The Buy Now Pay Later Divide

Merchant Heterogeneity and Market Structure

Shashwat Alok (ISB) Pulak Ghosh (IIM Bangalore) Ankit Kalda (Indiana, Kelley) Chirasree Mitra (IIM Bangalore)

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Motivation

The Scale of Buy Now, Pay Later

$560B

Global BNPL transaction volume in 2025

The Paypers, 2025

$912B

Projected by 2030 (63% growth)

The Paypers, 2025

10×

Indian BNPL market: $3.5B (2021) → $35–40B (2026)

Arun et al. (2024)

22–25M

Indian BNPL retail loans, projected 90–100M by 2026

Hero FinCorp

- BNPL is embedded in checkout flows across e-commerce, kirana stores, and offline retail.
- Adoption is concentrated among young, thin-file consumers: over 70% of Indian BNPL users are under 35.
- Tier-2/3 cities account for approximately 60% of demand — a segment that has historically been underserved by formal credit.

Regulators Have Responded — but Only on the Consumer Side

The Regulatory Wave

- U.S. CFPB (2024): BNPL providers classified as credit card issuers.
- India RBI (2022–25): BNPL brought under formal lending regulation.
- EU (2023): Consumer Credit Directive extended to BNPL.
- Australia (2024): BNPL-specific legislation.

An Underexplored Margin

BNPL is a two-sided platform. Existing rules address consumer-side outcomes — over-borrowing, disclosure, debt accumulation. The merchant-side effects — formalization, credit access, market concentration have received limited attention in both the academic literature and policy.

The Merchant Side: Open Questions

What the literature has established (consumer-side):

- Spending, over-borrowing, debt accumulation (Di Maggio et al. 2022; deHaan et al. 2024; Guttman-Kenney et al. 2023)
- BNPL users are younger, thin-file, liquidity-constrained (Cornelli et al. 2023)
- One large e-commerce merchant: price discrimination (Berg et al. 2024)

What remains less understood (merchant-side):

- Which merchants benefit, and through what channels?
- Does BNPL expand the market, or just redistribute demand among merchants?
- What are the implications for market concentration and small-merchant inclusion?
- What role does merchant-side formalization play?

Research Questions

1.

Which merchants benefit most from BNPL,
and through what channels?

2.

Does BNPL expand the overall market,
or redistribute existing demand?

3.

What are the implications
for market structure and concentration?

Distributional Ambiguity: Who Should Benefit?

Larger merchants benefit more

- Complementarities with existing digital infrastructure (Milgrom & Roberts 1990)
- Network effects in payment adoption (Rochet & Tirole 2002)
- Larger customer bases amplify gains.
- $\Rightarrow$ Reinforces scale; concentration rises.

Smaller merchants benefit more

- Small firms lack pledgeable assets, verifiable cash flows (Townsend 1979; Holmström-Tirole 1997)
- BNPL digitizes transactions $\Rightarrow$ observable cash flows for lenders.
- Information asymmetries fall most where they were largest.
- $\Rightarrow$ Equalizing effect; concentration falls.

Aggregate Ambiguity: Three Competing Forces

1. Zero-sum reallocation

BNPL = zero-interest installment ⇒ implicit price discount at adopters.

Consumers *already* served by cards/microfinance/informal credit *redirect* spending toward BNPL merchants.

⇒ Adopters gain at non-adopters' expense; no new activity.

2. Demand-side expansion

Consumers *without* prior credit can now transact.

Extensive margin in the credit market: previously excluded buyers enter; existing buyers transact more frequently.

⇒ New economic activity, not just redirected.

3. Supply-side formalization

BNPL digitizes merchant cash flows.

Verifiable records relax merchant-side financing constraints.

Adopters expand inventory/capacity to serve latent demand.

⇒ Supply-side market expansion.

Takeaway: Cross-sectional heterogeneity in treatment effects is informative for distinguishing these mechanisms: pure zero-sum reallocation predicts approximately uniform effects across merchants, whereas the expansion mechanisms predict effects concentrated among constrained merchants and underserved markets.

This Paper

This Paper

Setting: A large Indian payments fintech (>10M offline merchants) that launched a BNPL product embedded in its merchant-acquiring network in November 2021.

