Music subscription case study: investigating the behavioral changes of consumers upon subscription price changes

JingChen Feng

ABSTRACT

This paper includes an analysis of the elasticity of various well-known music platforms, such as Spotify, Pandora, and YouTube. Elasticity in economics means the impact that a product change has on a change in consumer behavior. In the context of this paper, I analyze how price changes of music subscriptions affect, if any, consumers' demand. All three music platforms include different music subscription programs with differing prices. Consumers may change their behavior as a result of the price increase, such as canceling subscriptions and choosing alternative products. I explore this change in behavior by documenting changes in the share of paid subscribers by music companies. In addition, this paper also explores other impacts and potential spillover effects of subscription changes.

INTRODUCTION

Elasticity in economics is defined as the impact that a product change has on a change in consumer behavior (Federal Reserve Bank of St. Louis). After a price rises, people will respond to the price of the product and the number of people who buy it will decline. If the price of an inelastic product goes up, there is no change in buyer behavior (Federal Reserve Bank of St. Louis). However, there are some flexible products that are usually non-essential or have alternatives that are considered elastic goods. Inelastic products are the opposite, lacking clear substitutes and often being essential (Federal Reserve Bank of St. Louis). In music platforms, there are different price movements within each platform, and these movements can have an impact on buyer behavior. Therefore, one way to analyze the elasticity of a product is by analyzing the change in the number of buyers as a result of a change in music subscription price; this will determine whether the buyer's behavior changes because of the price increase. I analyze this hypothesis by documenting the change in the share of paid subscribers on the YouTube, Spotify, and Pandora platforms. Ultimately, I find that music platforms are elastic; when the price of a subscription goes up, the consumer behavior changes, which indicates that music platforms behave as substitute goods. When the subscription price of one music firm goes up, these results show graphically that the share of paid subscribers for that company goes down while the share of paid subscribers in an alternative music company rises.

LITERATURE REVIEW

This paper is related to a robust body of work examining the elasticity of demand in the consumption sector. Differences in elasticity can lead to different prices paid by groups of people. Barnes and Brounstein (2023), hypothesize that the pink tax, in which women pay more for goods than men, is brought about because of the different elasticities of demand among these gender groups; if women in general have lower price elasticities than men, they are likely to pay higher prices for goods that they consider to be inelastic (Kayleigh Barnes et al. 2023, #3). However, it turns out that women have higher elasticity than men (Kayleigh Barnes et al. 2023, #4). The pink tax is caused by other factors not attributed solely to the elasticity of demand with respect to gender preferences (Kayleigh Barnes et al. 2023, #56). Drawing from Barnes and Brounsetin's work, I explore demand for consumer goods by analyzing consumers' behavioral changes to an increase in price from their music subscription.

This research also draws on literature that explores the e-commerce industry and its connection to elastic goods. For example, Dolfen et. al. (2019, #2) show that, "E-Commerce spending reached 8% of consumption by 2017, yielding consumers the equivalent of a 1% permanent boost to their consumption, or over $1,000 per household. While some of the gains arose from saving travel costs of buying from local merchants, most of the gains stemmed from substituting to online merchants" (Dolfen et. al. 2019). This may indicate that the rise in e-commerce goods has some effect on the rise of preferences for choosing various avenues for music consumption. Such avenues are consumption of music through subscription plan models provided by leading music companies like Pandora, Spotify, and more.

Research shows that different types of consumers have different price elasticities towards goods in the performing arts sector. The authors Kolhede (2023) show that it is possible to change the consumption behavior of someone who is price elastic to behave more in a price

inelastic manner when they consider buying performing arts goods. In the words of Kolhede et al, (2023, #1) “Price inelasticity among impressionables can be achieved through targeted programming and advertising efforts to these consumers, a group more susceptible to the influence of external factors affecting buying behavior.” The consumer categories mentioned in this article, and the strategies targeted, also apply to music platforms. The music platform industry can also promote different advertisements and give users a lot of personalized services, and these services may, in turn, affect consumers who typically are price elastic consumers into becoming more price inelastic consumers.

