OLD AT HEART, YOUNG AT THE PERIPHERY:
AN AGE-DEPENDENT APPROACH TO RESOURCE PARTITIONING

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ABSTRACT

We offer an age-related explanation for the process of resource partitioning. We theorize that, as the incumbents within a market category grow older, their ability to undertake structural changes diminishes: coupled with evolving audience preferences, this generates a gap between the incumbents' offerings and their audiences' preferences, creating opportunities for new entrants.

THEORETICAL BACKGROUND

Aging is a process that every organization undergoes. Researchers have long striven to understand how age affects organizational outcomes. Previous studies suggested that aging plays a role in a variety of organizational phenomena, including adaption (Amburgey, Kelly, and Barnett, 1993; Hannan and Freeman, 1984), strategic positioning (Ruef, 1997; Henderson, 1999), and innovation (Sorenson and Stuart, 2000), as well as firm growth and survival (Barron, West, and Hannan, 1994; Ranger-Moore, 1997). This literature has taught us that old organizations change less frequently and to a lesser extent compared to younger ones (Amburgey et al., 1993, Le Mens, Hannan, and Pólos, 2015b); in addition, they tend to be less innovative (Sorenson and Stuart, 2000), encounter more difficulties when repositioning (Ruef, 1997), experience lower growth rates and, as a result, they are more likely to exit the industry (Barron et al., 1994). The wealth of extant studies about the effects of aging on individual organizations contrasts with the scant research about its effects on macro-level market structures (for an exception, see Barnett, 1997), and particularly on the evolution of markets and industries. Yet age is very likely to affect these higher-level dynamics because industries consist of individual organizations who, much like living beings, inevitably age and experience the implications of this process.

This study aims to advance our understanding of the effects of aging on the evolution of markets. We provide an age-related explanation for resource partitioning, i.e., the ecological mechanism whereby the consolidation of mass or "mainstream" producers results in the proliferation of specialists in mature markets (Carroll, 1985; Carroll and Swaminathan, 2000). In its classical formulation, the theory holds that concentration rises as a result of scale-driven

competition among the large incumbents who occupy the resource-rich center of the market. Concentration in the center frees up space in the periphery, where small and specialized newcomers fill the pockets of demand that are too small for mass producers relying on scale advantages. Hence, the theory predicts greater vitality (i.e., higher likelihood of entry and lower likelihood of exit) for peripheral producers as market concentration rises.

In contrast, we explain the proliferation of new entrants through the effect of aging on incumbents. Our theoretical arguments are summarized by the dashed line in Figure 1, where a plus sign indicates that the two connected constructs vary in the same direction and a minus sign means they move in opposite directions. We theorize that, as a market matures, the average age of incumbents grows. One of the effects of aging on incumbents is increasing organizational size (Hannan, 1998), which results in greater market concentration—the main predictor in the classical theory (Carroll, 1985). However, aging also leads to structural inertia (Hannan and Freeman, 1984; Le Mens et al., 2015b), so that the speed at which the incumbents can adapt to their environment decreases as they become older. This leads to an increasing mismatch between the incumbents' offerings and the audience members' (e.g. consumers') preferences. Such a gap creates opportunities for new entrants, whose products are in tune with contemporary tastes: therefore, the aging of incumbents encourages new entry. We further conjecture that this effect is magnified when the environment changes at a faster rate, i.e. when tastes mutate more quickly. We propose three hypotheses about the effects of aging on the likelihood of d*e novo* entry and analyze how the entry of new record companies into music genres depends on the incumbents' speed of movement across the product space. Whereas earlier studies have relied on the frequency of organizational change to measure structural inertia (e.g., Amburgey et al., 1993; Beck, Brüderl, and Woywode, 2008), thus overlooking the role of distance between different organizational states, we measure the organizations' speed of movement taking both frequency and distance into account (Le Mens et al., 2015b; Liu, Pólos, and Hannan, 2017).

Figure 1 about here

HYPOTHESES

First, we argue that as a market category or segment matures, the mortality of producers who are active in the category decreases. Indeed, institutionalization processes are well underway in mature markets, where the boundaries are more established, producers become socialized with a shared set of norms, and audiences' expectations converge (Ruef and Patterson, 2009). As their mortality decreases, the average age of producers increases. According to Le Mens et al. (2015b), older organizations experience greater inertia and have lesser capacity for structural change: therefore, we expect their average speed of movement in product space to decline.

H1: The average speed of movement of incumbents decreases with their age.

Second, organizational obsolescence sets in if the incumbents cannot keep up with shifts in their environment, meaning that they are no longer able to offer what the audience wants. As a result, we expect the gap between their offerings and the consumers' taste to widen (Le Mens et

al. 2015b). Such a gap increases the likelihood of entry of new organizations (*de novo* entrants), who are unencumbered by age and internal resistance, and thus are better equipped to cater to the unmet demand. Therefore, we expect a greater likelihood of *de novo* entry in market categories or segments that are occupied by older incumbents.

H2: The likelihood of *de novo* entry increases as the average speed of movement of incumbents decreases.

