Strategic Timing of Product Introduction in the Digital Age: Evidence from the Music Industry

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Abstract

The timing of product introduction is perhaps the most important short-run strategic variable in many industries. In this project, we look at introduction timing as a response to competition as well as cannibalization issues. An exemplary setting for an empirical study is the recorded music industry. Sales patterns are usually unimodal, rendering competition for shelf space and consumer awareness a timing issue. This is underlined by the fact that there is essentially no price competition. With the advent of digital retailing that brought unlimited shelf space, one could argue that release timing has lost its importance. However, greater variety inflates the choice set of consumers, making it costly to evaluate the relative quality of alternatives, especially for experience goods such as music. This in turn means that consumers strongly rely on sales rankings or recommendations when making purchase decisions in digital markets. We argue that firms will consider this when making the release decision. We therefore pose the question whether we observe more or less temporal concentration of similar products in online vs. offline markets, controlling for competition and cannibalization issues. This will yield important insights to our understanding of how digitization shapes market structures. The important distinction to prior literature is that we explicitly look at endogenous firm behavior.

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1 Motivation

In many industries, firms do not compete in prices or quantities, but rather in product characteristics, brand and the timing of introduction. Indeed, we commonly observe near-uniform pricing of highly heterogeneous products especially in entertainment markets. As product characteristics and branding are difficult to change in the short run, release timing is perhaps the most important short run strategic variable in those industries. An exemplary industry for the features discussed above is the music industry: prices show almost zero variation and sales patterns are usually unimodal, which makes the first few weeks key determinants of overall product and artist success. Music is an experience good whose quality cannot be observed in advance, making consumer search and evaluation costly in terms of time and attention. In turn, sales success strongly depends on the match of song characteristics to imperfectly known consumer tastes and the availability of other, similar artists around the same time, rendering release timing a crucial variable in the competition for shelf space.

Uncertainty about quality reduces firm incentives for horizontal product differentiation when prices are fixed (Bester, 1998). If we reinterpret spatial location in a Hotelling sense as a temporal variable, this result implies that competitors bunch similar products in time, i.e. release products at similar times, while for products with different perceived quality or costs, product introduction will be spread out (Bayus et al., 1997; Krider and Weinberg, 1998; Einav, 2010). Competition for shelf space is not necessarily only limited to interaction with competitors, but also to one's own products. Multiproduct monopolists will be aware that new products cannibalize their existing ones and vice versa (Wilson and Norton, 1989; Moorthy and Png, 1992; Takeyama, 2002), leading to spread out product introduction. The optimal timing is determined by the degree of differentiation (Lehmann and Weinberg, 2000; Elberse and Eliashberg, 2003; Hu and Smith, 2011). However, it remains an empirical question how the net effect of competition with own and rivals' products plays out.

One could argue that release timing is less of an issue in digital channels because shelf space is less scarce prima facie. However, greater variety in turn inflates the choice set of consumers, making it costly to evaluate the relative quality of alternatives, especially for experience goods. Consumers therefore use popularity information (such as sales rankings) to guide their search and reduce complexity (Tucker and Zhang, 2011; Hendricks et al., 2012). At least as important for experience goods however are recommendations – either automated or through social media – reflecting similar tastes of consumers. They thus provide an effective mechanism to reduce uncertainty about quality in digital channels (Fleder and Hosanagar, 2009; Dewan and Ramaprasad, 2012), which in turn has implications for the timing strategy of firms (Liu and Schiraldi, 2012).

We look at the timing of product introduction in relation to products already on the market. Doing this, we explicitly take competitive as well as cannibalizing effects into account. The specific question we ask is: Controlling for competition and cannibalization issues, do we observe more or less temporal concentration of similar products in online vs. offline markets? Investigating whether releases of similar artists temporary cluster yields important insights to our understanding of how digitization shapes market structures (Sorensen, 2007; Brynjolfsson et al., 2011). This discussion is central to an emerging literature inspired by the Long Tail phenomenon (Anderson, 2004). The important distinction we propose in this project is to explicitly look at endogenous firm behavior, which may shed light on the question how firms manage the specifics of digital markets.

2 Data and Methods

2.1 Data

The empirical analysis in this projects builds upon a unique panel dataset compiled from several sources. We draw meta information about products from *discogs.com*, an online platform for music enthusiasts. This yields song-level information on artist, release date, release channel, genre and record label. Further we use a dataset from the online radio *last.fm* which provides a list of 100 similar artists for each artist in our release database. Similarity is calculated using network measures from actual listening behavior of about 48 million users. We combine these two datasets to arrive at a dyadic structure, where the level of observation are pairs of releases from similar artists. For each dyad of artists, we can observe a continuous measure of how similar they are perceived by consumers. This provides us an innovative measure of product differentiation based on consumer preferences. We add online and offline sales ranks from *Billboard* and *iTunes* for all releases of an artist and historical data on social media awareness (fans on *Facebook*, plays on *Youtube*, etc.). Finally, we aim to rule out alternative explanations of release shifts as a response to piracy (Zentner, 2010; Danaher and Waldfogel, 2012), or increased awareness due to live concerts (Tonon et al., 2012). Measures for file sharing intensity and information about live shows on the artist-level come from *Musicmetric* and *last.fm*, respectively.

