards/people.html).

Atack, Jeremy, and Fred Bateman. 2006. "Manufacturing output and implicit price indexes, by type of commodity: 1869-1939." Table Dd309-365 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright. New York: Cambridge University Press. Accessed August 16, 2017 (http://dx.doi.org/10.1017/ISBN-9780511132971.Dd309-660).

Barnett, Kyle S. 2006. "Furniture Music: The Phonograph as Furniture, 1900–1930." *Journal of Popular Music Studies* 18:301-24.

Barnett, Kyle. 2014. "Record Men: Talent Scouts in the U.S. Recording Industry, 1920-1935." Pp. 113-141 in *Making Media Work: Cultures of Management in the Entertainment Industries*, edited by Derek Johnson, Derek Kompare, and Avi Santo. New York: New York University Press.

Bastin, Bruce and Kip Lornell. 2012. *The Melody Man: Joe Davis and the New York Music Scene, 1916-1978*. Jackson, MS: University Press of Mississippi.

Belinfante, Alexander and Richard L. Johnson. 1982. "Competition, Pricing and Concentration in the U.S. Recorded Music Industry." *Journal of Cultural Economics* 6(2):11-24.

Berg, Richard E. [1998] 2019. "Sound Physics." *Encyclopædia Britannica*. Accessed December 13, 2019 (https://www.britannica.com/science/sound-physics).

Billboard. 1963. "Historical Outline of Country & Western Music." November 2, 1963 (sec. 2), pp. 18-22.

Billboard. 1968. "U.S. Record Survey." August 31, 1968 (sec. 2), pp. 9-13.

Bourdieu, Pierre. [2000] 2005. "Principles of an Economic Anthropology." Pp. 75-89 in *The Handbook of Economic Sociology* (2nd ed.), edited by Neil J. Smelser and Richard Swedberg. Princeton and Oxford: Princeton University Press; New York: Russell Sage Foundation.

Brooks, Tim. 1978. "Columbia Records in the 1890's: Founding the Record Industry." *ARSC Journal* 10(1): 5-36.

Brooks, Tim. 1990. Review of *Pop Memories, 1890-1954: The History of American Popular Music*, by Joel Whitburn. *ARSC Journal* 21(1): 134-41.

Brooks, Tim. 2002. "High Drama in the Record Industry: Columbia Records, 1901-1934." *ARSC Journal* 33: 21-76.

Cahill, Kevin J. 1992. “The U.S. Bank Panic of 1907 and the Mexican Depression of 1908-1909.” *The Historian* 60(4):795-812.

Carter, Susan B., Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright, eds. 2006. *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*. New York: Cambridge University Press. Accessed May 24, 2017 (http://hsus.cambridge.org).

Cohen, Norman. 1971. “Computerized Hillbilly Discography: The Gennett Project.” *Western Folklore* 30(3):182-93.

Cummings, Alex Sayf. 2013. *Democracy of Sound: Music Piracy and the Remaking of American Copyright in the Twentieth Century*. New York: Oxford University Press.

DeGraaf, Leonard. 1995. “Confronting the Mass Market: Thomas Edison and the Entertainment Phonograph.” *Business and Economic History* 24(1):88-96.

Dixon, Robert M.W. and John Godrich. 1970. *Recording the Blues*. New York: Stein and Day.

Dixon, Robert M.W., John Godrich, and Howard Rye. 1997. *Blues and Gospel Records, 1890-1943*. 4th ed. New York: Oxford University Press.

Dowd, Timothy J. 2002. “Culture and Commodification: Technology and Structural Power in the Early US Recording Industry.” *International Journal of Sociology and Social Policy* 22:106-40.

Dowd, Timothy J. 2003. “Structural Power and the Construction of Markets: The Case of Rhythm and Blues.” *Comparative Social Research* 21:147-201.

Dowd, Timothy J. 2007. “The Sociology of Music.” Pp. 249-260, 440, and 505-512 in Volume 2 of *21st Century Sociology: A Reference Handbook*, edited by Clifton D. Bryant and Dennis L. Peck. Thousand Oaks, CA: Sage.

ENHS (Edison National Historic Site). [1929] 2008. “Edison Disc Record and Phonograph Sales Statistics (1912–1928).” Accessed January 14, 2018 (https://web.archive.org/web/20170412182614/http://www.mainspringpress.com/edison_disc-sales.html).

Ferstler, Howard. 2005. “Speeds.” P. 1051 in *Encyclopedia of Recorded Sound*, 2nd ed, edited by Frank Hoffmann and Howard Ferstler. New York and London: Routledge.

Field, Alexander J. 2006. “Radio and television – stations, sets produced, and households with sets: 1921-2000.” Table Dg117-130 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright. New York: Cambridge University Press. Accessed May 8, 2017 (http://dx.doi.org/10.1017/ISBN-9780511132971.Dg117-180)

Fligstein, Neil. 1987. “The Intraorganizational Power Struggle: Rise of Finance Personnel to Top Leadership in Large Corporations, 1919-1979” *American Sociological Review* 52(1):44-58.

Fligstein, Neil. 1990. *The Transformation of Corporate Control*. Cambridge, MA: Harvard University Press.

Fligstein, Neil. 1996. “Markets as Politics: A Political-Cultural Approach to Market Institutions.” *American Sociological Review* 61(4): 656-673.

