Estimating the Demand for Spotify Premium Plans: Evidence from Pricing and Plan Characteristics in India

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Abstract. This paper investigates consumer demand for Spotify's premium subscription plans in India, focusing on how price and plan features influence user choice. Using a discrete choice framework and individual-level survey data, this paper estimates a conditional logit model to quantify the roles of price and account-sharing attributes (e.g., Duo and Family plans) in shaping subscription decisions. To address potential price endogeneity—where firms set prices in response to unobserved demand—this study employs an instrumental variable approach using Spotify's premium plan prices in other geographic markets (U.S. and Brazil). The results reveal substantial price sensitivity: after instrumenting, the estimated effect of price becomes more negative, suggesting that uncorrected models understate true demand elasticity. While the estimated impact of features such as the ability to share plans with one or more additional users is economically meaningful, statistical significance is limited—likely due to the constrained variation in available plan choices. The study contributes to the growing literature on digital subscription platforms and provides a flexible empirical framework for future research in emerging markets and multi-tier pricing environments.

Keywords: Demand Model, Subscription, Conditional Logit Model, Instrument.

1. Introduction

1.1. Background

The development of the global music industry has been significantly transformed since the emergence of music streaming platforms, shifting consumption patterns from ownership-based models to access-based models. Among all of these platforms, Spotify has emerged as the global leader, with over 675 million monthly active users (MAUs) as of 2024. An interesting feature of Spotify's business model is its structure of freemium and premium. Users can choose between a free, ad-supported service and several paid, premium subscription plans varying in prices as well as features. As shown in Figure 1 and Figure 2, Spotify has experienced substantial growth in the base of both non-premium users and premium subscribers over the past decade. As of Q4 2024, approximately 412 million users—over 60% of Spotify's global user base—used the free tier, making it an entry point for new users and a driver of platform scale. The platforms reaches a considerable number of 263 million premium subscribers, up from 236 million in Q4 2023. The premium subscribers can select from among the Individual, Student, Duo, and Family plans, each offering varying combinations of features such as ad-free listening, and multi-user access. The tremendous growth reflects Spotify's successful expansion into various markets and its ability to attract users to its premium offerings.

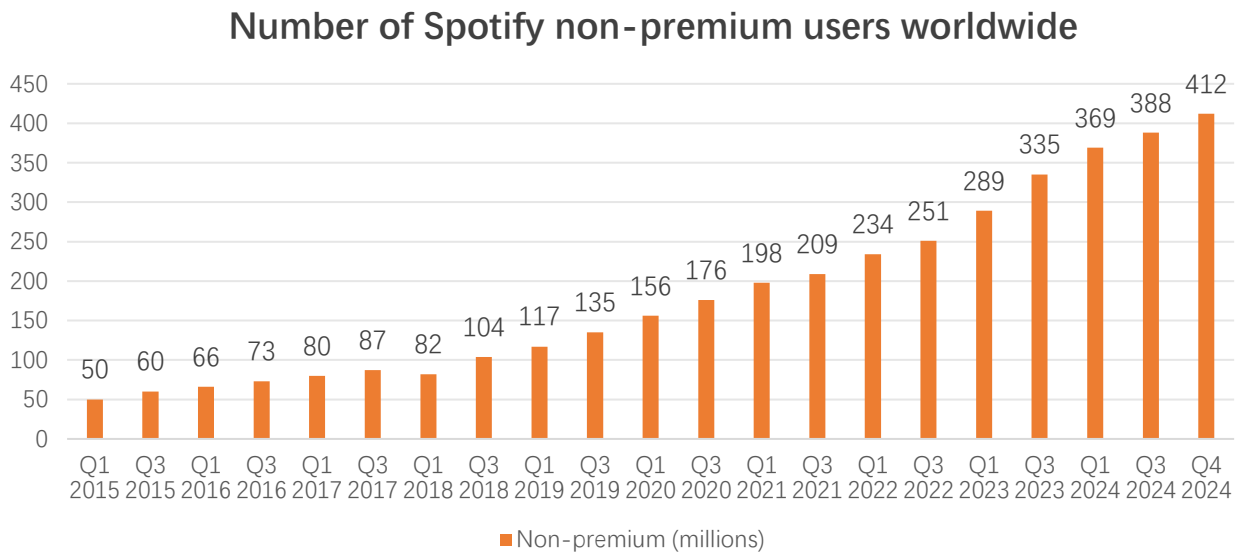

Figure 1. Number of Spotify non-premium users globally
Source: Compiled from Spotify earnings reports and visualized by Backlinko.
Available at: https://backlinko.com/spotify-users