An article discussing the price sensitivity of platforms commonly used by students shows that “the vast majority of students (71%) declared that if the respondents' favorite application or program was paid at an affordable price, they would continue to use it. One in four respondents said they would look for a replacement (25%)”(Lupa-Wojcik et. al. 2024, #1). The authors also assess the effect of price increase on students' behavior, finding that students have expressed concern about price, and some have indicated that they will change their behavior as a result. Therefore, it is elastic for students to platform products.

In an article on piracy and willingness to buy, the authors talk about some strategies that may affect consumers' behavior on buying piracy. In their words, “the general consensus among the copyright piracy literature is that economic incentives and enforcement are both effective strategies that complement one another in reducing the occurrence of piracy.”(Chiang et. al. 2009, #1). Piracy has a negative effect on music subscriptions; if the purchase of pirated music can be reduced and people’s willingness to purchase music can increase, then more people will subscribe to music services.

The last related article is about the bundling of music products. Changes in bundled prices can also affect consumer behavior, which can reflect the elasticity of music products. Research shows that “...tiered pricing coupled with reduced album pricing increases revenue to the labels by 18% relative to uniform pricing policies traditionally preferred by digital marketplaces while also increasing consumer surplus by 23%”(Brett Danaher et. al. 2014, #1413). A fall in prices, or bringing about a pricing tiered model, is likely to lead to an increase in consumers purchasing the respective product. In this context, music products are treated by consumers as more elastic when tiered pricing schemes are implemented. Information from Danaher et al.’s (2014) research will help inform whether consumers in various music subscription companies may move to other music companies when components or levels of the tiered pricing subscription model changes.

This paper explores several gaps:

1. **Contemporaneous and Modern Time Analyses** : This paper leverages continuous data from 2015 to 2023. It looks at general trends from the past to the present. It covers the period of the COVID-19 economic recession from 2019 to 2023. If this particular period has found some impact on the sale of music subscription products, I expect to see the COVID-19 pandemic to affect the key variable of interest (i.e., sale of music subscription products) during the height of the pandemic.

2. **Limitations within Extant Literature :** Although there is ample research on elasticity, the literature on elasticity does not often include research on the music subscription consumption sector. These studies mention consumer behavior related to other products, such as buying piracy music or even exploring the performing arts industry, but none of the articles analyzed music subscription services nor studied how subscription price changes affected the elastic behavior of their consumers. This research adds this narrow focus to the robust body of work on elasticity for consumer goods.