Fligstein, Neil. 2001. *The Architecture of Markets: An Economic Sociology of Twenty-First-Century Capitalist Societies*. Princeton and Oxford: Princeton University Press.

Garofalo, Reebee and Steve Waksman. 2014. *Rockin’ Out: Popular Music in the U.S.A*. 6th ed. Boston: Pearson.

General Phonograph Corporation. 1919. Untitled advertisement. *Talking Machine World*, October 15, 1919, between pp. 26 and 27.
Gracyk, Tim and Frank Hoffmann. 2000. *Popular American Recording Pioneers, 1895-1925*. Binghamton, NY: Haworth Press.
Greenwood, Royston and C. R. Hinings. 1996. "Understanding Radical Organizational Change: Bringing together the Old and the New Institutionalism." *Academy of Management Review* 21(4):1022-54.
Greer, James L. 2014. "The Better Homes Movement and the Origins of Mortgage Redlining in the United States." Pp. 203-35, 286-93 in *Statebuilding from the Margins: Between Reconstruction and the New Deal*, edited by Carol Nackenoff and Julie Novkov. Philadelphia: University of Pennsylvania Press.
Gronow, Pekka. 1983. "The Record Industry: The Growth of a Mass Medium." *Popular Music* 3:53-75.
Hirsch, Paul M. 1972. "Processing Fads and Fashions: An Organization-Set Analysis of Cultural Industry Systems." *American Journal of Sociology* 77(4): 639-59.
Hoffmann, Frank and Howard Ferstler, eds. 2005. *Encyclopedia of Recorded Sound*. 2nd ed. 2 vols. New York and London: Routledge.
Hughbanks, Leroy. 1945. *Talking Wax; or: The Story of the Phonograph*. New York: Hobson Book Press.
Kennedy, Rick. 2013. *Jelly Roll, Bix, and Hoagy: Gennett Records and the Rise of America's Musical Grassroots*. Rev. ed. Bloomington, IN: Indiana University Press.
Kenney, William Howland. 1999. *Recorded Music in American Life: The Phonograph and Popular Memory, 1890-1945*. New York: Oxford University Press.
Kline, Ronald R. 2000. *Consumers in the Country: Technology and Social Change in Rural America*. Baltimore: Johns Hopkins University Press.
Koenigsberg, Allen. 2005. "Patents." Pp. 805-07 in *Encyclopedia of Recorded Sound*, 2nd ed, edited by Frank Hoffmann and Howard Ferstler. New York and London: Routledge.
Kramer, Keith. n.d. "Talking Wax." *Tim Gracyk's Phonographs, Singers, and 78s*. Accessed November 13, 2019 (https://www.gracyk.com/talkingWax.html).
Laird, Ross. 2001. *Brunswick Records, A Discography of Recordings, 1916-1931*. 4 vols. Westport, CT: Greenwood Press.
Laird, Ross and Brian Rust. [2004] 2016a. " OKeh Historical Survey: OKeh Corporate History." *Discography of American Historical Recordings (DAHR)*. Accessed October 1, 2017 (https://adp.library.ucsb.edu/index.php/resources/detail/210).
Larson, Sarah Sue. 1992. "Good life in the country: Rural households and the American pie, 1900-1930." PhD dissertation, Department of History, American University, Washington, DC.
Lindert, Peter H. and Richard Sutch. 2006. "Consumer price indexes, for all items: 1774–2003." Table Cc1-2 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright. New York: Cambridge University Press. Accessed October 21, 2019 (http://dx.doi.org/10.1017/ISBN-9780511132971.Cc1-65).
Lindstrom, Diane. 2001. "Depressions, Economic." Pp. 182-85 in *The Oxford Guide to United States History*, edited by Paul S. Boyer, Melvyn Dubofsky, Eric H. Monkkonen, Roland L. Numbers, David M. Oshinsky, and Emily S. Rosenberg. New York: Oxford University