Approach: A shift-share IV (pre-BNPL UPI growth × post-launch) on a 48-month panel of ∼379,000 merchants.

Four contributions:

1. **First broad merchant-side evidence.** Revenue gains are >3× larger for small, credit-constrained merchants than for large ones.
2. **A novel formalization channel.** BNPL digitizes merchant transactions and generates verifiable records that improve credit *access* and credit *allocation* (defaults fall).
3. **Expansion vs. redistribution.** Spillovers on non-adopters are negative but an order of magnitude smaller than adopter gains.
4. **A divide in market concentration.** Concentration falls within adopters but rises overall — the divide is driven by adoption barriers, not by the technology.

Related Literature

1. BNPL — consumer-side: Di Maggio et al. (2022), deHaan et al. (2024), Guttman-Kenney et al. (2023), Cornelli et al. (2023). Merchant-side: Berg et al. (2024) on one e-commerce platform; Sharma, Jindal & Kumar (2025) on a digital asset platform.
   We provide the first broad merchant-side evidence in physical retail.

2. Payment digitization and formalization: Higgins (2024), Bachas et al. (2021), Jack-Suri (2014).
   We document a BNPL–card complementarity, contrary to the substitution predicted by standard payments models.

3. Information asymmetries and fintech credit: Petersen-Rajan (1994), Mester et al. (2007), Agarwal et al. (2020), Buchak et al. (2018), Fuster et al. (2019).
   We show that a payment innovation can expand credit indirectly through the generation of verifiable records, with concurrent improvements in allocation.

4. Aggregate effects of technology adoption: Aghion-Howitt (1992) on creative destruction.
   We extend the BNPL evidence to spillover and concentration outcomes.

Preview of Results

- **Headline.** BNPL adoption raises revenue growth by 85–93 pp; transactions +39 pp; basket size +46–52 pp.
- **Distributional.** Effects $>3\times$ larger for small, credit-constrained merchants. Concentrated in low-nightlight, low-vehicle areas. Null in affluent areas.
- **Credit channel.** Any active loan +18 pp; first-time formal loan +8 pp; default rates fall — broader access *and* better allocation.
- **Mechanism.** Cash share falls, card share rises alongside BNPL — comprehensive payment digitization. Effects 2–3$\times$ larger for cash-dependent, previously opaque merchants.
- **Spillovers.** A 10 pp$\uparrow$ in local BNPL adoption $\Rightarrow$ -0.66% revenue, -0.51% transactions for non-adopters — an order of magnitude smaller than adopter gains.
- **Concentration.** Adopter fraction $\Rightarrow$ HHI rises overall but falls within adopters. *Same technology, opposite signs across samples.*

Setting and Data

Data: A Deep Small-Merchant Panel

Source: One of India's largest payment-system fintechs (>10M merchants, 300+ cities); entered BNPL in November 2021. **Sample period:** April 2020 – 2024 (48 months); pre-period cleanly precedes the BNPL launch.

For each merchant we observe:

- Attributes: category, pincode, credit-bureau scores, tradelines.
- Daily activity: volume and count by payment type (UPI, card, cash) + revenue.
- Loan-level data: sanction date, amount, tenure, rate, repayment, default.
- Whether and when each merchant adopted BNPL (Nov 2021 onward).
- No fees for either merchants or consumers.

Sample:

- Merchants who took *at least one loan* from the platform.
- Categories with ≥500 unique merchants.
- Baseline restricts to BNPL adopters; Table IA.4 relaxes this.

Geo coverage | Platform growth | Business categories

Summary Statistics

Platform growth Business categories

Variable	Mean	Median	Std. dev.
Unique merchants		378,955	
Merchant-month observations		∼10.5 million	
Months in panel		48 (Apr 2020–2024)	
Monthly revenue (Rs.)	60,942	22,370	—
Monthly transaction count	—	106	—
Avg. transaction size (Rs.)	708	163	—
Transaction-count growth	—	—	0.95
Revenue growth	—	—	1.29
Share of merchant-months with a new loan		14.3%	

- Median merchant earns Rs. 22,370/month — a small business in India's informal economy.
- Distribution is right-skewed; substantial month-to-month volatility.
- 14.3% of merchant-months involve new loan origination — an active credit market.

