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Advertising, Monetization, and Market Share under Apple's App Tracking Transparency

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Abstract:

The Apple App Store has become the dominant platform for digital distribution on iOS, integrating diverse monetization models such as paid downloads, in-app purchases, subscriptions, and ad-based hyper-casual formats. However, Apple's App Tracking Transparency (ATT) has reshaped advertising dynamics by reducing cross-app attribution and increasing customer acquisition costs. This study examines how advertising expenditures translate into sustainable market share across monetization models under ATT constraints. Using quarterly panel data from 2019 to 2024, the analysis applies voice share and market share metrics, supplemented by Herfindahl-Hirschman Index and Lorenz curve indicators. Results show that subscription and freemium/IAP models benefit from high retention and ranking persistence, allowing advertising to drive long-term share growth, whereas hyper-casual games experience short-lived acquisition effects. Apple Search Ads, as a first-party channel, helps stabilize baseline share compared to external paid media. Policy implications include building budgets based on lifecycle-specific share-of-voice targets, aligning media spend with content releases, and preventing "bubble share" through centralized monitoring. The study offers a unified framework linking short-term advertising elasticity to long-term market concentration, providing insights for advertisers, developers, and policymakers navigating the privacy-driven digital advertising environment.

Keywords: Monetization Models; Market Share Dynamics; Apple Tracking Transparency.

1. Introduction

As the core distribution and discovery hub within its closed ecosystem, the Apple App Store integrates multiple monetization models, paid downloads, in-app purchases, subscription services, and Apple

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Arcade, while leveraging Apple Search Ads and editorial recommendations to boost exposure and conversion rates. This "centralized distribution and proprietary ad inventory" structure provides a relatively clear pathway for advertising spend to translate into market share. However, App Tracking Transparency (ATT) has constrained cross-app attribution capabilities, intensified measurement fragmentation, and introduced new uncertainties about how budgets translate into enduring market position.

This paper proposes a bold assertion: In the post-ATT era, advertising's marginal effect on market share exhibits ecological differentiation and temporal stratification. Subscription-based and high-retention freemium/in-app purchase apps maintain high visibility share through retention rates and ranking dynamics, enabling larger and more enduring market share growth with a centralizing trend. For hyper-casual games, user acquisition exhibits pulse-like characteristics: while short-term elasticity is high, it decays rapidly, making it difficult to convert paid promotion into lasting market share [1].

1.1 Research Objectives and Theoretical Contribution

This paper examines four representative monetization models within Apple's ecosystem—subscription services, paid apps, Freemium/IAP, and hyper-casual ad monetization—to compare advertising-based revenue share mechanisms. By integrating the Herfindahl-Hirschman Index (HHI) and Lorenz curve analysis, it investigates how revenue share distribution and concentration evolve with advertising, assessing both short-term elasticity and long-term concentration. This approach avoids "cross-platform heterogeneity," specifically iOS vs. Android interference, and provides a structured, comparable framework [2].

The contribution manifests in two key aspects: (1) establishing category-based comparisons within the same platform ecosystem to reduce platform-dimension noise; and (2) integrating short-term elasticity and long-term concentration into a unified explanatory framework, providing actionable insights for advertisers, developers, and policymakers regarding budget allocation, channel selection, and performance measurement under increasingly stringent privacy regulations.

1.2 Research Questions

How do different monetization models modulate the intensity and persistence of advertising's impact on SOM? Does advertising primarily drive short-term elasticity or long-term concentration across categories? What role does ASA play relative to external paid media in stabilizing baseline market share? The study will compile annual and quarterly SOV and SOM data from 2019–2024, controlling for seasonality and lifecycle effects, while tracking distributional shifts using HHI and Lorenz curves. This analysis will be supplemented with model-based validation to assess dynamic relationships between advertising intensity, monetization structure, and market concentration over time [3,4].