Press.
Lopes, Paul D. 1992. “Innovation and Diversity in the Popular Music Industry, 1969 to 1990.” *American Sociological Review* 57:56-71.
Lopes, Paul D. 2002. *The Rise of a Jazz Art World*. New York: Cambridge University Press.
Martin, Susan Boyles, Jeffrey Lehman, and Jane A. Malonis, eds. 1995. *Notable Corporate Chronologies, Volume 1: A-K*. Detroit: Gale Research.
Martland, Peter. 2013. *Recording History: The British Record Industry, 1888-1931*. Lanham, MD: Scarecrow Press.
Mazor, Barry. 2014. *Ralph Peer and the Making of Popular Roots Music*. Chicago: Chicago Review Press.
Mergent. 2004-19. *Moody’s Industrials.* Mergent Archives. Accessed September 18, 2018 (https://www.mergentarchives.com).
Millard, Andre. 2005. *America on Record: A History of Recorded Sound*. 2nd ed. New York: Cambridge University Press.
Miller, Karl Hagstrom. 2010. *Segregating Sound: Inventing Folk and Pop Music in the Age of Jim Crow*. Durham, NC: Duke University Press.
Negus, Keith. 1999. *Music Genres and Corporate Cultures*. New York: Routledge.
Officer, Lawrence and Samuel Williamson. 2006. “Better Measurements of Worth.” *Challenge* 49(4): 86-110.
Ogren, Kathy. 1989. *The Jazz Revolution: Twenties America and the Meaning of Jazz*. New York: Oxford University Press.
Pecknold, Diane. 2007. *The Selling Sound: The Rise of the Country Music Industry*. Durham and London: Duke University Press.
Peterson, Richard A. 1997. *Creating Country Music: Fabricating Authenticity*. Chicago: University of Chicago Press.
Peterson, Richard A. and David G. Berger. 1975. “Cycles in Symbol Production: The Case of Popular Music.” *American Sociological Review* 40:158-73.
Phillips, Damon J. 2013. *Shaping Jazz: Cities, Label, and the Global Emergence of an Art Form*. Princeton, NJ: Princeton University Press.
Phillips, Damon J. and David A. Owens. 2004. “Incumbents, Innovation, and Competence: The Emergence of Recorded Jazz, 1920 to 1929.” *Poetics* 32:281-95.
Poggi, Jack. 1968. *Theater in America: The Impact of Economic Forces 1870-1967*. Ithaca, NY: Cornell University Press.
RCA (Radio Corporation of America). [1943] 2002. “Sales by Class of Record and Total Sales of Records by Units, Years 1901 and 1941 Inclusive.” Accessed July 3, 2019 (https://web.archive.org/web/20170915050232/http://www.mainspringpress.com/victorsales.html).
Raman, Anantanarayanan. 2014. “Discovery of *Kerria lacca* (Insecta: Hemiptera: Coccoidea), the Lac Insect, in India in the Late 18th Century.” *Current Science* 106(6):886-90.
Read, Oliver and Walter W. Welch. 1976. *From Tin Foil to Stereo: Evolution of the Phonograph*. 2nd ed. Indianapolis: Howard W. Sams.
Richmond Item. 1922. “Starr Co. Wins Record Case.” April 6, 1922, p. 12.
Roell, Craig H. 1989. *The Piano in America, 1890-1940*. Chapel Hill and London: University of North Carolina Press.
Roy, William G. 2004. “‘Race Records’ and ‘Hillbilly Music’: Institutional Origins of Racial Categories in the American Commercial Recording Industry.” *Poetics* 32:265-79.

Russell, Tony. 2004. Introduction to *Country Music Records: A Discography, 1921–1942*. New York: Oxford University Press.
Russell, Tony. 2007. "Country Music on Location: 'Field Recording' before Bristol." *Popular Music* 26(1): 23-31.
Russell, Tony, and Bob Pinson, eds. 2004. *Country Music Records: A Discography, 1921–1942*. New York: Oxford University Press.
Sanjek, Russell. 1988a. *American Popular Music and Its Business: The First Four Hundred Years.* Vol. 2, *From 1790 to 1909*. New York and Oxford: Oxford University Press.
Sanjek, Russell. 1988b. *American Popular Music and Its Business: The First Four Hundred Years.* Vol. 3, *From 1900 to 1984*. New York and Oxford: Oxford University Press.
Schmidt Horning, Susan. 2013. *Chasing Sound: Technology, Culture, and the Art of Studio Recording from Edison to the LP*. Baltimore: Johns Hopkins University Press.
Schuller, Gunther. 1968. *Early Jazz: Its Roots and Musical Development*. New York: Oxford University Press.
Segrave, Kerry. 1994. *Payola in the Music Industry: A History, 1880-1991*. Jefferson, N.C.: McFarland.
Segrave, Kerry. 2002. *Jukeboxes: An American Social History*. Jefferson, N.C.: McFarland.
Sherman, Mary. 1926a. "The Federation Survey." *Woman's Home Companion*, April 1926, pp. 36, 81.
Sherman, Mary. 1926b. "The Home Equipment Survey." *Woman's Home Companion*, November 1926, pp. 15, 111-12.
Sherman, Mary. 1927a. "Heat and Light in America's Homes." *Woman's Home Companion*, January 1927, pp. 4, 94.
Sherman, Mary. 1927b. "Where the American Family Finds Its Recreation." *Woman's Home Companion*, February 1927, pp. 32,78.
Suisman, David. 2009. *Selling Sounds: The Commercial Revolution in American Music*. Cambridge, MA: Harvard University Press.
Sutton, Allan. 1994. *Directory of American Disc Record Brands and Manufacturers: 1891–1943*. Westport, CT: Greenwood Press.
Sutton, Allan. 2000. *American Record Labels and Companies: An Encyclopedia (1891-1943)*. Denver: Mainspring Press.
Sutton, Allan. 2008. *Recording the 'Twenties: The Evolution of the American Recording Industry, 1920-29*. Denver: Mainspring Press.
Sutton, Allan. 2010. *A Phonograph in Every Home: The Evolution of the American Recording Industry, 1900-19*. Denver: Mainspring Press.
Sutton, Allan. 2014. "Pathé in the United States." Pp. vii-xxiii in *The Pathé-Perfect Discography: American Issues, 1922-1930*. Vol. 1, *Race, Popular Vocal, Star, Standard/Miscellaneous, and Classical/Operatic Series*, by William R. Bryant, Allan Sutton, and the Record Research Associates. Denver: Mainspring Press.
Sutton, Allan. 2016. *Race Records and the American Recording Industry, 1919-1945: An Illustrated History*. Denver: Mainspring Press.
Sutton, Allan. 2018. *American Record Companies and Producers, 1888-1950: An Encyclopedic History*. Denver: Mainspring Press.
Swedberg, Richard. 2005. "Markets in Society." Pp. 233-53 in *The Handbook of Economic Sociology* (2nd ed.), edited by Neil J. Smelser and Richard Swedberg. Princeton and Oxford: Princeton University Press; New York: Russell Sage Foundation.