Adopters vs. Non-Adopters: Selection Motivates the IV

Geo coverage Platform growth

Pre-period characteristic	Adopters	Non-adopters
Mean monthly revenue (Rs.)	26,530	14,703
Mean monthly transaction count	96	31
Mean avg. transaction size (Rs.)	522	716
Transaction-count growth (monthly)	10.9%	5.9%
Transaction-size growth (monthly)	4.7%	9.3%
Loan take-up rate	15.6%	15.2%
Loan amount | borrowing (Rs.)	121,858	97,944
First-loan amount (Rs.)	80,525	76,851

- Adopters are larger and growing faster on volume; non-adopters have higher per-ticket size.
- Pre-period credit access is essentially equal $\Rightarrow$ differential post-period credit is informative about BNPL, not pre-existing access.
- Adopter selection on growth requires a credible identification strategy.

Identification

Empirical Challenges

1. **Selection.** Growth-oriented merchants are more likely to adopt; the same traits drive revenue and credit access independently.
2. **Reverse causality.** Merchants experiencing declining revenue may adopt BNPL *to attract* customers $\Rightarrow$ bias.
3. **Omitted variables.** Local shocks or demographic shifts may simultaneously drive adoption and outcomes.

$$Y_{ipt} = \beta \cdot \text{BNPL}_{it} + \alpha_i + \delta_t + \varepsilon_{ipt}$$

- Merchant FE absorbs time-invariant traits; time FE absorbs common shocks.
- Even so, β in this OLS is biased — we need an instrument for BNPL adoption: predetermined, plausibly exogenous, and excluded from outcomes except through BNPL.

Shift-Share Instrument

$$Z_{pt} = \underbrace{\text{UPIGrowth}_{p,\,2017\text{–}2019}}_{\text{share: pre-existing digital infrastructure}} \times \underbrace{\text{BNPLLaunch}_{t}}_{\text{shift: post Nov 2021}}$$

Intuition

Pincodes with higher pre-BNPL UPI growth (2017–19) had better digital infrastructure and digitally familiar consumers $\Rightarrow$ more feasible/attractive BNPL adoption once the product launched in Nov 2021.

2SLS:

$$\text{BNPL}_{it} = \pi Z_{pt} + \alpha_i + \delta_t + \nu_{it} \quad \text{(first stage)}$$

$$Y_{ipt} = \beta \cdot \widehat{\text{BNPL}}_{it} + \alpha_i + \delta_t + \epsilon_{ipt} \quad \text{(second stage)}$$

- Share is measured years before BNPL launch $\Rightarrow$ no anticipation.
- BNPL launch timing is exogenous to individual merchants.
- All specifications include merchant and time fixed effects; SEs clustered at pincode.

First Stage and Exclusion Restriction

Relevance (First Stage)

- Coefficient on Z_{pt}: 0.0303 (pincode FE), 0.0274 (merchant FE), both $p < 0.01$.
- Kleibergen-Paap F: 20.28 (pincode FE), 17.89 (merchant FE).
- High ex-ante UPI growth $\Rightarrow$ $\sim$3 pp higher BNPL uptake after launch.

Exclusion Restriction

- Timing: 2017–19 share predates Nov 2021 launch by years $\Rightarrow$ no anticipation.
- Merchant FE absorb time-invariant differences across high- vs. low-UPI-growth areas.
- Direct test: control for contemporaneous UPI transaction share.
- Estimates strengthen with this control $\Rightarrow$ BNPL-specific channel, not generic digitization.

Takeaway: First stage is strong; the exclusion restriction survives a direct robustness check using contemporaneous UPI as a control.

Main Results

Revenue, Transaction Count, Basket Size

	Revenue		Tx Count		Avg Tx Size	
	Pincode FE	Merchant FE	Pincode FE	Merchant FE	Pincode FE	Merchant FE
$\widehat{\text{BNPL}}$	0.933***	0.851***	0.413***	0.394***	0.519***	0.457***
	(0.199)	(0.197)	(0.119)	(0.121)	(0.105)	(0.099)

- Revenue growth: +85–93 pp/month, on a small base (≈Rs. 22,370 median).
- Decomposition: tx count +39–41 pp *and* basket size +46–52 pp — both intensive and extensive in the goods market.
- LATE interpretation: compliers are merchants whose adoption is induced by pre-existing digital infrastructure — the most "transformable" segment.