Third, we contend the effect of aging on the likelihood of *de novo* entry is stronger when the environment changes more quickly around the incumbents. This is because the gap between the incumbents' offerings and audiences' preferences grows even larger if audiences' preferences drift at a greater speed. The higher the speed of environmental drift, the more difficult it is for the aging and sluggish incumbents to catch up with shifting demand. Because this creates even more opportunities for new organizations, we predict that the negative effect of incumbents' speed of movement in product space on the likelihood of *de novo* entry is amplified in fast-changing categories or segments.

H3: The negative effect of incumbents' speed of movement on the likelihood of *de novo* entry becomes stronger if the speed of the environmental drift is higher.

EMPIRICAL SETTING: THE RECORDING INDUSTRY

We test our hypotheses on data from the recording industry. In this setting, record companies constitute the most relevant organizational units (Lena 2012). In the eyes of market participants, record companies belong to one of two groups: majors and independents (or *indies*). The majors, who collectively command about two-thirds of the recording business, abide by corporate norms and structures, have access to distribution channels suitable for the mass market. They also have access to a considerable amount of resources, which they use to target mainstream tastes. In contrast, the indies tend to be more specialized (Benner and Waldfogel, 2016). Although the indies are not necessarily young and small, the majors are invariably old and very large: historically, they have played a leading role in the consolidation of the music industry (Anand and Peterson, 2000).

We opted to test our predictions in this market for three important reasons. First, this context satisfies the key assumptions required by our theoretical arguments, especially with regard to changes in consumer preferences. In music, and in creative industries more generally, environmental change is strongly related to fads and fashions (Hirsch 1972) and bandwagon effects (Mark, 2003), which create a turbulent environment for artists and record companies to cope with (Peterson and Berger, 1971). Second, the recording industry has already been the focus of studies dealing with dynamics of concentration and specialization (Dowd, 2004; Peterson and Berger, 1996) and has long attracted the attention of resource-partitioning theorists (Carroll, 1985, p. 1279). Third, this market satisfies the scope conditions underlying Carroll's (1985) classical formulation of resource partitioning. In fact, the theory requires: (a) non-uniform distribution of demand, (b) scale advantages in competition, and (c) limits to scope economies (cf. Liu and Wezel, 2015; Reis et al., 2012). In the recording business, customers show a wide variety of preferences that, partly because of social influence (Mark, 1998), tend to converge on

mainstream tunes (e.g., Peterson and DiMaggio, 1975). This setting thus fulfills condition (a). With regard to condition (b), competitive advantages based on economies of scale are apparent as the major record companies owe their fortune largely to returns to scale in the production, marketing, and distribution of records. Finally, with regard to condition (c), there are limits to scope economies because record companies cannot cater to the full spectrum of consumer preferences without incurring identity penalties (Phillips and Kim, 2009).

DATA AND VARIABLES

For data collection we primarily draw on Discogs, a user-contributed database and marketplace for record collectors. We assume that potential entrants do not screen the market for recorded music as a whole, but rather consider a finer segmentation at different levels, thereby targeting first music genres and then styles. Our empirical analyses focus on music genres, as resources like network and experience tend to be primarily genre-specific. The Discogs database enables us to count the number of record companies entering each genre in a given year. We complement this with information from the Billboard 200, available to us from November 19th, 1988, to April 18th, 2015. The Billboard 200 ranks the weekly best-selling albums and EPs in the U.S. based on retail sales and, as of 2014, also on digital sales and streaming revenues. We use this chart to measure the annual demand for particular genres of music. The final dataset consists of 26844 companies, 3.8-percent of which are connected to one of the six majors active in 1988–2015, and 149774 products, which are scattered across 14 genres. Because our unit of analysis is genre-year and for each genre we have a 29-year window, our sample consists of 406 observations.

The key variable involved in our analysis is *organizational speed* of movement, which captures how fast the record companies active in a particular genre-year move across the product space. Building on Le Mens et al. (2015b), we use a Mahalanobis distance to measure organizational speed adjusted for the similarity between the genres where the companies in question are active. For every record company active in year *t*, we calculate the Mahalanobis distance between its product portfolios at *t* and *t-1*. For each genre-year in our sample, we then take the mean Mahalanobis distance covered by the incumbents in the focal genre-year and thus obtain a variable that increases with the speed at which the incumbents move across the space.

This average speed serves as the dependent variable in our test of H1, but it is rather an independent variable in our tests of H2 and H3, where the outcome of interest is the number of new entrants in a genre-year. We restrict this count to *de novo* entrants, i.e., record companies that are entirely new to the market (cf. Carroll et al., 1996), thereby excluding lateral entries from other genres. For each genre-year in our sample, we count the record companies that released at least one product in the focal genre during the focal year and for which the focal year is the first year of activity. Because a firm can release more than one product during its first year of activity, and because each product can belong to more than one genre, some firms are counted as new entrants in multiple genres during the same year.