Talking Machine World. 1919a. "New Records Popular in Canada." May 15, 1919, p. 117.
Talking Machine World. 1919b. "Descants on the Wonderful Advance of the Industry." May 15, 1919, p. 128.
Talking Machine World. 1919c. "Those Who Buy Talking Machines and Records—and Why—An Analysis of the Field." October 15, 1919, pp. 25-26.
Talking Machine World. 1927. "Nation-wide Survey of Phonographs and Radios in Homes." April 15, 1927, pp. 10-11.
Taylor, Timothy D. 2007. "The Commodification of Music at the Dawn of the Era of 'Mechanical Music.'" *Ethnomusicology* 51(2):281-305.
Titon, Jeff Todd. 1994. *Early Downhome Blues*: *A Musical and Cultural Analysis*. 2nd ed. Chapel Hill and London: University of North Carolina Press.
Tufte, Edward R. 2001. *The Visual Display of Quantitative Information*. 2nd ed. Cheshire, CT: Graphics Press.
U.S. Bureau of the Census. 1895. *Report on Manufacturing Industries in the United States at the Eleventh Census, 1890*. Part 1, *Totals for States and Industries*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1902a. *Twelfth Census of the United States.* Vol. 7, *Manufactures Part I: United States by Industries*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1902b. *Twelfth Census of the United States.* Vol. 9, *Manufactures Part III: Special Reports on Selected Industries*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1902c. *Twelfth Census of the United States.* Vol. 10, *Manufactures Part IV: Special Reports on Selected Industries (Continued)*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1907. *Manufactures, 1905.* Part 1, *United States by Industries*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1908a. *Manufactures, 1905.* Part 3, *Special Reports on Selected Industries*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1908b. *Manufactures, 1905.* Part 4, *Special Reports on Selected Industries*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1913a. *Thirteenth Census of the United States.* Vol. 8, *Manufactures 1909: General Report and Analysis.* Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1913b. *Thirteenth Census of the United States.* Vol. 10, *Manufactures 1909: Reports for Principal Industries.* Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1916. *Census of Manufactures: General Totals for the United States by Geographic Divisions, States, and Industries—1914, 1909, 1904, and 1899.* Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1917. *Abstract of the Census of Manufactures, 1914.* Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1918a. *Census of Manufactures: 1914—Musical Instruments.* Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1918b. *Census of Manufactures: 1914—Printing and Publishing.* Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1919. *Census of Manufactures, 1914*. Vol. 2, *Reports for Selected Industries and Detail Statistics for Industries, by States*. Washington, DC: Government

Printing Office.
U.S. Bureau of the Census. 1923a. *Fourteenth Census of the United States*. Vol. 8, *Manufactures, 1919: General Report and Analytical Tables*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1923b. *Fourteenth Census of the United States*. Vol. 10, *Manufactures, 1919: Reports for Selected Industries*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1924. *Biennial Census of Manufactures, 1921*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1926. *Biennial Census of Manufactures, 1923*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1928. *Biennial Census of Manufactures, 1925*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1930. *Biennial Census of Manufactures, 1927*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1932a. *Fifteenth Census of the United States—Manufactures: 1929*. Vol. 1, *General Report: Statistics by Subjects*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1932b. *Fifteenth Census of the United States—Census of Distribution: Products of Manufacturing Industries, 1929*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1933a. *Fifteenth Census of the United States: 1930—Population*. Vol. 6, *Families*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1933b. *Fifteenth Census of the United States—Manufactures: 1929*. Vol. 2, *Reports by Industries*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1935. *Biennial Census of Manufactures, 1931*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1936. *Biennial Census of Manufactures, 1933*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1938. *Biennial Census of Manufactures, 1935*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1939. *Biennial Census of Manufactures, 1937*. Pt. 1. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1942a. *Sixteenth Census of the United States—Manufactures: 1939*. Vol. 1, *Statistics by Subjects*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1942b. *Sixteenth Census of the United States—Manufactures: 1939*. Vol. 2, Pt. 2, *Reports by Industries—Groups 11 to 20*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1949. *Census of Manufactures: 1947*. Vo1. 2, *Statistics by Industry*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1950. *Census of Manufactures: 1947*. Vo1. 1, *General Summary*. Washington, DC: Government Printing Office.
U.S. Bureau of the Census. 1975. *Historical Statistics of the United States, Colonial Times to 1970*. 2 vols. Washington, DC: Government Printing Office.
U.S. Congress. Senate. 1929. "Home Equipment Survey." 70th Congress, 2nd Session. *Congressional Record* 70 (January 30, 1929):2439-45.

U.S. Congress. Senate. Committee on Interstate Commerce. 1943. *Use of Mechanical Reproduction of Music: Hearings before a Subcommittee of the Committee on Interstate Commerce*. 77th Cong., 2nd sess., September 17, 18, and 21, 1942.

U.S. Department of Commerce. 1923. Commercial and Government Radio Stations of the United States. Washington, DC: Government Printing Office.