2.2 Identification

Figure 1: Product Introduction in the Music Industry

Single_{A1} Album_A Single of a similar artist Single_{A2} $\text{Single}_{A\dots}$ Single_{B1} Album_B
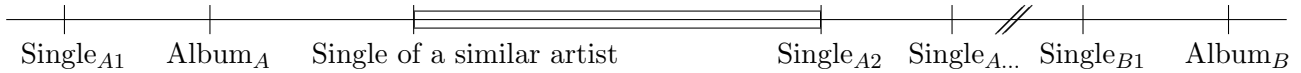
Identification of release timing decisions is difficult because we do not directly observe shifting from previously scheduled release dates. However, we can draw inference from the specific characteristics of product introduction in the music industry. The usual release pattern is depicted on the timeline in Figure 1. In the beginning of the process an artist records a number of songs from which usually 10–20 are selected to be jointly released on Album_A. Before this album is introduced to the market, record labels often choose one of the songs as a separate single-release (Single_{A1}). After the album is introduced, often a second (third, etc.) single is chosen (Single_{A2}). In the meantime the musician is producing new songs for Album_B and the process starts over again. It should be noted that record labels may use singles as a tool to advertise an album (Hendricks and Sorensen, 2009), but at the same time, they are an important stand-alone source of revenue.

To identify whether observed releases dates result from forward or backward shifting in response to the market environment, a reference point of what would have been the earliest possible release date is needed. For singles of type $A2$ (and follow-ups $A\dots$) we can use the release date of Album_A. At this time, the song had already been produced and in principle ready to be released. Any release date of Single_{A2} is now a function of observables, such as the market environment or declining sales of Album_A. Restricting attention to singles additionally has the nice property that we can rule out indirect price effects due to unbundling of albums and songs in digital distribution (Elberse, 2010).

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2.3 Empirical Set-up

The dependent variable is the release time difference of dyads of singles of similar artists. Hence, we take a release of a similar artist as given and count how many days it takes for the (record label of the) focal artist to respond. Here we explicitly test for the effect of how similar these artists are perceived by consumers. We further test the difference between artists contracted by the same record label and those contracted by different record labels. An initial model could take the form

$$\Delta RD_{ij} = \alpha + \beta_1 sim_{ij} + \beta_2 same_{ij} + \beta_3 sim_{ij} \times same_{ij} + \gamma'_{ij} X_{ij} + \varepsilon_{ij}$$

where ΔRD_{ij} is the time difference in release dates of singles of artists i and j. Dyad similarity (on the artist level) is given as sim_{ij}, the dummy variable $same_{ij}$ indicates whether both singles have been released by the same record label. The vector X_{ij} includes a set of fixed effects and control variables.

In a second step, we expand the difference-in-difference setting to a comparison of ΔRD_{ij} (the first difference) in online and offline markets (the second difference). This allows to explicitly test whether endogenous firm decisions increase or decrease temporal concentration of similar products in digital relative to physical markets. Different specifications will be tested, e.g. comparing singles that were released exclusively on physical media to singles that were exclusively released on digital media. This has the obvious disadvantage of self selection. It is likely that those products differ in unobserved characteristics such as the targeted consumer group. A potential solution is to construct a control group based on a matched sample of observables. Alternatively, one could exploit variation in release dates of the same singles, online vs. offline. In addition to cross-country variation, the fact that physical media releases are traditionally scheduled to fixed week days (e.g. Tuesdays and Saturdays in the US, Fridays in Germany), whereas there seems to be no such convention for digital releases, could be helpful for identification.

3 Insights from Practice

We believe that apart from a critical assessment of the existing scientific literature, it is crucial in this project to cross-check proposed mechanisms with insights gained from practice. An important objective is therefore to conduct structured interviews with industry experts. To avoid a potential bias arising from the selection of experts based on their institutional background, we aim to gain insights from big multi-national companies as well as small niche players. As the project has an international focus, we will conduct interviews in the US and Germany.

4 Contribution

With this project, we aim to add a new theoretical perspective to the literature. We believe that whether endogenous firm behavior leads to more or less variety in online vs. offline markets is an interesting question from a social welfare perspective. Combining an internal and external view on competitive response might also provide new insights for managers. Although our empirical analysis focuses on the music industry, results may also apply to other experience goods markets that face the challenges of digitization such as movies, software, video games and books.

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