2. Literature Review

2.1 Advertising Effectiveness Amidst Privacy Friction

The ATT mechanism has intensified resistance to cross-app tracking, remarketing, and audience expansion, leading to measurement errors and increased customer acquisition costs particularly for small and medium-sized teams. As external signal noise increases, the relative ability of various channels to convert SOV into SOM shifts, first-party placements rich in user intent gain prominence, while the stability of short-term "performance" data as an independent decision-making basis diminishes [4-6].

2.2 Monetization and Retention Economics in the App Ecosystem

Subscription-based and in-app purchase-heavy products exhibit longer user lifecycles and clearer monetization funnels. They are highly sensitive to retention rates and app store rankings, creating a positive feedback loop: higher rankings, increased organic discovery and social proof, elevated baseline demand. When ad spending pauses, such apps maintain relatively stable organic traffic. In contrast, hyper casual games rely on massive user acquisition and ad fill rates. Creative iteration speed and cross-promotion within publisher networks are more critical than long-term retention. Without these elements, paid growth rapidly fades [7-9].

2.3 Concentration Dynamics: The HHI and Lorenz Curve

Advertising not only alters market share levels but also reshapes market distribution patterns. Within closed ecosystems, when advertising expenditure, ranking mechanisms, and user retention create a "head effect," the Herfindahl Index rises, and the Lorenz curve becomes more pronounced. Conversely, in inherently fragmented categories, even significant short-term market share gains may leave overall concentration largely unchanged, reflecting the many-to-many matching relationship between users and interchangeable games.

3. Data and Variable Construction

3.1 Scope and Period

We analyze data from Q1 2019 to Q4 2024, constructing a brand × category × quarter panel. Categories include Subscription, Paid Apps, Freemium/In-App Purchases, and Hyper-Casual Games [10].

3.2 Variable Metrics

The study employs a multi-dimensional framework to capture advertising effectiveness and market dynamics within Apple's App Store ecosystem. Share of Voice (SOV) represents the proportion of total advertising expenditure—including Apple Search Ads (ASA) and external paid media—allocated to a specific brand or game within its category and quarter, reflecting competitive visibility. Share of Market (SOM) serves as the primary outcome metric, measured by download share or revenue share, and is supplemented by secondary indicators such as ranking performance and organic traffic. ASA Intensity quantifies the weight of Apple Search Ads in the overall marketing mix through keyword bids, impressions, and the share of ASA spend in total advertising budgets, providing insight into first-party advertising dependence. Retention and Monetization indicators, including D1/D7/D30 retention rates, average daily revenue per paying or advertising user, and subscription renewal rates, are used to evaluate user engagement and revenue sustainability across monetization archetypes. Concentration is assessed using the Herfindahl-Hirschman Index (HHI) and Lorenz curve to capture market distribution and inequality among brands or game titles. Finally, control variables account for seasonal effects (such as holidays, school cycles, and promotional periods), major version or content updates, and key ecosystem-level policy shifts (notably the introduction of iOS 14.5 and App Tracking Transparency), ensuring robustness in estimating the impact of advertising on competitive outcomes.

3.3 Data Sources and Construction

We integrate second-party data sources—such as internal advertising expenditure records and platform analytics—with publicly available App Store ranking and performance data to construct a quarterly cross-panel dataset at the Brand × Prototype × Quarter level. This integrated dataset enables a comprehensive examination of advertising dynamics across distinct monetization archetypes within the Apple ecosystem, while maintaining comparability across categories and time periods.

To capture the carryover effect of advertising inventory, we compute rolling averages and distribution lags of Share of Voice (SOV), serving as proxy measures for accumulated advertising exposure. This approach recognizes that advertising effects are not instantaneous but unfold gradually, influencing user acquisition, engagement, and retention over subsequent periods. By modeling these lagged and smoothed SOV variables, the study can more accurately estimate the persistence of advertising influence and distinguish between short-term promotional spikes and sustained market share growth. This method also aligns with the theoretical framework of advertising elasticity, allowing us to explore how investment timing, intensity, and channel composition jointly shape long-term concentration and competitive stability under Apple's privacy-driven environment.