Testing H1 also requires us to measure the mean age of incumbents in a given genre-year. To this purpose, we associate every record company with an internal clock that starts from zero at the firm's year of entry and increases with each passing year. For each genre-year in our sample, we compute the mean age of active record companies. In addition, we compute the mean number of records released by the incumbents during the focal year, regardless of genre, as a proxy for their *size*. To test H3, we need to measure the environmental drift within each genre, i.e., the pace at which audiences' preferences change. Such a variable is challenging to compute

directly because it requires in-depth information about the products' features and how these features are distributed among successful products. Our data source does not grant this information because it only lists the products' genre memberships: however, we can assume the pace at which consumers update their preferences within a genre to be slower if the genre is older. With this in mind, we use *genre age* as a proxy for the volatility of consumers' tastes, that is, the local speed of environmental drift. We equate the year of "birth" of any given genre with the release year of the earliest record assigned to that genre on Discogs.

Because H2 and H3 are intended to support our proposition that organizational speed contributes to dynamics of resource partitioning, it is important to show that music genres, as sub-markets of the recording industry, conform to the predictions of resource-partitioning theory. We thus need to show that increasing market concentration in the hands of mainstream producers (the majors) increases the number of *de novo* entrants (Carroll, 1985). In organizational ecology, it is common to account for concentration through a *C4* ratio (e.g., Carroll and Swaminathan, 2000). We compute the number of records released by each incumbent in the genre-year that sold enough copies to appear on the Billboard 200 during the same year and divide it by the total number of records from that genre-year that appeared on the chart. This quantifies the market share of individual record companies. We aggregate the shares of the top four record companies in each genre-year in order to measure concentration in a way that is agnostic to whether these companies are independent or owned by a major.

We include control variables for various genre characteristics that are likely to affect both the speed of organizations and the likelihood of *de novo* entry. Two such variables are category *contrast* (Carnabuci et al., 2015) and *leniency* (Pontikes and Barnett, 2015). In addition to these two properties, we also compute the yearly *demand* for products in a given genre by counting the records released in that genre-year that appeared on the Billboard 200 during the same year and dividing by the total number of records from that year that appeared on the chart during the same year (regardless of genre). Finally, we control for the *density* of incumbents. Compatibly with ecological research (Carroll and Hannan, 1989; Hannan and Freeman, 1988), we use a quadratic polynomial to account for both legitimating and competitive effects. All the independent variables are lagged by one year to address concerns of simultaneity.

PRELIMINARY RESULTS AND DISCUSSION

To estimate effects on organizational speed (H1), we use a generalized linear model (GLM) assuming a gamma distribution of responses (Myers et al., 2002, pp. 214–215). To account for systematic differences between the genres, we specify genre-fixed effects through a set of 13 dummy variables. In addition, we split our study period into four time-windows and use three dummies to account for period-fixed effects. These windows correspond to spells within our study period where different sets of major record companies were active. Time-period dummies serve the purpose of controlling for changes in the number of mainstream producers in the market as well as other industry shocks (Bhattacharjee et al., 2007). To estimate effects on the likelihood of *de novo* entry (H2 and H3) we use a negative binomial model. Again, all predictors are lagged by one year and we include fixed effects for genres and periods.

In addition to confirming the existence of resource-partitioning dynamics (Carroll, 1985) in the market for recorded music, the results of our analysis (available upon request) return three findings of interest: First, the incumbents' average speed of change decreases with age, and therefore we found support for H1. This effect is moderated by size, i.e. larger firms are the ones

whose speed decreases most as a result of aging. Second, the incumbents' average speed of change has a negative effect on the likelihood of *de novo* entry, meaning that new firms are more likely to enter market categories or segments (in our setting, genres) where the incumbents are slow. Therefore, H2 also receives support. Third, the age of a category or segment crucially moderates the relationship between incumbents' speed and *de novo* entry, so that if the incumbents are slow and the segment is young, new entrants are even more likely but if the incumbents are slow and the genre is old, they are less likely. This suggests that newcomers maximally benefit from the incumbents' inertia in unstable environments, where audience members' preferences change too fast for aging organizations. Based on this evidence, H3 looks also supported. If the environment is stable, however, the effect of aging on new entry turns negative, which suggests that slow organization remain capable of meeting demand.

  Our study makes multiple contributions to the literatures on age dependence and resource partitioning. First, while existing studies on age dependence almost exclusively focus on the effect of aging on individual organizations, we explore how aging drives changes in market structure. Given the fundamental role of aging in any organization, poor understanding of the macro-level effects of age impedes our ability to explain and predict market evolution. Second, our study advances the current understanding of resource partitioning by proposing an alternative explanation based on aging and inertia. This explanation adds to recent theoretical developments, which extend the classical model by incorporating effects of organizational identity (Liu and Wezel, 2015). Finally, our study makes empirical contributions to both literatures: our novel measure of firms' speed not only takes the frequency of change into account, as is common in existing studies, but also accounts for distance between the various positions that firms may occupy in the product space.

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REFERENCES AVAILABLE FROM THE AUTHOR(S)

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Figure 1: Classical (solid) and age-related (dashed) explanations for resource partitioning

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