U.S. Department of Commerce. 1927. Commercial and Government Radio Stations of the United States. Washington, DC: Government Printing Office.

U.S. Federal Communications Commission. 1939. *List of Radio Broadcast Stations by State and City as of January 1, 1939*. Washington, DC: Government Printing Office.

U.S. Federal Communications Commission. 1941. *Report on Chain Broadcasting*. Washington, DC: Government Printing Office.

Wald, Elijah. 2004. *Escaping the Delta: Robert Johnson and the Invention of the Blues*. New York: Amistad.

Warfield, Patrick. 2009. "John Philip Sousa and 'The Menace of Mechanical Music.'" *Journal of the Society for American Music* 3(4):431-63.

Wells, Mildred White. 1953. *Unity in Diversity: The History of the General Federation of Women's Clubs*. Washington, DC: General Federation of Women's Clubs.

Wile, Raymond R. 2004a. "The North American Phonograph Company: Part I (1888-1892)." *ARSC Journal* 35(1):1-36.

Wile, Raymond R. 2004b "The North American Phonograph Company: Part II (1893-1898)." *ARSC Journal* 35(2):206-231.

Wile, Raymond R. 2006. "The 1896 Consent Agreement Between the Graphophone and the Edison Interests." *ARSC Journal* 37(2): 193-208.

Wolfe, Charles K. 2002. "The Bristol Syndrome: Early Field Recordings of Country Music." Pp. 202-221 in Country Music Annual 2002, edited by Charles K. Wolfe and James E. Akenson. Lexington: University Press of Kentucky.

Wolman, Leo. 1929. "Consumption and the Standard of Living." Pp. 13-78 in *Recent Economic Changes in the United States*, by the Committee on Recent Economic Changes of the President's Conference on Unemployment. New York: McGraw-Hill.

Wurtzler, Steve J. 2007. *Electric Sounds: Technological Change and the Rise of Corporate Mass Media*. New York: Columbia University Press.

Zuckerman, Mary Ellen. 1995. "From Educated Citizen to Educated Consumer: The Good Citizenship and Pro-Advertising Campaigns in the *Woman's Home Companion*, 1920-1938." *American Periodicals* 5:86-110.

Appendices

Table A1. Number of firms, average number of wage-earners, and sum value of output by industry and individual firm output value, 1921

	Group A: Product value < $5,000			Group B: Product value $5,000+			Ratio of Group A to B		
	Firms	Wage-earners	Product values	Firms	Wage-earners	Product values	Firms	Wage-earners	Product values
Pianos	5	5	10,598	185	15,836	73,639,912	0.027	0.000	0.000
Organs	3	2	13,800	56	2,346	10,184,854	0.054	0.001	0.001
Piano and organ materials	5	5	14,882	89	5,569	18,597,436	0.056	0.001	0.001
Other musical instruments	89	26	197,790	116	3,424	12,353,778	0.767	0.008	0.016
Phonographs	19	10	54,173	154	17,938	98,212,784	0.123	0.001	0.001
Music publishing	34	4	81,750	107	900	14,024,672	0.318	0.004	0.006

Source: U.S. Bureau of the Census 1924. Product values are in (nominal) dollars.

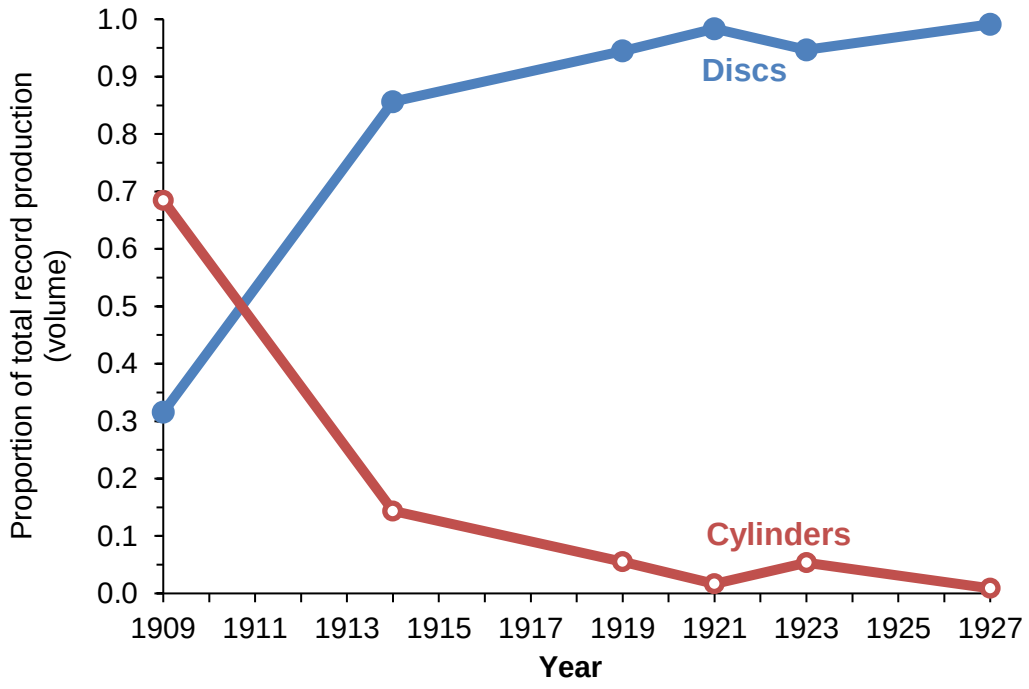


Figure A1. Proportion of record production (volume) by format, 1909-27
Source: U.S. Bureau of the Census.