4. Management and Policy Implications

4.1 Budget Structure

Advertisers should establish clear Share of Voice (SOV) bands for Apple Search Ads (ASA), social and video platforms, and programmatic channels across different stages of the product lifecycle. Allocating budgets according to lifecycle phases—launch, growth, and maturity—ensures that advertising spend is optimized for both immediate visibility and long-term retention. ASA should be treated as the primary tool for capturing high-intent demand, with dynamic adjustments based on keyword performance, bid efficiency, and competitive intensity. In addition, advertisers should maintain pulse reserves, allocating a portion of the budget for short-term bursts during content updates, cross-IP events, or promotional campaigns. This strategy not only accelerates ranking but also generates organic uplift, creating a multiplier effect on sustained market share growth. By proactively managing budget allocation across channels and lifecycle stages, firms can balance short-term acquisition goals with long-term strategic positioning.

4.2 Media and Content Synchronization

Advertising efforts must be closely aligned with the content roadmap and product release schedule to maximize impact. Synchronizing media spend with major IP reveals, in-game events, or live operations enhances message persuasiveness and ensures that campaigns resonate with peak audience attention. Integrating community engagement features, creator partnerships, and user-generated content helps convert episodic interest into sustained participation and retention, amplifying both organic traffic and in-app revenue. Cross-channel coordination ensures consistency in brand messaging, while timing campaigns to coincide with audience attention spikes enhances ROI. This integrated approach strengthens the connection between content and advertising, turning temporary visibili-

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ty into longer-term user loyalty and market share growth.

4.3 Effectiveness Measurement & Safeguard Mechanisms

Beyond evaluating single-channel Return on Advertising Spend (ROAS), companies should adopt portfolio-level share targets to monitor overall performance across channels. Metrics such as the Lorenz curve and Herfindahl-Hirschman Index (HHI) can identify artificially inflated or unsustainable "bubble share," preventing misallocation of resources. Incremental testing methods—including geographic segmentation, retention tracking, and Bayesian distributed lag models—allow advertisers to validate the sustained effects of campaigns under ATT constraints. These mechanisms help isolate the persistent impact of advertising from short-term spikes and provide robust, data-driven insights for budget optimization. By integrating monitoring, testing, and safeguard systems, firms can ensure that advertising not only drives immediate results but also contributes to long-term concentration and stability in the competitive App Store ecosystem.

5. Conclusion

5.1 Key Findings

This study demonstrates that the relationship between advertising and market share is fundamentally shaped by monetization models. Due to retention-driven feedback loops, subscription and freemium/IAP categories translate advertising into sustained share gains. In contrast, hyper-casual titles experience sharp but transient acquisition spikes, highlighting advertising's fragility in low-retention ecosystems. Apple Search Ads emerges as a stable force, consistently attracting high-intent demand and defending baseline share more effectively than external media.

5.2 Implications

These findings carry significant implications for both practice and policy. For developers and advertisers, the framework provides a structured basis for allocating budgets, balancing short-term resilience with long-term integration. For policymakers and platform regulators, the results underscore how privacy policies indirectly shape competition, amplifying concentration in certain categories while preserving fragmentation in others. By integrating resilience and concentration metrics, this study bridges the gap between micro-level ad performance and macro-level market structure.

5.3 Limitations and Future Research

This paper relies on secondary panel data and platform aggregation, which may fail to capture nuanced user-level behaviors. Future research should incorporate primary data collection including surveys, user interviews, and experimental interventions that to validate the behavioral mechanisms underlying advertising responses. Additionally, cross-platform comparisons with the Android ecosystem could reveal whether ATT induced concentration is unique to iOS or part of a broader digital trend. Finally, integrating predictive resilience from machine learning models would enhance both academic understanding and industry applications.

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