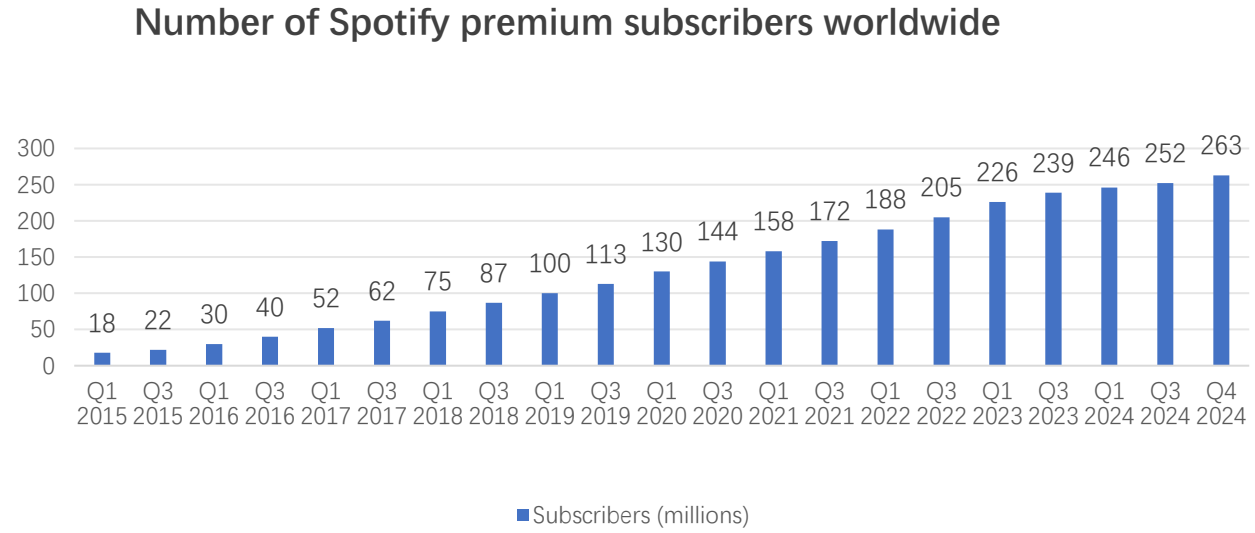

Figure 2. Number of Spotify premium users globally
Source: Compiled from Spotify earnings reports and visualized by Backlinko.
Available at: https://backlinko.com/spotify-users

The distribution of Spotify's premium subscribers varies across regions. As of 2024, the breakdown is illustrated in Figure 3, which shows Spotify's strong presence in Europe (37%), followed by North America (26%), Latin America (22%), and the rest of the world (14%). Although this figure provides a snapshot rather than a trend, the observed regional differences reinforce the importance of tailored pricing and plan structures. By adjusting prices and features to align with regional market conditions and consumer preferences, Spotify can more effectively expand its user base and improve premium conversion rates across diverse economic contexts.

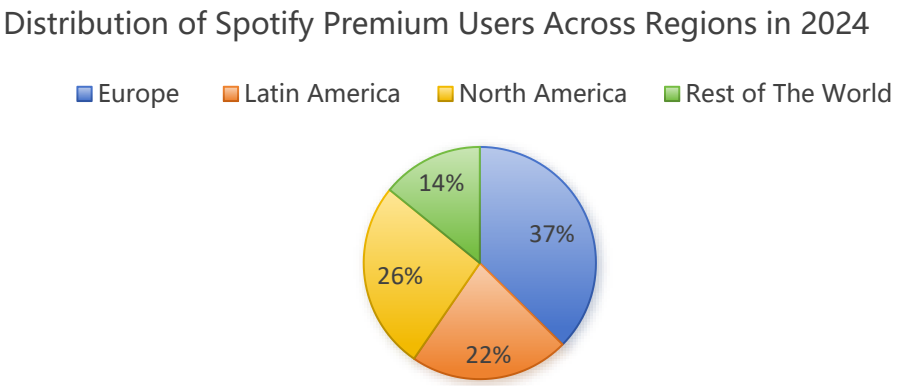

Figure 3. Distribution of Spotify premium users across regions in 2024

Source: Compiled from Spotify earnings reports and visualized by Backlinko. Available at: https://backlinko.com/spotify-users

