Ad Performance Case Study

Facebook App Install Campaign Analysis

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+138% ROI

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Dashboard said:	**Reality:**
$0.02 profit/install	$0.05 profit/install

More than double.

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3. **Can we make this even better?**
   (Spoiler: yes, by shifting budget by weekday)

The Situation

Campaign Overview

The app:

- Free iOS app
- Revenue from in-app purchases & ads
- Market: Brazil

The campaign:

- Platform: Facebook
- Duration: Oct 7 – Dec 31, 2014
- Daily budget cap: $90
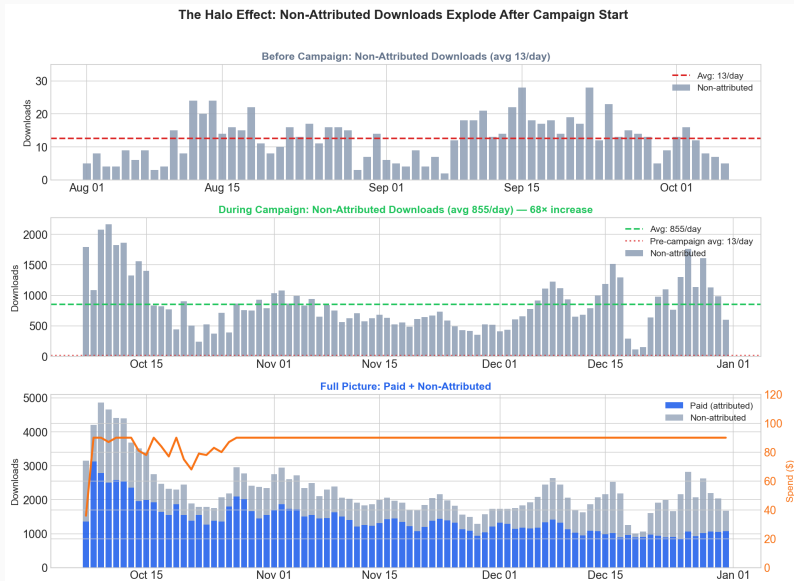- Single creative, broad targeting

Data sources:

1. **Campaign data** (Facebook)
   Spend, attributed installs, day-0 revenue

2. **App-wide data**
   Total downloads & revenue (all users)

Key insight: The second dataset shows what attribution *doesn't* capture.

3

Question 1: How many installs?

The Halo Effect: Non-Attributed Downloads Explode After Campaign Start

The Halo Effect: Key Numbers

	Before Campaign	During Campaign
Non-attributed downloads/day	13	855

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$60\times$ **increase**

These are real users the campaign brought in, but Facebook didn't credit.

Two Ways to Calculate CPI

CPI_paid vs CPI_all: The True Acquisition Cost

- CPI_paid (attributed only)
- CPI_all (includes halo)
- Gap (non-attributed installs)

Cost per Install ($)

CPI: Key Insight

CPI$_{paid}$ (Facebook reports)

$0.07

Spend ÷ Attributed installs

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CPI$_{all}$ (includes halo)

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Spend ÷ Total installs

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Spend ÷ Total installs

43% lower acquisition cost when we include halo installs.

Working assumption: CPI$_{all}$ is our true acquisition cost.

(The 60× jump is too large to be coincidence, but we'll validate with a geo holdout.)

Question 2: True value per user?

The LTV Problem

What we have:

- Day-0 revenue per install: \$0.017 (from Facebook)
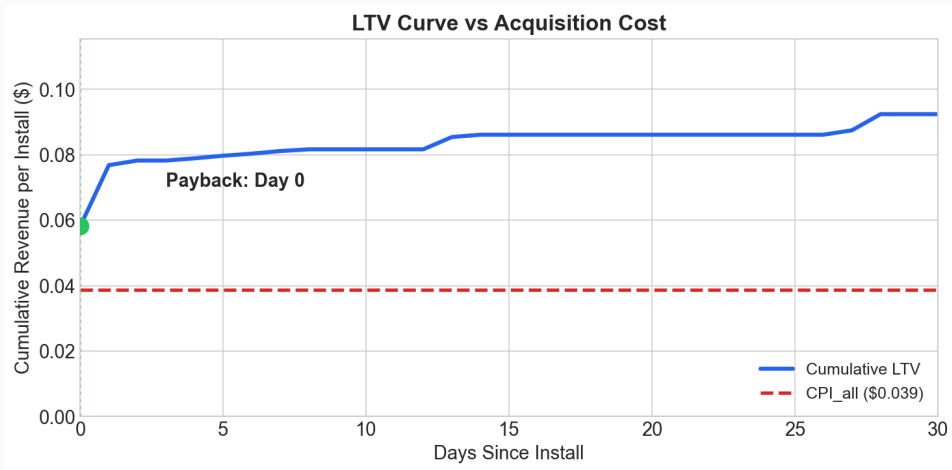- Daily totals: revenue & installs

What we need:

- 30-day value per user
- Payback period

The challenge: No user-level data.