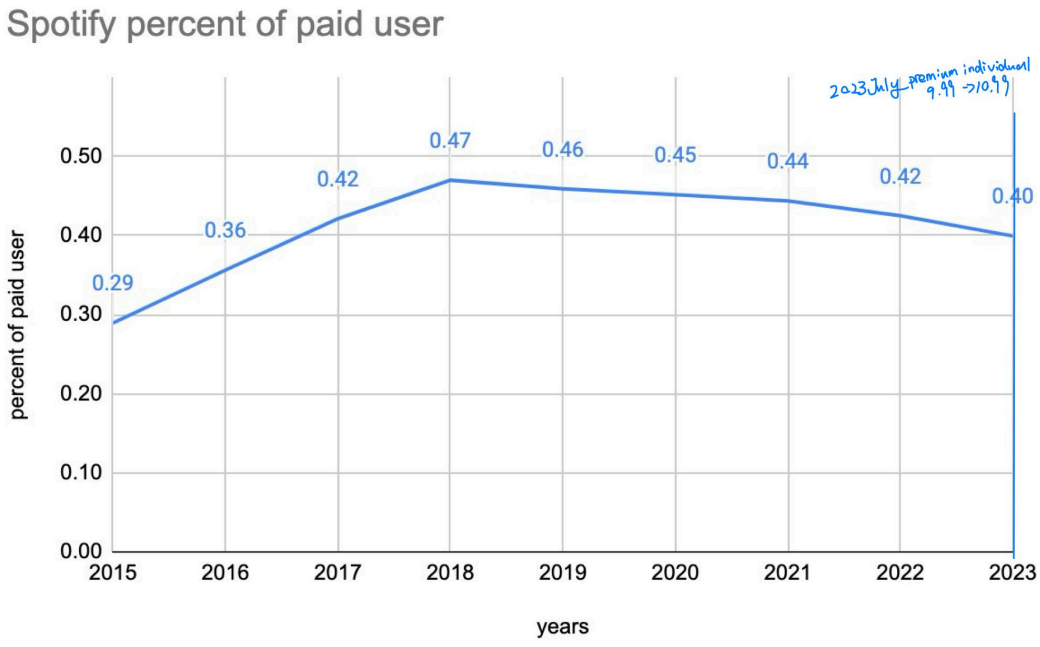
CONTEXT

This paper analyzes several years of subscription data from three well-known music platforms, Spotify, Pandora, and YouTube. I identify the inflection point of the time when the number of subscribers changed in the data, and then link this year to the data point that depicts the change in the subscription price. Doing so allows me to explore the elasticity of the three platforms and infer their user behavior. The paper ends with a discussion of other factors that may affect the number of subscribers, as well as the potential spillover effects of price changes.

TRENDS OF PAID MUSIC SUBSCRIPTION USERS ACROSS YEARS BY MUSIC COMPANY

In this section I will explore the concept of elasticity by examining how Spotify, Pandora, and YouTube's percentage of paid users have changed over successive years, and note whenever subscription prices have changed. I hypothesize that the percentage of paid users will change as the subscription price changes.

Graph1

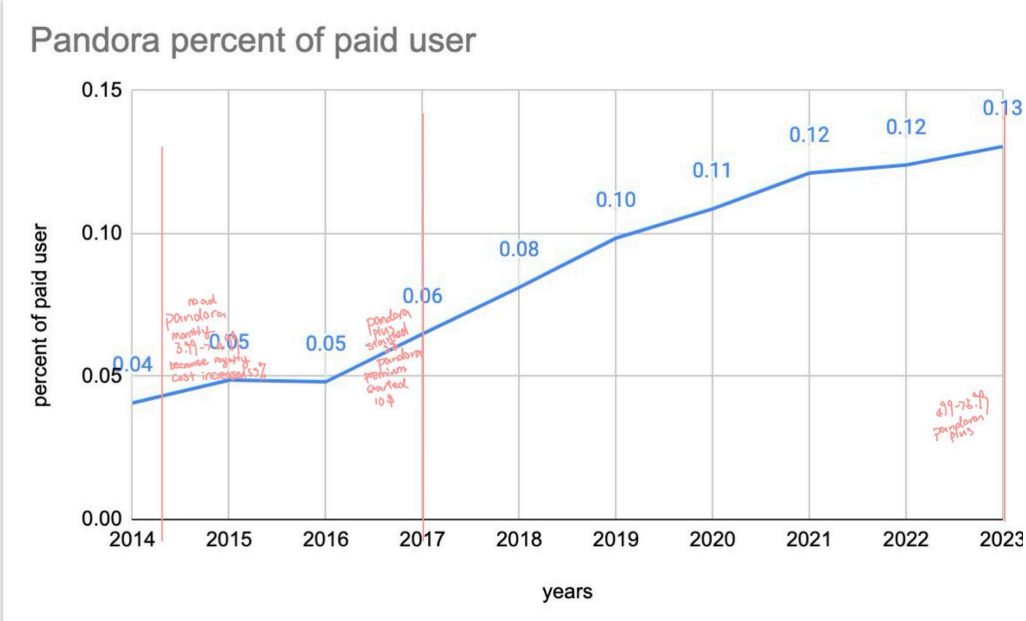


Note: The source of the graph is from Statista. The graph shows the share of Spotify consumers on paid subscriptions from 2015 to 2023.

Graph 1 uses data from a series on the number of paid Spotify subscribers worldwide and a series on monthly active Spotify users worldwide; it is calculated by taking the average number of consumers on Spotify paid subscriptions and dividing this number by the average number of active Spotify listeners in the world each year. This number represents the percentage of Spotify listeners on paid subscriptions. Graph 1 shows that the percentage of subscriptions skyrocketed from 2015 to 2018, reaching a peak of 47%. According to Inês Gomes et al. 2021, this increase is likely due to Spotify's initial success, strong publicity, and high quality service. Spotify has a personalized service it offers to both free and paying subscribers (Inês Gomes et al. 2021, # 341). Since then, the percentage of Spotify listeners on paid subscriptions has gradually declined. Simply stated by Yulianto and Hillebrandes (2021, #266), "while being a leader in music streaming service, Spotify is not at their top performance lately due to having reached the maturity stage.