Table A2. Population estimates and price indices, 1899-1947

	Population estimates			Price indices (1899 = 100)	
	Total	Households	Civilian labor force	Implicit (consumer durable)	Consumer (Solar-David)
1899	74,793,000	—	27,753,000	100.00	100
1904	82,166,000	17,521,000	31,441,000	119.29	107
1909	90,490,000	19,734,000	35,721,000	129.14	109
1914	99,111,000	22,110,000	39,401,000	134.86	120
1919	105,063,000	23,873,000	39,696,000	192.14	207
1921	108,538,000	25,119,000	41,979,000	199.71	214
1923	111,947,000	26,298,000	43,444,000	154.57	204
1925	115,829,000	27,540,000	45,169,000	147.57	210
1927	119,035,000	28,632,000	46,375,000	148.57	208
1929	121,767,000	29,582,000	47,757,000	152.00	205
1931	124,040,000	30,272,000	49,325,000	142.57	182
1933	125,579,000	30,802,000	50,882,000	138.29	155
1935	127,250,000	31,892,000	52,283,000	133.71	164
1937	128,825,000	33,088,000	53,768,000	131.29	172
1939	130,880,000	34,409,000	55,218,000	131.57	166
1947	144,698,000	39,107,000	59,682,000	—	267

Sources: U.S. Bureau of the Census 1975; Atack and Bateman 2006; Carter et al. 2006; Lindert and Sutch 2006
Note: Data listed for years with censuses of manufactures only.

Table A3. Unadjusted product value totals by industry, 1899-1939

	Phonograph	Other musical instruments	Organ	Piano	Piano/organ materials	Radio (extrapolated)	Music publishing	Radio & phonograph
1899	2,246,274	3,394,734	5,691,504	35,428,225	—	—	2,272,385	—
1904	10,237,075	3,481,710	6,041,844	46,922,471	13,128,315	114,050	4,147,783	—
1909	11,725,996	3,228,108	4,745,655	66,569,273	18,474,616	448,262	5,575,903	—
1914	27,115,916	3,624,667	6,297,348	62,775,085	19,875,762	672,575	7,271,266	—
1919	158,547,870	12,506,334	5,973,268	107,088,050	20,096,487	7,834,698	14,592,177	—
1921	98,212,784	12,353,778	10,184,854	73,639,912	18,597,436	9,549,649	14,024,672	—
1923	107,311,265	15,619,438	9,602,692	111,159,398	38,838,735	44,176,298	14,626,810	—
1925	61,057,147	20,329,301	12,283,089	101,180,777	36,836,238	155,819,724	15,089,636	—
1927	95,296,137	17,891,948	15,438,623	75,490,681	22,244,731	176,273,332	15,881,634	—
1929	—	—	—	—	—	329,624,505	15,240,268	—
1931	—	8,113,712	5,710,028	15,293,048	3,089,883	—	10,903,247	193,142,845
1933	—	5,113,618	1,626,804	7,242,819	1,732,193	—	—	121,801,611
1935	—	9,060,222	1,698,763	12,688,485	3,185,962	—	—	200,972,523
1937	—	11,947,583	4,636,921	21,703,055	4,977,795	—	—	277,807,140
1939	—	11,552,380	3,420,893	20,493,110	4,771,563	—	—	275,870,165

Source: U.S. Bureau of the Census

Note: Radio 'industry' extrapolated from wireless telegraph apparatus ('04-'09), wireless apparatus ('14), radio and wireless ('19), radio apparatus, both telephone and wireless apparatus ('21-'23), radio apparatus, including tubes ('25), and radio apparatus and tubes ('27-'29).

Table A4. Unit volume and total value of phonographs, records, pianos, and radio receivers produced, 1899-1939

	Phonographs (total)		Straight phonographs		Combination phonographs		Records		Pianos		Radio receivers	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
1899	13,550	1,240,503	13,550	1,240,503	—	—	2,763,277	539,370	171,362	27,069,412	—	—
1904	—	2,966,343	—	2,966,343	—	—	—	4,678,547	261,197	41,497,789	—	—
1909	344,681	5,406,684	344,681	5,406,684	—	—	27,183,959	5,007,104	364,545	58,493,846	—	—
1914	514,154	15,290,491	514,154	15,290,491	—	—	27,221,290	11,111,418	326,274	56,311,863	—	—
1919	2,226,406	91,568,943	2,226,406	91,568,943	—	—	106,996,510	44,689,795	336,557	94,521,939	—	—
1921	596,033	38,604,739	596,033	38,604,739	—	—	105,191,929	47,843,856	221,210	66,267,751	—	—
1923	997,459	57,037,060	997,459	57,037,060	—	—	98,104,279	36,372,410	347,589	104,362,578	413,677	13,996,022
1925	642,015	22,613,909	642,015	22,613,909	—	—	82,125,060	26,790,847	306,584	93,676,977	2,508,982	93,579,849
1927	1,046,387	49,242,170	987,502	39,814,510	58,885	9,427,660	105,701,302	31,781,443	218,140	67,210,775	1,978,057	95,162,393
1929	—	—	—	—	—	—	—	—	—	—	4,980,090	253,724,035
1931	121,907	8,810,323	48,304	2,499,881	73,603	6,310,442	30,851,282	7,697,787	51,370	12,780,746	3,745,682	117,836,744
1933	—	3,317,931	—	1,910,281	30,092	1,407,650	—	2,500,477	—	—	3,599,522	70,553,334
1935	—	10,821,638	—	8,360,292	23,362	2,461,346	—	3,705,016	61,198	11,688,531	5,590,745	132,212,416
1937	—	11,653,733	—	7,086,391	57,807	4,567,342	—	7,823,192	103,110	19,567,879	5,843,569	131,526,468
1939	—	45,743,590	—	20,731,855	474,823	17,193,408	—	19,761,884	111,245	18,031,038	8,256,250	111,847,649