Spotify's premium pricing varies significantly across countries, influenced by factors such as local economic conditions, competition, and market maturity. In 2023 and 2024, Spotify implemented global price increases across its premium tiers. For instance, In the United States, the Individual Premium plan increased from $10.99 to $11.99 in 2024. Despite price increases in various markets, Spotify has managed to sustain growth in its premium subscriber base. This resilience suggests that users perceive sufficient value in the premium offerings to justify the higher costs. Additionally, the introduction of diverse plans, such as Duo and Family, caters to different user segments, encouraging account sharing and enhancing user retention. The pattern of Spotify growth raises intriguing questions about how sensitive users are to price changes, and what features of the subscription plans are most valued by users.

1.2. Research interest

Across all the Spotify markets worldwide, India an interesting one to study. First, Spotify entered India in 2019, facing an extremely price-sensitive user base and fierce competition from global (Apple Music, Youtube Music) and domestic (JioSaavn, Gaana) rivals. Second, Spotify's pricing strategy in India reflects global market conditions, which might be different from pricing policies in Western markets. Therefore, this country might provide a valuable setting to study consumer preferences in subscription choices under different pricing regimes.

This research aims to estimate the demand for Spotify's premium subscription plans in India, focusing on how consumers trade off price against plan features such as ad-free listening, sharing licenses (Duo and Family), and other characteristics. The key research questions are:

- How sensitive is consumer demand for Spotify premium plans in India to changes in subscription plan prices?
- How valuable are product attributes like the ability to share accounts (Two Licenses, Three Plus Licenses) in determining plan choice?
- How does the distribution of demand shift across different plan designs and price increases?

2. Literature review

2.1. Demand estimation in Industrial Organization

This research relies on the structural estimation for differentiated products — a central topic in industrial organization (IO) economics. The pioneering work of Berry introduced the aggregate logit model for demand estimation, providing a tractable framework to analyze markets where products differ in characteristics like price, quality, and other features [1]. Berry's approach transformed the estimation of demand by using market share data and observable product characteristics to infer consumer preferences, even in the absence of detailed consumer-level data. This approach has been

widely applied in empirical IO, particularly in investigations of product markets such as automobiles [2], cereals [3], and consumer electronics [4]. These models are constructed to express demand as a function of observable product attributes while accounting for an unobservable quality term that captures product-specific demand shocks.

One common challenge in demand estimation is the endogeneity of price—firms often set prices based on anticipated demand conditions, which makes price correlated with the unobserved product quality component. A standard solution to this problem is the use of instrumental variables (IVs) that affect price but are uncorrelated with the demand shocks. Hausman suggests using the prices of similar goods in other markets or time periods as instruments [5], while Nevo uses prices of the same product in other geographic markets as instruments [3].

2.2. Pricing and plan differentiation in digital markets

Other literature has extended the IO tools to the analysis of digital platforms and subscription-based business models. Investigations focus on streaming services like Spotify, Netflix, and YouTube Premium, which operate in multi-tiered pricing models, offering consumers different plans based on features such as ad-free access, multi-device support, or content exclusivity.

Datta, Knox, and Bronnerberg analyze Spotify's freemium-to-premium conversion funnel and conclude that free users exhibit diverse behavioral patterns in how they transition to paid tiers [6]. Pauwels and Weiss provide a framework for understanding how online firms transition from free to fee-based models, emphasizing the importance of strategically timing, targeting, and perceived value [7]. Wagner et al. investigate ad-supported digital media platforms and argue that advertising can both substitute for and complement subscription revenue depending on user tolerance for ads [8]. Meanwhile, Li et al. develop a structural model to evaluate optimal freemium tier design for content platforms, suggesting that the choice between differentiating by ads, content, or both depends on ad revenue potential and user tolerance for advertising [9]. These studies generally confirm that consumers exhibit heterogeneous willingness to pay for different service features, and that multi-tier pricing is a powerful tool to segment the market and extract more consumer surplus.