Spotify kept the single-player subscription price at $9.99 from 2015 until July 2023, when the price went up by one dollar. Spotify's research shows that Spotify's prices did not change between 2015 and 2022. In July 2023, Spotify announced a $1 price increase for all premium services. Individual premiums increased from $ 9.99 to $10.99. This price change may be why the percentage of subscribers declined between 2022 and 2023 (the percentage dropped from 0.42 to 0.4) This decline may seem in part to be due to a general trend, as the percentage of subscribers has been declining since 2018. However, this general trend most likely does not capture the elasticity effect given that the slope of the line remains constant between 2018 and 2021.

Graph 2



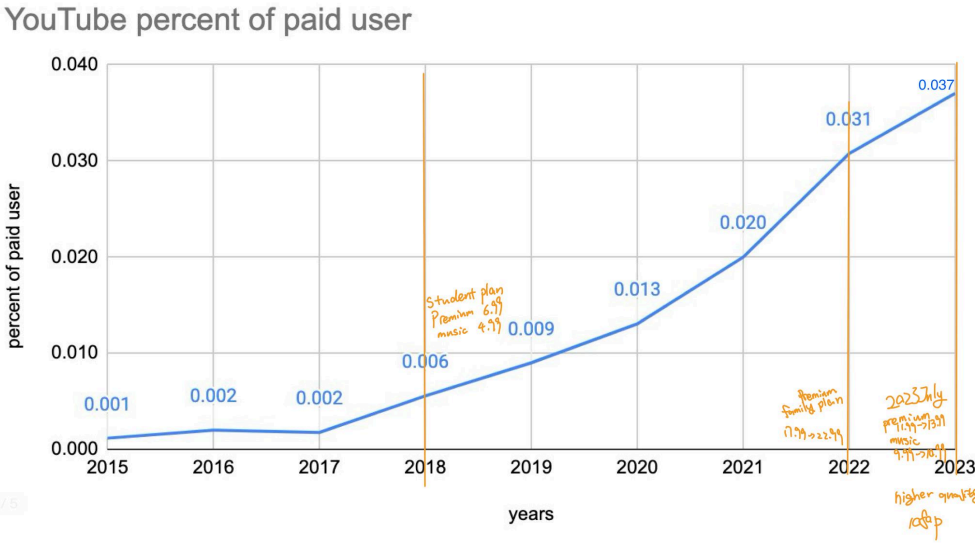
Note: The source of the data is from Businessofapps. The graph shows the share of Pandora consumers on paid subscriptions from 2014 to 2023.

Graph 2 is calculated by dividing the number of paid subscribers by the total number of subscribers to get the percentage of paid subscribers. Pandora's percentage of paid users

increased in 2014 and slightly decreased from 2015 to 2016, and then the percentage rose rapidly. After 2021, the percentage increase has slowed down. Pandora's overall subscription percentage is far from Spotify's. Spotify's paid subscriber percentage is between 29% and 47%, while Pandora's is between 4% and 13%.

Over the last 10 years, Pandora has had three price and subscription changes (Adrianne Jeffries, 2014) (Micah Singleton, 2016) (Community Pandora, 2023). According to Pandora's data, the price change may have affected the percentage of paid users (Curry, 2024). In 2014, Pandora Plus had increased $1, from $3.99 to $4.99. The graph 2 for 2015-2016 shows that the percentage stopped rising. This is likely due to high elasticity, where price increases limit the number of paid subscriptions. The second subscription price changes in 2017 and 2023 did not decrease the percentage of paid users. The percentage is growing at an even faster rate. The subscription change in 2017 is that Pandora launched Pandora Premium for the first time. For other platforms like Spotify and YouTube, Premium plans were already available many years ago. Therefore, Pandora's percentage of paid users did not decrease because, compared to other music platforms, such as Spotify, its subscription changes set the price of premium in line with the price of other music apps. People's impression of a premium individual plan on a music platform is around $10, so Pandora has not exceeded the generally accepted price. Not only that, the percentage of paid users of Pandora was increasing in 2017. This may suggest that some users prefer the Premium plan because of the products it provides. In 2023, Pandora Plus went up $1, from $4.99 to $5.99, but the percentage trend of paid users has not changed significantly. One possible reason is the price of Pandora Plus is not a premium plan, so people care less about it. YouTube and Spotify have raised the price of premium plans, but Pandora has not raised its premium price in 2023. The same price may be the reason why Pandora's subscriber percentage is still rising in 2023.