Source: U.S. Bureau of the Census

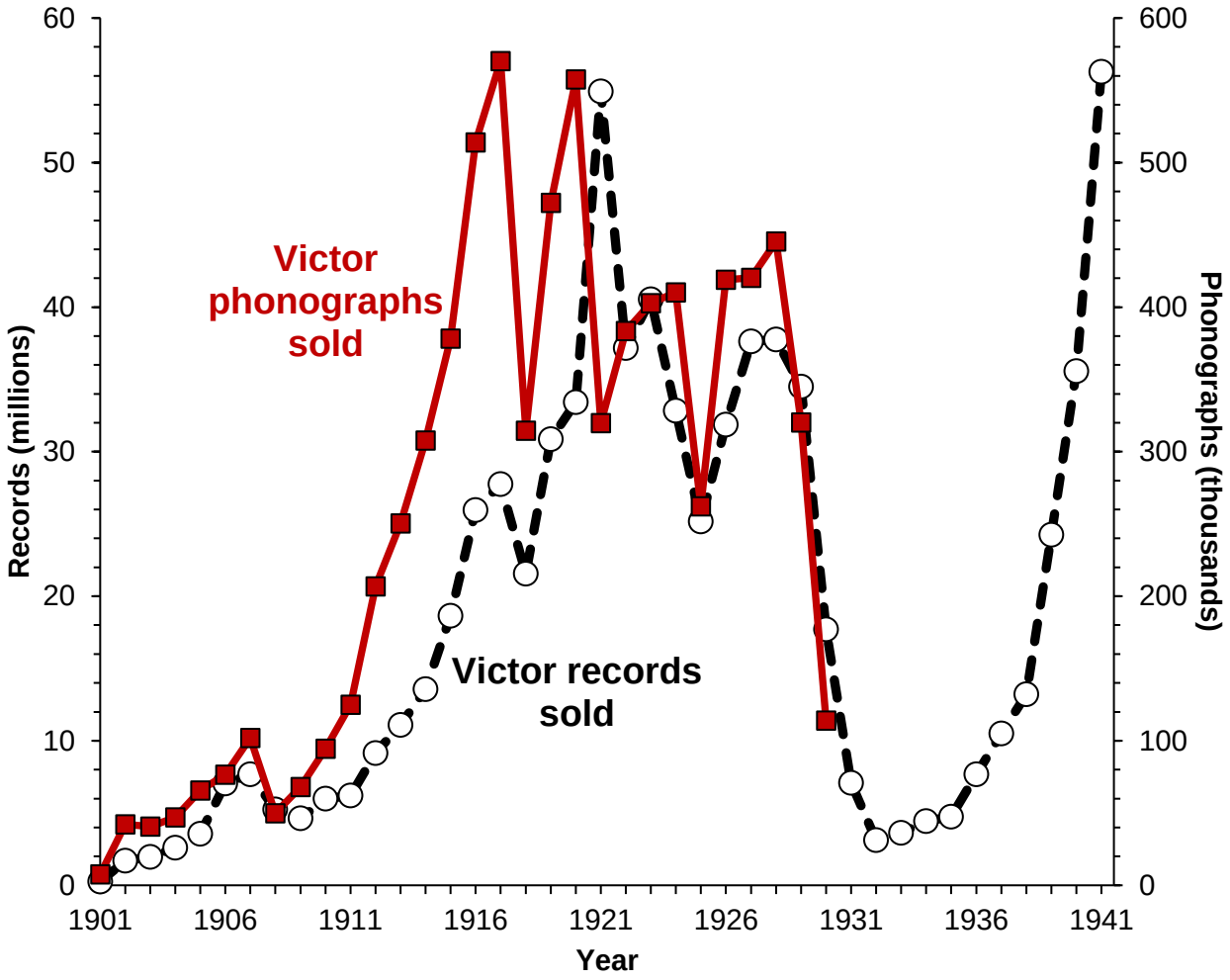


Figure A2. Victor/RCA Victor unit sales for records (1901-41) and phonographs (1901-30)
Sources: Aldridge [1964] 1983; RCA [1943] 2002