Spotify's freemium strategy has received attention in marketing and strategy literature as well. For example, Aguiar and Waldfogel examine the impact of free streaming on music piracy and purchases [10], while Datta, Knox, and Bronnenberg analyze subscription conversion from free to paid tiers [6]. However, most of these studies focus on Spotify's business model rather than formally estimating consumer demand functions for different plans.

3. Data

3.1. Data source and construction

The primary dataset used in this research is the *Spotify User Behavior Dataset* compiled by Meera Ajayakumar and made available through Kaggle. The dataset is constructed through a survey in 2023 capturing the behavior on Spotify from 520 users in India. The dataset includes detailed information about users' subscription plans, music consumption habits, demographic attributes, content preferences, and engagement patterns within Spotify. The dataset used in this paper is available at: https://www.kaggle.com/datasets/meeraajayakumar/spotify-user-behavior-dataset/data.

The dataset consists of multiple-choice survey responses collected from Spotify users. Each row corresponds to a unique user and includes variables such as:

- Subscription plan: Free, Student, Individual, Duo, Family
- Willingness to pay for Premium: Yes or No
- Preferred Plan
- Music and podcast listening frequency
- Content preferences: genre, time of day, mood influence, device used
- Demographics: age, gender

3.2. Summary statistics

As shown in Table 1, the majority of the users in the dataset (81.5%) are using the free, ad-supported plan. 18.5% of the users are paying for the subscription plans. As of early 2025, Spotify has approximately 83 million monthly active users (MAUs) in India. However, the proportion of these users who subscribe to Spotify Premium remains relatively low compared to global figures. Globally, Spotify reports 263 million Premium subscribers out of 675 million MAUs, indicating a subscription rate of about 39%. In contrast, estimates suggest that only around 3 million users in India are Premium subscribers[1], translating to a subscription rate of approximately 3.6%.

This discrepency between the survey sample and the known market-level statistics indicates the issue of sample selection bias. The proportion of premium users is higher in the global market of Spotify than the targeted responders of the survey, while the actual proportion is lower in the Indian market according to the Indian aggregate statistics. Specifically, when estimating the demand in India, this discrepency serving as an overrepresentation may inflate estimated willingness to pay and distort the demand model's predictions. One practical method to correct for this bias is to apply sample weights that align the distribution of observed data with population-level benchmarks. For instance, each observation can be weighted by the inverse of its group's representation in the population. A user who reports being a premium subscriber would receive a smaller weight so that the weighted sample better reflects the true market composition. Then these weights can be incorporated into the likelihood function during estimation, effectively rebalancing the sample to simulate population-level choice behavior.

Table 1. Premium users distribution

Plan	Count	Percentage
Free (ad-supported)	424	81.5%
Premium (paid subscription)	96	18.5%
Total	520	100.0%

As shown in Table 2, 312 respondents say that they want a Premium Spotify plan and 208 of them want to use the free plan. Among the 312 respondents who want a premium plan, 94 of them choose a Student Plan, 95 choose an Individual Plan, 84 choose a Duo Plan, and 39 choose a Family Plan. However, it is notable that these responses reflect users' stated preferences instead of actual subscription choices. Many people express their interest in premium plans but a significantly smaller proportion are actually active subscribers, which suggest the presence of barriers such as payment friction or limited perceived value, and show the importance of understanding demand in this market.

Table 2. Preferred plans distribution

Preferred plan	Count	Percentage
None	208	40.0%
Student	94	18.0%
Individual	95	18.3%
Duo	84	16.2%
Family	39	7.5%
Total	520	100.0%