Graph3



Note: The source of the data is from Businessofapps. The graph shows the share of YouTube consumers on paid subscriptions from 2015 to 2023.

Similar to the way in which Graph 2 is calculated, Graph 3 is calculated by dividing the number of paid subscribers by the total number of subscribers to get the percentage of paid subscribers. YouTube's percentage of paid users did not change much between 2015 and 2017, after which the percentage of paid users skyrocketed without declining. Even so, the overall percentage did not reach four percent.

YouTube went through three subscription changes between 2015 and 2023. First, in 2019, YouTube ran a time-limited student plan, which was scheduled to stop at the end of January 2019. A reason that people may join premium can be because of the limited-time offer. The Premium price on this plan was reduced to $6.99. This price is much cheaper than Spotify and Pandora, which are both priced at $9.99. The affordability of YouTube may be the reason why YouTube's paid users percentage rose rapidly in 2018, which was from 0.006 to 0.009 percent of paid users. The next price change came in 2022. YouTube's premium family plan went up by $5, from $17.99 to $22.99 (Roberts, 2022). This price gap is very large, but according to the data, the subscription percentage is still rising rapidly from 2021 to 2022. Importantly, the increase in family plans did not affect the percentage.

In 2023, YouTube changed its overall price. The price for individual premiums went up from $11.99 to $13.99. This adjustment may have an impact on the percentage of YouTube paid users. The percentage of YouTube paid users rose rapidly in 2021-2022, and it has an increase of 0.011 percent of paid users, but from 2022 to 2023 it did not rise as much, an increase of 0.06. YouTube's overall percentage of paid users is much lower than Spotify and Pandora. One reason could be that YouTube Premium is more expensive than the other two music platforms; it is two dollars more because it includes more than just music, which may discourage people who only want to listen to songs from going to YouTube because they have cheaper options. As a result, it is likely that consumers view YouTube Premium as an elite music consuming good due to the extra services the platform provides. Due to this, I expect that the share of YouTube Premium subscribers reflects a higher income group while consumers of Spotify and Pandora may likely encompass a higher share of consumers in the middle or lower rungs of the income distribution.

Analysis

Relationship between variables

Taken together, the three graphs show signs of the substitution effect arising among the three platforms. In 2015 and 2016, Pandora and YouTube's percentage did not change much, while Spotify's percentage rose rapidly; perhaps this was the year users paid more attention to Spotify than to any other platforms. Spotify's percentage declined in 2018, while the other two platforms have been on the rise, which may be a sign of movement away from Spotify toward Pandora and YouTube. Interestingly, all three music platforms increased in price in 2023. Spotify and Pandora Plus had no additional products to their services after price increases. YouTube, on the other hand, offered users higher-quality video playback. YouTube didn't see a percentage drop, probably because users embraced the new service.

Factor 2: Subscribe content and the product itself

The content included in each music software subscription may vary; some subscriptions may have more content than others. Differences in these content may cause users to behave differently. Pandora, Spotify, and YouTube Premium all include ad-free, higher audio quality, edited playlists, and offline and download listening. In addition to this basic content, Spotify and Pandora both include more personalized services. Spotify gives a very special experience, listening to music in real-time with friends. Pandora has personalized song recommendations. It can create a new playlist or album based on the song users just listened to. YouTube, however, does not have these personalized services. This may be the reason why YouTube's subscription percentage is very low. More convenient software with more personalized services may be more appealing to users.