Credit Access: Both Deepening and First-Time Entry

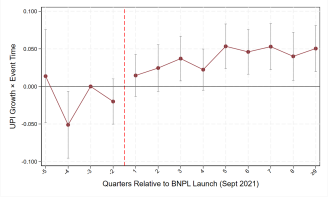
	Loan Dummy		IHS(Loan Amt)		First Loan		IHS(First Loan)	
	Pin	Mer	Pin	Mer	Pin	Mer	Pin	Mer
$\widehat{\text{BNPL}}$	0.184**	0.237***	2.385**	3.063***	0.084***	0.087***	0.912**	0.971***

Pin = pincode + time FE; Mer = merchant + time FE. SEs clustered at the pincode level.

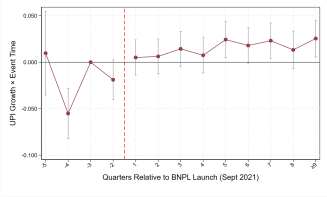
- Probability of *any* active loan: +18–24 pp.
- Probability of *first* formal loan: +8–9 pp; first-loan amount approximately doubles.
- The estimates indicate that BNPL operates as a mechanism for first-time entry into formal credit markets, in addition to its role as a payment instrument.

Event Study: Clean Pre-Trends; Effects Appear After Launch

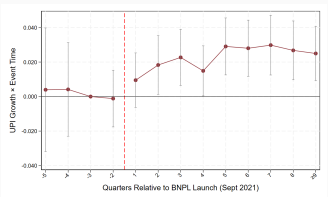
Revenue



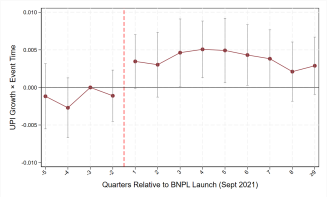
Transaction Count



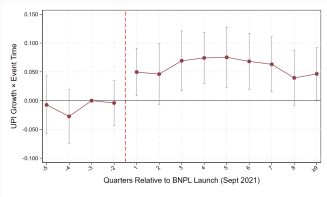
Avg Transaction Size



Loan Dummy



IHS(Loan Amount)



Reading:

- Flat pre-trends across all five outcomes.
- Post-launch effects appear and grow.
- Direct visual support for parallel trends and the exclusion restriction.

Heterogeneity and Mechanisms

Distributional Effects: Small and Constrained Gain Most

Panel A: Splitting by ex-ante revenue

	Revenue	Tx Count	Avg Tx Size	Loan Dummy
Below median (small)	1.727***	0.587***	1.139***	0.263**
Above median (large)	0.525***	0.281***	0.243**	0.165**
Small/Large ratio	≈3.3×	≈2.1×	≈4.7×	≈1.6×

Panel B: Splitting by ex-ante credit-bureau score

	Revenue	Tx Count	Avg Tx Size	Loan Dummy
Below median (low score)	3.279**	2.093**	1.186*	0.249
Above median (high score)	1.188**	0.651**	0.537	0.141
Low/High ratio	≈2.8×	≈3.2×	≈2.2×	≈1.8×

Takeaway: Effects are $> 3\times$ larger for small and low-score merchants. For these firms, revenue *and* credit access expand. For larger firms, gains come more from demand expansion alone.

Mechanism: Cash ↓, Card ↑ — Comprehensive Digitization

- Following BNPL adoption, cash transaction share falls significantly.
- Surprisingly, card transaction share rises alongside BNPL.
- In standard payments models, digital methods substitute for one another (Alvarez & Argente 2022; Brown et al. 2022). *We find complementarity.*
- BNPL appears to be a gateway into broader payment digitization.

Three candidate channels:

1. Infrastructure: terminals/gateway integration also enable card acceptance.
2. Customer mix: BNPL attracts digitally savvy customers who use multiple methods.
3. Liquidity: BNPL relaxes constraints on cash-preferring consumers, pulling them into digital flows.