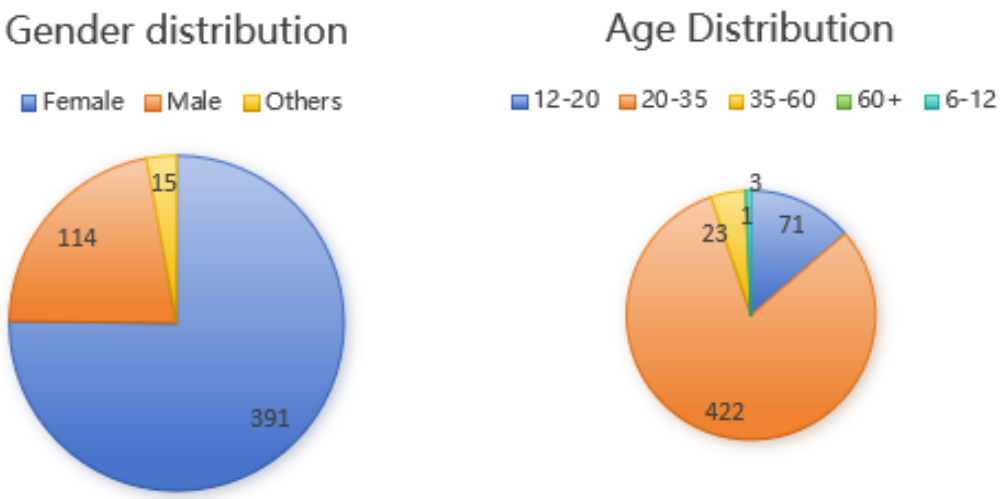

Figure 4. Demographic distribution

The demographic distribution is shown in Figure 4. The statistics show that 75.2% of the respondents are females while 21.9% are males. Regarding the age distribution, the majority of the respondents are in the age range from 12 to 35, implying that this research focuses on investigating the user behavior of the younger generation.

3.3. Data processing

The market for Spotify's subscription plans has a special feature. The Student Plan has the exactly same attributes as the Individual Plan, but it has a lower price. However, users need to provide student verification to be eligible to purchase the Student Plan. Therefore, the Student Plan and the Individual Plan cannot be treated as distinct products in this market, since their differentiation is based on eligibility rather than product characteristics.

This study classifies the respondent who want the Student Plan as illustrated in Figure 5. Among these, respondents are either currently freemium users or premium subscribers. For those who have not subscribed to any premium plan, their preference for the Student Plan is hypothetical, so they are treated as having no preference for any premium plan instead. In constrast, for respondents who have previously paid for a subscription, they are dropped from the dataset because it is uncertain which premium plan they would choose without the presence of the Student Plan. At the end, 85 respondents preferring a Student Plan are labeled as not preferring any premium plan, and 9 responses are dropped from the dataset.

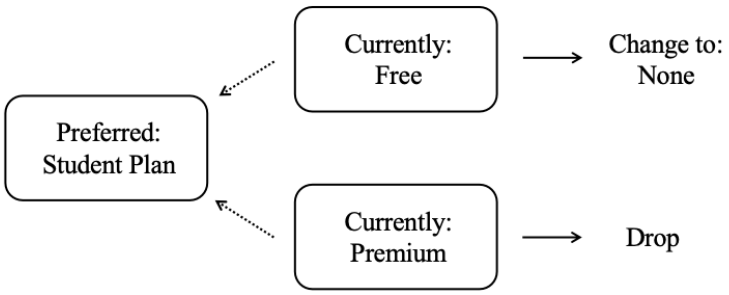

Figure 5. Treatment of respondents preferring Student Plans

3.4. Data limitations

Despite the dataset's richness, there are several limitations worth noting. First, the data is collected through surveys and may be subject to recall bias, social desirability bias, or inaccurate responses. Second, the dataset does not represent Spotify's full user base in India. It likely over-represents younger and more tech-savvy users, and may not reflect actual subscription statistics. In addition, the

dataset is not a panel or time series; all responses are from a single snapshot in time. As a result, we simulate temporal variation for estimation by incorporating historical pricing and plan features. Last but not least, true cost-side instruments are not available. This study relies on Spotify premium pricing in other regions (e.g., the U.S. market) as instruments, which may introduce bias if they correlate with unobserved demand shocks.

4. Model specification

4.1. Assumptions

This research makes several structural and behavioral assumptions to enable the estimation of consumer demand for Spotify subscription plans. These assumptions provide a simplified framework for interpreting consumer choice behavior in the Indian digital streaming market.