Furthermore, YouTube is a special platform; it includes videos, movies, and a lot more than just music. Too many products can be overwhelming for users who just want to listen to music. People who only enjoy music may choose to use specialized music software, which is easier for them to use and does not need to think about additional products.

Potential Spillover Effects of Price Changes in the Music Subscription Industry

Potential spillover effects refer to the impact of a seemingly unrelated event in one business on another (Jelle Barkema et al, 2021). This effect exists in music platforms. When the price of a subscription changes, so does the number of subscribers. An important feature of subscriptions is the removal of ads. Subscribers do not see the ads, so they do not have the opportunity to buy the products offered by the ads. This can result in a change in the revenue of the advertising company based on the change in the number of subscribers. If the subscription price is lower, more people can participate in the subscription. When consumers pay the subscription and do not listen to ads, this may negatively affect the advertising company because music listeners are no longer aware of the chance to buy additional products. As stated by Sahni (2016, #1), “ads can increase the chance of consumers buying advertised products but may also remind them of similar (non-advertised) options (those being substitutable goods).”

Another potential spillover effect of music subscriptions is the impact on demand for live music events. According to Rouven Seifert et al. (2023, #201) "converting from no streaming or free streaming to a premium subscription leads to a particularly high surplus in WTP [willingness to pay] and demand for live music." The more people pay for subscriptions, the more willingness to pay . Therefore, if the percentage of paid subscribers increases, more people will spend money on music, and then they will be more willing to spend money for live music later, increasing live music revenue.

CONCLUSION

In conclusion, after analyzing the trends in the percentage of paid users and the timing of price changes for each platform, the results show that music platforms may be elastic. The graphs for Pandora and YouTube both show a change in the slope of the percentage of paid users in the year of the price change. When the subscription price increases, the rise in the

percentage of paid users compared to previous years slows down. For example, Spotify's graph shows that during the year of subscription price changes, the already declining trend has seen more percentage declines in the percentage of paid users. The results in this paper suggest that music platforms are elastic because consumer behavior changes in response to changes in subscription prices. In addition, this paper analyzes other potential factors. For example, consumers may subscribe to one platform instead of another because of the platform's content . Consumers may also be overwhelmed by too many subscription products. This may be the reason for YouTube's low percentage of paid users. Finally, subscriptions to music platforms may have potential spillover effects. Subscriptions often remove advertisements as a perk to the consumer; therefore, more people subscribing leads to fewer people seeing ads and buying goods. If fewer people buy things, the advertising company makes less money. Finally, this research shows that music subscriptions may affect people's willingness to go to concerts; if more people pay for subscriptions, then more people may be willing to pay for concerts.

CITATION

1.Curry, David. "Pandora Music Revenue and Usage Statistics (2024)." *Business of Apps*, 21 Feb. 2024, www.businessofapps.com/data/pandora-statistics/.

2.Dolfen, Paul, Liran Einav, Peter J. Klenow, Benjamin Klopack, Jonathan D. Levin, Larry Levin, and Wayne Best. 2023. "Assessing the Gains from E-Commerce." *American Economic Journal: Macroeconomics*, 15 (1): 342–70. DOI: 10.1257/mac.20210049

3. "Spotify: Number of Premium Users Worldwide 2023." *Statista*, Statista Research Department, 29 May 2024, www.statista.com/statistics/244995/number-of-paying-spotify-subscribers/.

4."Spotify Maus Worldwide 2023." *Statista*, Statista Research Department, 29 May 2024, www.statista.com/statistics/367739/spotify-global-mau/.

5."Adjusting Our Spotify Premium Prices." *Spotify*, Spotify, 8 Apr. 2024, newsroom.spotify.com/2023-07-24/adjusting-our-spotify-premium-prices/.

6.Porter, Jon. "YouTube Premium Now Costs an Extra $2 Each Month." *The Verge*, The Verge, 20 July 2023, www.theverge.com/2023/7/20/23801390/youtube-premium-music-price-increase.

