Title: Stars-to-Sponsors Conversion Gap: Gendered Economies of Attention on GitHub

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Introduction

Open-source software infrastructure is sustained by highly visible yet unevenly remunerated labor. Platforms such as GitHub concentrate attention via stars, followers, and trending feeds, while monetization tools like GitHub Sponsors, OpenCollective, and Patreon monetize goodwill into recurring income. A central but unmeasured question is whether equal attention yields equal money across gender on these platforms. If the “attention-to-money” conversion function differs by gender, then platform affordances and sponsor behavior may reproduce unequal returns to visibility and entrench disparities in the open-source labor market.

This project offers a computational, multi-method assessment of the stars-to-sponsors conversion gap by gender. We assemble a longitudinal, cross-platform panel that links public GitHub activity and attention metrics to sponsorship outcomes; exploit staggered, platform-level UI changes to identify causal effects; estimate a structural conversion-funnel model to quantify where gaps emerge; and run survey experiments that isolate sponsor taste-based discrimination with blinded versus non-blinded gender cues. Semi-structured interviews with maintainers contextualize strategies and constraints around monetization. The study integrates platform studies, economics of digital labor, gender and media studies, HCI, and network science to quantify unequal returns to attention and to inform design changes that close gaps without suppressing overall funding.

Methods

Data construction. We will build a monthly panel (2018–2025) of repositories and maintainers focused on the top 200,000 repositories by stars plus a stratified sample of medium- and low-attention projects to ensure coverage across the attention distribution. For each repository and maintainer, we collect: stars, watchers, forks, issues and pull requests opened/merged, release cadence, repository age, topics, languages, license, team size, default branch protection, and follower counts. We compute network features from (a) the GitHub following graph, (b) the dependency graph where available (package dependencies for npm, PyPI, crates, etc.), and (c) a stargazer bipartite projection to derive centrality and brokerage. All data are retrieved respecting platform terms using public endpoints and rate-limited collection.

Monetization outcomes are linked across GitHub Sponsors, OpenCollective, and Patreon. For GitHub Sponsors, we record whether a maintainer or organization has enabled sponsorship, sponsor counts by month when visible, available tier prices, and whether amounts are disclosed. We bound monthly revenue by multiplying sponsor counts by minimum and maximum visible tier prices and report point estimates under conservative assumptions (e.g., median tier). For OpenCollective, we ingest monthly contribution amounts and backer counts from public ledgers at the project or collective level. For Patreon, where creators sometimes hide earnings, we retain only pages that publicly disclose patron counts and/or revenue and link them to repositories via explicit URLs in READMEs, profiles, or websites. We deduplicate identities across platforms using linked URLs, emails in commit metadata (hashed), and consistent display names. Where multiple maintainers share a funding page, we attribute outcomes proportionally based on commit share or role tags specified by the project.

Gender operationalization follows a conservative, ethics-forward protocol. We assign gender only when there is self-disclosure (pronouns in profiles or linked personal websites) or explicit community identifiers, and we include nonbinary categories. We do not infer gender from names unless a maintainer has explicitly indicated pronouns elsewhere; ambiguous cases are coded as unknown and

retained. Analyses report results for self-disclosed groups and include partial identification bounds that incorporate unknowns. The survey experiment separately studies perceived gender effects without attributing identities to real maintainers.

Modeling conversion and identification. We define attention Ait for maintainer i in month t using several measures (log stars, followers, recent forks), standardized and combined via principal components; results are reported by measure. Monetization outcomes Mit include sponsor counts and monthly revenue (point and bounds). We first estimate hierarchical zero-inflated negative binomial and hurdle models for sponsor counts and a log-linear model with smearing for revenue: Mit = f(Ait, Git, Xit) where Git is a gender indicator and Xit includes repository age, team size, language fixed effects, package ecosystem, dependency and social centrality, release cadence, issue responsiveness, region-time fixed effects, and calendar month. Gender-varying slopes on Ait capture conversion elasticities. Random intercepts and slopes vary by ecosystem (e.g., JavaScript, Python), project domain (infrastructure, data science, web), and geography to absorb unobserved heterogeneity.