- Assumption 1: Consumers can afford all plans without violating their budget constraint.
- Assumption 2: All consumers are informed and know all options.
- Assumption 3: Consumers evaluate plans based only on observable features.
- Assumption 4: The market is static and based on a one-time choice.
- Assumption 5: The free plan serves as the outside option.

4.2. Utility framework

Assume that consumers choose among $J+1$ alternatives: J subscription plans (Individual, Duo, Family) and an outside option representing the free (ad-supported) plan. Each consumer i derives utility U_{ij} from choosing product J, given by:

$$U_{ij} = \beta_0 + \beta_1 \text{Price}_j + \beta_2 \text{TwoLicenses}_j + \beta_3 \text{ThreePlusLicenses}_j + \xi_j + \varepsilon_{ij} \quad (1)$$

where Price_j is the price of subscription plan j, TwoLicenses_j is a dummy for plans that support two accounts (e.g., Duo), $\text{ThreePlusLicenses}_j$ is a dummy for plans that support more than two accounts (e.g., Family), ξ_j captures unobserved quality or demand shocks for product j, ε_{ij} is an idiosyncratic error term assumed to follow a Type I Extreme Value distribution.

In this specification, the model omits the ξ_j term and estimates demand using a standard conditional logit framework. This method treats all variation in utility as observable and does not account for unobserved demand components that might be correlated with price. A more complete structural model incorporates ξ_j, and estimation proceeds using Berry's (1994) inversion approach. In that approach, observed market shares are used to recover $\delta_j = X_j\beta + \varepsilon_{ij}$, followed by instrumental variables (IV) estimation (2SLS) to address endogeneity concerns.

After omitting the unobserved demand component, the utility function can be rewritten using vector X:

$$U_{ij} = X_j'\beta + \varepsilon_{ij} \quad (2)$$

where X_j is a vector of observable attributes for plan j.

The outside option (Free plan) is normalized such that $U_{i0} = \varepsilon_{i0}$, implying zero mean utility and zero price.

4.3. Conditional logit choice probabilities

Given the Type I Extreme Value assumption, the probability that user i chooses plan j is given by multinomial logit formula:

$$P_{ij} = \frac{\exp(X_j'\beta)}{\sum_{k=1}^{J} \exp(X_k'\beta)} \quad (3)$$

In the conditional logit model, plan attributes X_j vary across alternatives but not across individuals. This means individual characteristics (e.g., age, income) cannot directly enter the utility function unless interacted with plan dummies or other attributes.

4.4. Estimation procedures

To estimate the model, the user-level data is reshaped into long format, where each user appears four times — once for each alternative. Each row contains the plan-specific attributes for that choice, and a binary outcome indicating whether that plan was chosen by the user. Then the model is estimated using **maximum likelihood**, by maximizing the log-likelihood function:

$$\mathcal{L}(\beta) = \sum_{i=1}^{N} \sum_{j=1}^{J} y_{ij} \log P_{ij} \quad (4)$$

where $y_{ij} = 1$ if user i chooses plan j, and 0 otherwise.

Due to concerns about multicollinearity (e.g., AdFree is constant across premium plans), the model is estimated using a reduced set of features when needed (i.e., dropping AdFree). Optimization is performed using built-in routines (e.g., fminsearch) in MATLAB, as the dataset is cross-sectional and modest in size.

4.5. Instrumental variable strategy

A central concern in demand estimation is the likely endogeneity of price. In the context of Spotify subscriptions, the prices of different premium plans may not be exogenously determined. Instead, Spotify may set these prices based on anticipated consumer demand, market segment characteristics, or other unobserved factors (e.g., regional competition, user preferences) that are also correlated with unobserved utility. If such endogeneity exists and is unaddressed, it will make the coefficient on price biased and undermine the estimated price sensitivity.

To address this concern, this study employs an instrumental variable (IV) strategy, using **Spotify's premium plan prices in other geographic market** as an instrument for Indian plan prices. This study incorporates international Spotify premium prices in the U.S. and Brazil market. This approach relies on the following two assumptions. First, the prices in other markets are **relevant** to the Indian prices. Second, prices in other foreign markets are **exogenous** to India-specific unobserved demand shocks (e.g., consumer preferences, household structure).