7.The YouTube Team. *YouTube launches student plans for YouTube Music and YouTube Premium just in time for winter break.* YouTube, 27 November 2018, https://blog.youtube/news-and-events/youtube-launches-student-plans-for/

8.Roberts, Rachel. “Streaming Gets More Expensive: YouTube Premium and Apple Music Hike Subscription Prices.” *MusicTech*, 25 Oct. 2022, musictech.com/news/industry/streaming-gets-pricier-youtube-premium-apple-music-raise-prices-spotify/.

9.Singleton, Micah. “Pandora Premium Unveiled, Coming Early next Year for $10 per Month.” *The Verge*, The Verge, 7 Dec. 2016, www.theverge.com/2016/12/6/13846936/pandora-premium-music-streaming-service.

10.Jeffries, Adrianne. “Pandora Raises Fees and Drops Annual Subscriptions, Citing Rising Music Costs.” *The Verge*, The Verge, 19 Mar. 2014, www.theverge.com/2014/3/19/5525444/pandora-raises-fees-and-drops-annual-subscriptions-citing-rising.

11.“Price Increase on Google Play for Pandora Plus.” *Pandora Community*, Pandora Community, 19 July 2023, community.pandora.com/t5/Subscriptions/Price-Increase-on-Google-Play-for-Pandora-Plus/td-p/131681.

12.Yulianto, H. C., and A. N. Hillebrandes Oroh. “The Effects of Social Value, Value for Money, App Rating, and Enjoyment on the Intention to Purchase the Premium Service of the Spotify App”. *KnE Social Sciences*, Vol. 5, no. 5, Mar. 2021, pp. 266–281, doi:10.18502/kss.v5i5.8815.

13. Gomes, Inês, et al. “Keeping the beat on: A case study of Spotify.” *Advances in Intelligent Systems and Computing*, 29 Mar. 2021, pp. 337–352, https://doi.org/10.1007/978-3-030-72651-5_33.

14.Sahni, Navdeep S. “Advertising spillovers: Evidence from online field experiments and implications for returns on advertising.” *Journal of Marketing Research*, vol. 53, no. 4, 1 Aug. 2016, pp. 459–478, https://doi.org/10.1509/jmr.14.0274.

15. Seifert, Rouven, et al. “Conversion in music streaming services.” *Journal of Interactive Marketing*, vol. 59, no. 2, 25 Sept. 2023, pp. 201–219, https://doi.org/10.1177/10949968231186950.

16. Barnes, Kayleigh, and Jakob Brounstein. “The pink tax: Why do women pay more?” *SSRN Electronic Journal*, 21 Nov. 2022, https://doi.org/10.2139/ssrn.4269217.

17.Kolhede, Eric, et al. “Price elasticity in the performing arts: A segmentation approach.” *Journal of Marketing Analytics*, vol. 11, no. 3, 20 Aug. 2022, pp. 523–550, https://doi.org/10.1057/s41270-022-00179-2.

18. CHIANG, ERIC P., and DJETO ASSANE. “Estimating the willingness to pay for digital music.” *Contemporary Economic Policy*, vol. 27, no. 4, 23 Oct. 2009, pp. 512–522, https://doi.org/10.1111/j.1465-7287.2009.00152.x.

19.Danaher, Brett, et al. “An empirical analysis of digital music bundling strategies.” *Management Science*, vol. 60, no. 6, 5 May 2014, pp. 1413–1433, https://doi.org/10.1287/mnsc.2014.1958.

20. Lupa-Wójcik, Iwona. “Price sensitivity of students to their favorite applications and programs.” *Scientific Papers of Silesian University of Technology. Organization and Management Series*, vol. 2024, no. 194, 2024, pp. 259–274, https://doi.org/10.29119/1641-3466.2024.194.15.

21. Mrkaic, Mico, et al. “License to spill: How do we discuss spillovers in Article IV staff reports.” *IMF Working Papers*, vol. 2021, no. 134, 7 May 2021, https://doi.org/10.5089/9781513573670.001.

22. “Elasticity of Demand - the Economic Lowdown Podcast Series.” *Saint Louis Fed Eagle*, Federal Reserve Bank of St. Louis, www.stlouisfed.org/education/economic-lowdown-podcast-series/episode-16-elasticity-of-demand.