To identify causal shifts in conversion attributable to platform design, we exploit staggered adoption of the GitHub Sponsor button and other monetization affordances. For each repository, we observe the month the Sponsor button is enabled. We estimate event-study and modern staggered difference-in-differences models that compare changes in the conversion ratio Mit/Ait (and its log) before and after enabling, relative to repositories that have not yet enabled in the same period, with triple-differences by gender. We also analyze platform-wide UI changes (e.g., default placement of the Sponsor button in repository headers or READMEs) when rollout cohorts can be reconstructed from public changelogs or interface snapshots; when changes were universal, we use a triple-difference strategy that contrasts repositories with GitHub-native monetization exposure to those monetizing only via external links (OpenCollective/Patreon), under the assumption that non-GitHub monetization visibility is less affected. Placebo tests around non-monetization UI changes check for spurious effects.

Selection into monetization is addressed by two strategies. First, we fit a two-stage selection model where the first stage predicts enabling GitHub Sponsors using pre-treatment Xit and cohort availability, and the second stage models Mit conditional on selection, including the inverse Mills ratio. Second, we leverage exogenous shocks to attention that plausibly do not vary by gender—such as inclusion in ecosystem-wide newsletters or package registries' "new releases" feeds—to instrument short-run variation in Ait when dates can be matched from public archives. Robustness checks include alternative attention measures, alternative revenue bounds, developer- and repository-level fixed effects, and permutation tests that randomly reassign gender labels within matched strata.

Structural conversion-funnel modeling decomposes the path Attention → Profile visit → Sponsor page view → Pledge → Dollar amount. While platform-wide clickstream data are unavailable, a consented subsample of maintainers recruited for the study will share private GitHub traffic graphs and UTM-tagged referral logs from OpenCollective/Patreon for a six-month window. We estimate stage transition probabilities by gender and calibrate the population model by aligning predicted sponsor counts with observed outcomes. This clarifies whether gaps arise in discovery, clickthrough, pledge initiation, or tier selection.

Survey/experiment and interviews. We run a preregistered, incentive-compatible conjoint experiment with 2,000 active GitHub users and current/past sponsors recruited via platform-agnostic channels. Respondents receive a small endowment that can be allocated to real donations among a set of consenting maintainers at the end of the study to mitigate hypothetical bias. Profiles vary randomized attributes: gendered first names and pronouns (with a blinded condition showing no name/pronoun), avatar type (photo vs identicon), location, attention levels, domain, release cadence, team size, and stated funding goals. Outcomes are willingness-to-pay, probability to sponsor, and tier choice. Average marginal component effects estimate taste-based discrimination net of quality signals. Complementing

this, we conduct 40–60 semi-structured interviews with maintainers across gender identities, geographies, and ecosystems about monetization strategies, the decision to enable Sponsors, presentation choices, and experiences with sponsors; transcripts are thematically coded and integrated with quantitative findings.

Ethics and reproducibility. The study uses only public platform data, abides by terms of service, and minimizes personal data collection. Survey and interview components obtain informed consent and IRB approval; deception is not used. Identifiers are hashed; results are reported in aggregate with k-anonymity thresholds for small groups. We will release code and synthetic or de-identified data sufficient to reproduce analyses, along with a documented data schema and measurement codebook.

Potential Impact

The project delivers the first platform-scale estimate of gendered returns to attention in open-source, quantifying both average differences and where in the conversion funnel they arise. Evidence of a stars-to-sponsors conversion gap would shift debates from participation deficits to monetization inequities and provide actionable targets for intervention. If gaps concentrate in clickthrough, for example, platforms could pilot default-blinded sponsor prompts, avatar-neutral sponsor cards, or randomized presentation of maintainer metadata at the moment of pledge. If gaps emerge in tier choice, platforms could implement fair default tiers or nudges that equalize suggested amounts.

For platform designers and policy makers, we propose measurable fairness criteria such as parity in conversion elasticity conditional on attention and project quality, continuous monitoring dashboards for monetization equity, and A/B tests that evaluate UI changes for disparate impact before global rollout. For maintainers, we will provide evidence-backed guidance on presentation strategies that improve conversion without burdening already disadvantaged groups. More broadly, the methods generalize to other creator economies where attention and money are mediated by platform affordances. By connecting network position, attention flows, and monetization across gender, the study advances computational social science accounts of digital labor markets and informs design choices that can expand total funding while narrowing inequitable returns.