Why this matters

The digitization channel generates verifiable transaction records that:

- Reduce information asymmetries between merchants and lenders.
- Disproportionately benefit previously opaque merchants.
- Constitute the substantive content of the formalization story.

Cash-Dependent Merchants Gain Most: Direct Evidence for Formalization

	Revenue	Loan Dummy	IHS(Loan Amount)
Above-median cash share (cash-dependent)	1.964***	0.325*	3.806*
Below-median cash share	0.812***	0.082	1.346
Ratio (high/low)	$\approx 2.4\times$	$\approx 4.0\times$	$\approx 2.8\times$

- Cash-reliant merchants were the least observable to formal lenders *ex ante* — precisely the segment for which BNPL-induced digitization generates the most new information.
- Treatment effects on revenue and credit access are 2–3× larger for these merchants — the cross-sectional pattern the formalization channel predicts.
- The pattern is consistent with the formalization channel: the marginal value of digital records is largest in segments where such records were previously absent.

Takeaway: This is the most direct test of the formalization channel: the gains from BNPL concentrate exactly where pre-adoption transaction records were absent, consistent with verifiable digital cash flows resolving information frictions between merchants and lenders.

Credit Allocation Improves: Defaults *Fall*

	Coefficient	Notes
P(overdue > 0)	-0.023**	Default probability declines
Overdue amount (level)	Negative***	Significant decline
IHS(overdue amount)	Negative***	Robust to scale

Heterogeneity:

- By revenue: similar coefficients across small and large merchants $\Rightarrow$ improvement reflects better screening, not differential cash-flow or repayment ability.
- By bureau score: defaults fall 2–3$\times$ more for low-score merchants — the same group with the largest credit-access gains.

Takeaway: Lending expands while default rates decline, indicating that BNPL improves credit allocation in addition to credit access. The pattern is consistent with verifiable transaction records reducing the information friction faced by lenders.

Effects Concentrate Where Constraints Bind — Neighborhoods

Panel A: Splitting by nightlight intensity

	Revenue	Loan Dummy	IHS(Loan Amount)
Below-median (less developed)	0.856***	0.354***	4.466***
Above-median (more developed)	0.455***	0.036	0.609

Panel B: Splitting by four-wheeler vehicle registration rate

	Revenue	Tx Count	Avg Tx Size
Below-median (less affluent)	0.596***	0.295**	0.301***
Above-median (most affluent)	−0.754	−1.458**	0.704

Takeaway: Treatment effects are *weaker* in affluent areas, where neither merchants nor consumers face binding constraints. The pattern is inconsistent with a pure zero-sum reallocation mechanism, which would predict approximately uniform redistribution across neighborhoods.

Effects Concentrate Where Constraints Bind — Business Type

Business categories

Panel A: Ticket size

	Revenue	Tx Count	Avg Tx Size	Loan Dummy
Low-ticket (essentials, F&B, fuel, transport)	1.044***	0.446***	0.598***	0.141
High-ticket (electronics, healthcare, services)	0.734***	0.391***	0.343**	0.109*

Panel B: Discretionary vs. non-discretionary

	Revenue	Tx Count	Avg Tx Size	Loan Dummy
Non-discretionary (essentials)	1.099**	0.629***	0.471***	0.264***
Discretionary	0.733***	0.231**	0.502***	0.068*

- Treatment effects are economically larger for non-discretionary, small-ticket merchants — categories in which small liquidity shocks most plausibly suppress consumption and BNPL has the highest marginal value.
- The pattern is consistent with the neighborhood-level evidence.

Spillovers and Market Structure

Spillovers on Non-Adopters: Negative but Small

Specification (non-adopters only):

$$Y_{ipt} = \beta \cdot \text{BNPLAdoptionFraction}_{pt} + \alpha_i + \delta_t + \varepsilon_{ipt}$$

	Revenue	Tx Count	Avg Tx Size
10 pp↑ in local BNPL adoption ⇒	−0.66%	−0.51%	no sig. effect

- Statistically significant, but economically small — an order of magnitude smaller than adopter gains.
- Heterogeneity: spillovers modestly larger for non-discretionary non-adopters — consistent with consumers switching between nearby merchants based on payment availability.
- Within each category, magnitudes remain an order of magnitude smaller than within-category adopter gains.