The approach: Use *deconvolution* — work backward from daily revenue patterns to estimate revenue-by-age.
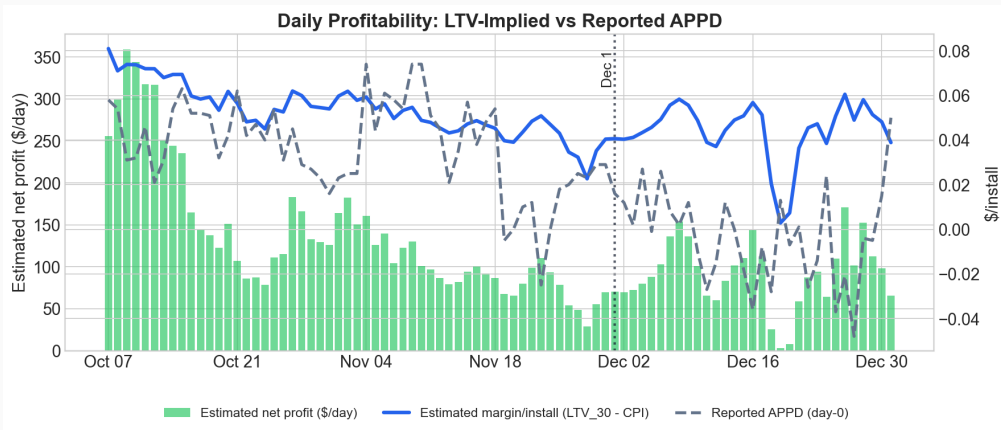
LTV Curve vs Acquisition Cost

LTV: Key Numbers

Metric	Value
30-day LTV	$0.092
Acquisition cost (CPI_{all})	$0.039
30-day margin/install	**$0.053**
Payback	**Day 0**
30-day ROI	**+138%**

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Payback	**Day 0**
30-day ROI	**+138%**

63% of value captured on day 0; 87% by day 7.

Daily Profitability: LTV-Implied vs Reported APPD

The Punchline

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December drift: Performance weakened in December.
Likely cause: creative fatigue, audience saturation.
Action: refresh creatives, monitor cohort quality.

Question 3: Can we do better?

Weekday Seasonality

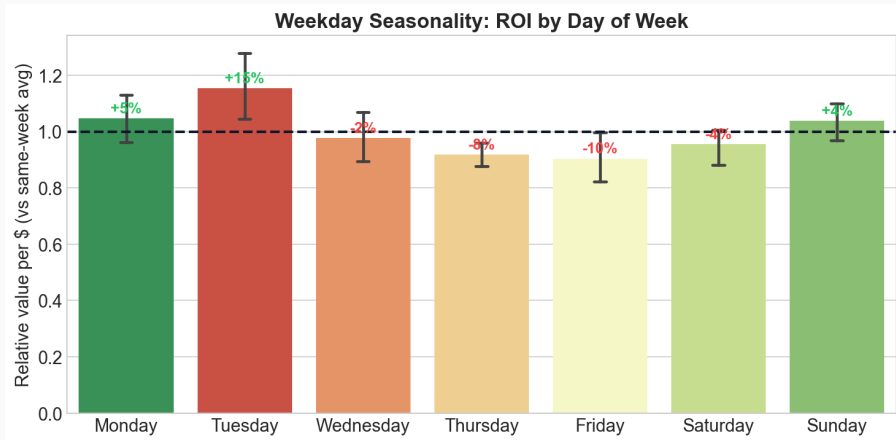**Observation:** Some weekdays look more efficient than others.

Challenge: Campaign drifts over time (December < October).

Solution: Compare weekdays *within the same week*.

- Is Tuesday better than the average day in that week?
- This removes drift, isolates weekday effects.

Goal: Turn weekday patterns into a daily cap schedule.

Weekday Seasonality: ROI by Day of Week

Weekday Caps: The Recommendation

Day	Relative ROI	Multiplier	Daily Cap
Tuesday	+15%	1.15×	$104
Monday	+5%	1.05×	$94
Sunday	+4%	1.04×	$94
Wednesday	−2%	0.98×	$88
Saturday	−5%	0.96×	$86
Thursday	−8%	0.92×	$83
Friday	−10%	0.91×	$81

Weekly spend stays the same: $7 \times \$90 = \$630$

How to Validate

A/B test design:

- **Week A:** Flat caps ($90/day)
- **Week B:** Weekday-weighted caps (table above)
- Alternate weeks, compare CPI, installs/$, revenue/$

Why test?

- Shifting budget can change ROI (diminishing returns)
- Multipliers should be tuned based on results

Low-risk: we learn something either way.

Limitations & Next Steps

Limitations

1. **No randomized control group**
   Halo effect based on step-change, not a true experiment.

2. **Aggregate data only**
   LTV inferred from totals, not tracked per user.

3. **Cohort quality may vary**
   Single LTV estimate may not hold for all cohorts.

4. **Single creative, single market**
   Results may not generalize.

Next Steps

Validate:

- Geo holdout test: ads on in some cities, off in others
- Measure lift in installs and revenue

Operate:

- Test weekday caps (flat vs weighted)
- Refresh creatives to address December drift

Next Steps (II)

Measure better:

- Track LTV by cohort and source (paid vs non-attributed)
- Monitor D0/D7/D30 revenue weekly

Scale:

- Budget step test to map diminishing returns
- Then: increase spend where ROI holds

This campaign works.

CPI_{all}	LTV_{30}	ROI
$0.039	$0.092	+138%

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Key insight: The dashboard understated profit by half.

Opportunity: Shift budget to better weekdays ($+15\%$ on Tuesdays).

Next: Validate with geo holdout, test weekday caps, refresh creatives.

Questions?