In the first stage, Indian prices are regressed on the U.S. or Brazil prices and other plan attributes (e.g., number of licenses), then use the fitted values as the predicted prices in the second-stage conditional logit estimation.

4.6. Variables and plan attributes

The key attributes used in the model are:

- Price: Monthly subscription fee for each plan (in INR)
- AdFree: Binary indicator for whether the plan includes ad-free listening (1 for all premium plans, 0 for Free)
- TwoLicenses: Binary indicator (1 if plan includes exactly 2 user licenses; 0 otherwise)
- ThreePlusLicenses: Binary indicator (1 if plan includes more than 2 licenses; 0 otherwise)

These variables are constant across users but vary across plans. The dependent variable is the observed **PlanChoice**, taking values 1 (Free), 2 (Individual), 3 (Duo), or 4 (Family), indicating which plan the user currently subscribes to or prefers. The overview of plan attributes is shown in Table 3.

Table 3. Plan attributes

PlanChoice	Price (INR/month)	PriceUS_IV (USD/month)	PriceBrazil_IV (BRL/month)	AdFree	TwoLicenses	ThreePlus Licenses
1 (Free)	0	0	0	0	0	0
2 (Ind)	119	11.99	21.90	1	0	0
3 (Duo)	149	16.99	27.90	1	1	0
4 (Fam)	179	19.99	34.90	1	0	1

5. Estimation results

5.1. Baseline results (without instruments)

This study first estimates a conditional logit model using observed Indian Spotify plan prices without correcting for potential endogeneity. The model includes the monthly subscription price as a continuous variable, and binary indicators for whether a plan supports two users (Duo) or three or more users (Family).

Table 4. Estimation results without instrument

Variable	Coefficient	Std. error	t-Value	p-Value
Price	-1.3975	0.1103	-12.67	<0.001
TwoLicenses	0.1364	0.2052	0.665	0.506
ThreeLicenses	-0.1375	0.2683	-0.513	0.608

As shown in Table 4, the negative coefficient on Price indicates that more expensive plans are less likely to be chosen. This aligns with basic consumer demand theory and highlights the economic importance of affordability in Spotify's pricing strategy. The positive coefficient on TwoLicenses suggests that offering two user licenses (i.e., Duo plan) provides additional utility to users, possibly because of perceived value in cost-sharing or convenience. The negative coefficient on ThreePlusLicenses is somewhat surprising—it implies that plans supporting three or more users (Family plan) might reduce utility compared to alternatives, perhaps because users perceive the plan as excessive or not applicable to their household structure.

While the coefficient on Price is statistically significant, the effects of account-sharing features (TwoLicenses, ThreePlusLicenses) are not. However, this lack of significance may not be due to a lack of economic importance, but rather to limitations in the dataset. The data is cross-sectional and reflects only four product options, with limited variation across users. This makes it harder to detect subtle preference differences in features, particularly when these features overlap with pricing structure.

5.2. Results using instrumented prices

To address potential endogeneity in Spotify pricing, where prices may respond to anticipated demand, this study instruments for Indian plan prices using Spotify's U.S. plan prices. The predicted prices from this first-stage regression are then used in the second-stage conditional logit model.

Table 5. Estimation results with U.S. prices as instruments

Variable	Coefficient	Std. error	t-Value	p-Value
Fitted Price US (IV)	-1.5624	0.1234	-12.67	<0.001
TwoLicenses	0.4107	0.2209	1.859	0.063
ThreeLicenses	0.1336	0.2828	0.473	0.637

Table 5 shows the estimation results using U.S. prices as instruments. The price coefficient becomes more negative than in the baseline model (–1.56 vs. –1.40), indicating that after correcting for endogeneity, users appear more responsive to price. This supports the idea that the baseline model underestimated true price sensitivity. The coefficient on TwoLicenses increases substantially, suggesting that the Duo plan provides meaningful added value—likely due to users seeing it as a practical or economical choice. Interestingly, the ThreePlusLicenses coefficient changes sign

compared to the baseline model, implying that the Family plan may offer utility for certain user segments, despite being more expensive.

Only the price coefficient remains statistically significant. The other coefficients, while economically intuitive, are not statistically distinguishable from zero at conventional levels. This may again reflect the limitations of the dataset—in particular, the small number of discrete product options and limited heterogeneity in product features. In richer datasets with more plan variation or user demographics, we would expect clearer identification of the value users place on shared plans.