Takeaway: The data are inconsistent with pure zero-sum redistribution: adopter gains exceed non-adopter losses by an order of magnitude, implying net market expansion through consumer credit access and supply-side formalization.

Market Concentration: A Sign Flip Across Samples

Specification (pincode-month panel):

$$HHI_{pt} = \beta \cdot \text{AdopterFraction}_{pt} + \alpha_p + \delta_t + \varepsilon_{pt}$$

	All merchants in pincode		Adopters only	
	Revenue HHI	Tx Count HHI	Revenue HHI	Tx Count HHI
Adopter Fraction	$+0.072 * **$	$+0.089 * **$	$-0.189 * **$	$-0.180 * **$

- Overall concentration rises: smaller non-adopters bear (small) negative spillovers; the adopter/non-adopter divide widens.
- Within-adopter concentration falls: small constrained merchants gain disproportionately, compressing the adopter distribution.
- Robust to controlling for UPI transaction fraction $\Rightarrow$ BNPL-specific, not generic digitization.

Takeaway: Aggregate distributional outcomes are governed by the adoption margin rather than by the technology's effect on adopters, which is equalizing within the adopter pool.

Robustness and Interpretation

Robustness Checks: Findings Are Stable

Check	Revenue coef.	Interpretation
Baseline (merchant + time FE)	0.851***	—
Control for contemporaneous UPI share	0.954***	Strengthens ⇒ supports exclusion restriction
Include adopters *and* non-adopters	0.572***	Diluted compliers but consistent
Replace time FE with category × time FE	0.898***	Not driven by category-specific shocks
Drop top/bottom UPI-growth deciles (Borusyak-Hull)	0.978***	First-stage F jumps to 117.8 — not outliers

- Coefficient strengthens when controlling for current UPI usage — the IV captures BNPL-specific variation, not generic digitization.
- Coefficient persists on the broader sample, under category-by-time FE, and after trimming pincode outliers.

Reconciling Three Channels with the Heterogeneity Fingerprint

Empirical pattern	Zero-sum	Demand expansion	Supply formalization
Effects $>3\times$ for small, low-score, low-cash merchants	✗	✓	✓
Effects in low-nightlight / low-vehicle areas; null in affluent	✗	✓	✓
Effects largest for non-discretionary, low-ticket categories	✗	✓	∼
Cash ↓, card ↑ (digitization complementarity)	✗	✗	✓
First-time formal loan $+8$ pp; loan amount roughly doubles	✗	✗	✓
Default rates *fall*, especially for low-score merchants	✗	✗	✓
Spillovers an order of magnitude smaller than adopter gains	✗	✓	✓

Takeaway: The joint pattern is inconsistent with pure zero-sum reallocation and consistent with both expansion mechanisms. The formalization channel provides the link between payment digitization, credit access, and improved allocation.

Conclusion

Conclusion

- **Research questions:** Which merchants benefit from BNPL, and through what channels? Does it expand the market, or redistribute? What does this imply for market structure?
- **What we find:**
  - Revenue effects are $> 3\times$ larger for small, credit-constrained merchants.
  - BNPL digitizes merchant cash flows $\Rightarrow$ formalization: first-time formal credit access rises; defaults decline.
  - Spillovers on non-adopters are an order of magnitude smaller than adopter gains $\Rightarrow$ net market expansion.
  - Concentration falls within the adopter pool but rises overall — the divide is driven by differential adoption.
- **Theoretical inference:**
  - BNPL functions as a payment innovation that also operates as a credit-record technology, addressing information frictions in small-merchant lending.
  - Aggregate distributional outcomes are governed by the adoption margin rather than by the technology's effect on adopters, which is equalizing within the adopter pool.

Implications for Policy

- Existing BNPL regulation is oriented primarily toward consumer protection; the merchant side has received limited attention.
- Our estimates document substantial merchant-side benefits, concentrated among the most constrained firms — a margin policymakers have not priced in.
- Aggregate concentration rises because small merchants are less likely to adopt — not because BNPL is inherently anti-competitive.
- Reducing adoption frictions for small merchants would jointly improve financial inclusion and mitigate the adverse concentration effects we document.