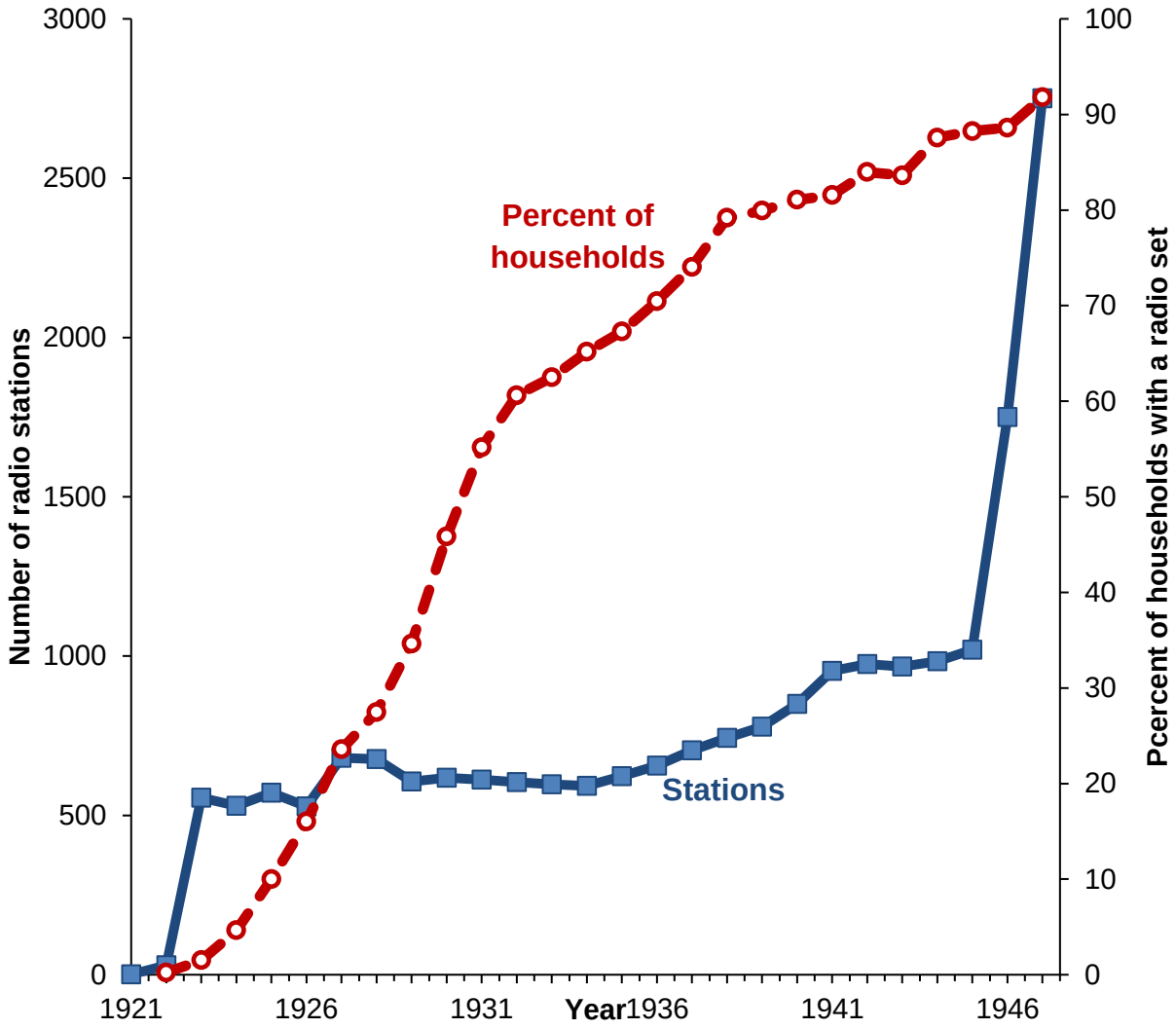


Figure A3. Number of licensed operating radio stations and estimated share of households with a radio set, 1921-1947

Sources: U.S. Bureau of the Census 1975; Field 2006

Table A5. Home Equipment Survey results for radio, phonograph, and piano ownership by community size

		0 - 999	1,000 - 2,499	2,500 - 4,999	5,000 - 9,999	10,000 - 24,999	25,000 - 49,999	50,000 - 99,999	100,000+	Total
Radio Sets	Communities reporting	526	353	176	105	66	27	18	9	1,283
	Total no. of families	66,618	133,153	157,718	183,509	247,774	239,911	355,380	612,358	1,996,421
	Families owning	12,471	26,555	29,434	34,264	61,598	62,126	94,619	159,570	480,637
	Percent	18.7	19.9	18.7	18.7	24.9	25.9	26.6	26.1	24.1
Phonographs	Communities reporting	473	321	155	92	64	23	17	9	1,157
	Total no. of families	59,224	121,689	136,989	161,435	245,059	206,766	326,806	581,347	1,839,313
	Families owning	17,189	39,519	47,702	55,833	104,119	93,868	141,189	350,406	849,825
	Percent	29.0	32.5	34.8	34.6	42.5	45.4	43.2	60.3	46.2
Pianos	Communities reporting	499	328	164	94	62	24	16	10	1,200
	Total no. of families	62,958	124,056	144,363	164,815	231,716	205,976	316,567	689,732	1,940,183
	Families owning	23,250	50,628	54,007	61,711	87,343	88,721	116,491	300,843	782,994
	Percent	36.9	40.8	37.4	37.4	37.7	43.1	36.8	43.6	40.4

Source: *Talking Machine World* (1927)