Table 6. Estimation results with Brazil prices as instruments

Variable	Coefficient	Std. error	t-Value	p-Value
Fitted Price Brazil (IV)	-1.462	0.1154	-12.67	<0.001
TwoLicenses	0.1728	0.2073	0.834	0.405
ThreeLicenses	0.0112	0.2761	0.041	0.968

Table 6 shows the results using Brazil prices as instruments instead. The price coefficient remains strongly negative and statistically significant (−1.462), reinforcing the finding that users are highly price sensitive when endogeneity is properly addressed. However, in contrast to the U.S. instrumented model, the coefficients on both TwoLicenses and ThreePlusLicenses are smaller in magnitude and still statistically insignificant. This may reflect weaker correlation between Brazil's pricing structure and the unobserved components of Indian plan demand, or greater measurement noise due to regional variation in price positioning.

The comparison of the two IV models provides an important robustness check. The consistent sign and significance of the price coefficient across both specifications suggests that instrumental variable correction is necessary to investigate true demand sensitivity. However, variation in the estimates for shared plan features highlights the need for careful instrument selection and further investigation into how international pricing structures map onto user valuation in emerging markets of India.

6. Conclusion and outlooks

This study aims to empirically investigate consumer preferences for Spotify's premium subscription plans in India. The results consistently show that consumer demand is highly price-sensitive. After addressing potential endogeneity using Spotify's prices in other geographic markets (U.S. and Brazil) as instruments, the results indicate that the true price effect is even stronger than suggested by the baseline model. This implies that price plays a pivotal role in user decision-making in emerging markets like India. In addition, this paper finds out the economically meaningful preferences for plans that support multiple users—especially Duo plans that allow sharing between two individuals. Although statistical significance is limited, likely due to dataset constraints, the direction and magnitude of the coefficients indicate that account-sharing is an important driver of subscription behavior. The growth of shared plans globally, and their increasing prominence in Spotify's portfolio, suggest a meaningful shift in consumer demand toward value-oriented, flexible subscription models. The findings support this narrative by showing that even marginal differences in pricing and license structure can significantly influence user choice.

While this study contributes to the growing literature on platform pricing and digital goods, it is important to acknowledge the limitations of this paper. The analysis is based on cross-sectional data from India, and therefore the findings may not be directly generalizable to other emerging markets that differ in income distribution, platform penetration, or cultural norms regarding shared usage. To enhance the external validity of these results, future research could replicate this framework across multiple countries and incorporate macroeconomic or demographic controls. In addition, this study lays the groundwork for more granular, data-driven exploration of consumer behavior in the streaming

economy. By adapting this model to other countries and price structures, researchers can evaluate how regional differences in price sensitivity and feature valuation affect optimal pricing strategies. Moreover, future work can incorporate panel data to explore how users respond to price changes over time, free-to-premium conversion dynamics, or churn. With the rise of competing services (e.g., YouTube Music, Amazon Music), it is increasingly valuable to estimate multi-product demand systems, simulate counterfactual pricing, or evaluate the impact of content bundling strategies.

Future research can directly benefit Spotify's strategic decision-making by leveraging a larger amount of official user data on premium plan adoption, churn, and engagement. With access to detailed behavioral data across markets and time, future scholars could estimate dynamic demand models that capture how users respond to price changes, promotions, or feature upgrades over time—enabling Spotify to optimize not only pricing but also upgrade paths between plans (e.g., from Free to Duo or Family). Additionally, incorporating official usage data could improve the estimation of heterogeneous preferences, allowing the platform to tailor offerings more effectively to different demographic or behavioral segments. By simulating demand responses under alternative pricing structures, bundling options, or loyalty programs, new models can inform fine-grained targeting strategies and help Spotify balance revenue growth with long-term user retention. Ultimately, these insights would empower the platform to design more flexible pricing schemes that align with evolving user needs and competitive pressures across global markets.

As streaming services continue to evolve and expand into new verticals like podcasts, audiobooks, and live content, the demand-side insights generated by research like this will be more necessary for platforms, policymakers, and scholars.

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