Thank You

shashwat_alok@isb.edu

Geographic Coverage — Pan-India

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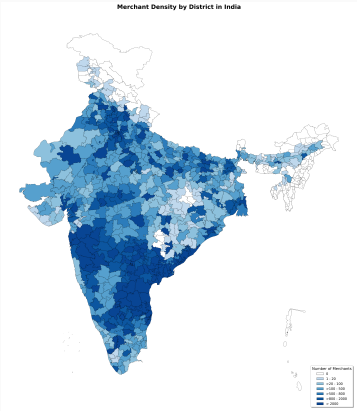
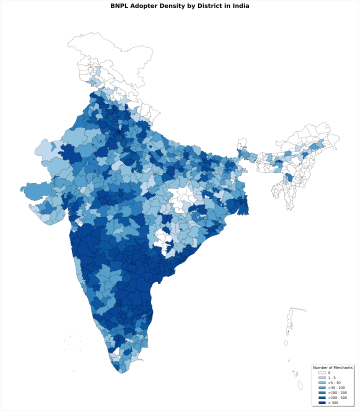
All Merchants



Concentrated in southern and western India

BNPL Adopters



Adopter distribution mirrors overall sample

Platform Growth and BNPL Take-Up

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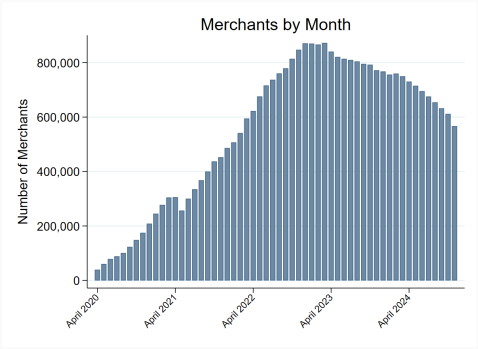
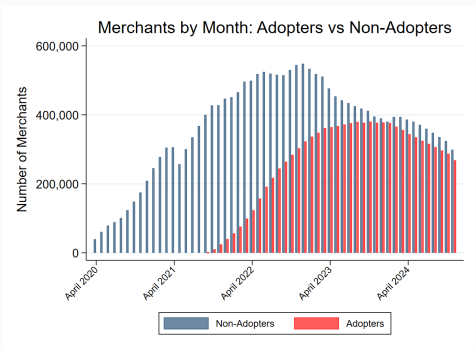
Panel A: Total Merchants on Platform



~50K (Apr 2020) → >800K (late 2023)

Panel B: Adopters vs. Non-Adopters



Adopters ≈ half of active merchants by mid-2023

Merchants Across Business Categories

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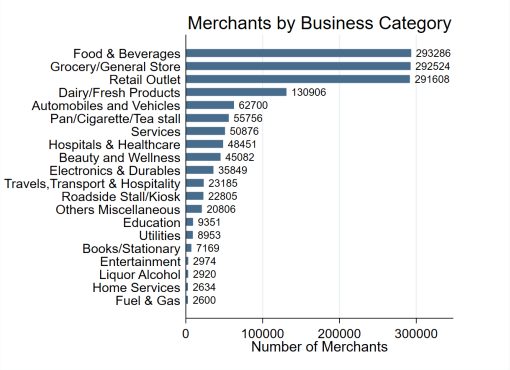
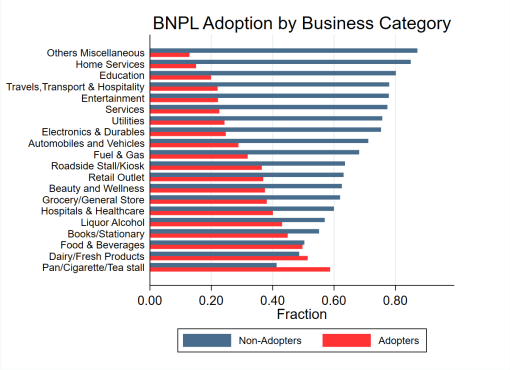
Panel A: Total Merchants by Category



F&B, Grocery, Retail Outlet ∼290K each

Panel B: BNPL Adoption Rate by Category



Highest: Misc., Home Services, Education (>60%)

Lowest: Pan/Cigarette/Tea, Dairy (<30%)