

Data Storytelling Summary

To analyze the viability of the casino acquisition campaign, I developed a **Python-based statistical simulation model** using the data provided in the original campaign document. The script calculated month-over-month performance projections for 12 months, based on average player behavior and the campaign's reward mechanics (cashback and rakeback systems).

Although the model is based on monthly data, I also extended the structure to support **daily and weekly forecasting**. In this version, the monthly data is averaged downward to predict shorter timeframes. The trend patterns remain consistent across all three granularities.

However, since the problem statement focused on **monthly results**, the analysis in this report is based on monthly projections. With additional detailed daily-level data and more time to tune the simulation, the daily/weekly model could play a key role in early detection of profitable or unprofitable campaigns, allowing decisions to be made sooner.

Key Constants Used in the Model

These reward and economics assumptions remain constant across all periods:

- **House Edge ≈ 3.095%**
The expected percentage revenue the casino earns from wagering.
- **Cashback Rate = 3%**
A portion of house revenue returned to players as cashback.
- **Rakeback Rate = 20%**
A portion of house revenue returned to players based on wagering contributions.
- **Cap Rate ≈ 33%**
The maximum combined rewards (cashback + rakeback) allowed as a percentage of lifetime deposits.

Data Structure & Column Logic

Each column in the simulation output was calculated using deterministic formulas based on campaign assumptions:

Column	Description / Logic
<code>month_index</code>	Sequence number (1–12).
<code>month_start</code>	First day of the reporting month.
<code>growth_param</code>	Input driver determining player count change.
<code>growth_model</code>	“retained_plus_new” → total players are the sum of retained + new.

Column	Description / Logic
<code>retained_players</code>	Users continuing from the previous month.
<code>new_players</code>	Users acquired during this month.
<code>total_players</code>	<code>retained_players + new_players</code>
<code>deposits</code>	Total deposits for the month.
<code>lifetime_deposits</code>	Cumulative deposits across months: <code>prev_lifetime + deposits</code> .
<code>lifetime_cap</code>	Maximum total rewards: <code>lifetime_deposits × CAP_RATE</code> .
<code>remaining_cap_before</code>	Total cap available before payouts this month.
<code>expected_cashback</code>	<code>total_wagering × HOUSE_EDGE × CASHBACK_RATE</code> .
<code>expected_rakeback</code>	<code>total_wagering × HOUSE_EDGE × RAKEBACK_RATE</code> .
<code>expected_total_cashrake</code>	Sum of rakeback + cashback.
<code>actual_cashrake_paid</code>	<code>min(expected_rewards, remaining_cap_before)</code> — cannot exceed cap.
<code>lifetime_cap_used</code>	Aggregate rewards paid out to date.
<code>remaining_cap_after</code>	<code>lifetime_cap - lifetime_cap_used</code> .
<code>total_wagering</code>	Forecasted wagering volume for the month.
<code>gross_revenue</code>	<code>total_wagering × HOUSE_EDGE</code> .
<code>acquisition_cost</code>	Cost of acquiring that month's new players.
<code>net_profit</code>	<code>gross_revenue - acquisition_cost - actual_cashrake_paid</code> .

This framework allowed the model to simulate realistic financial outcomes month by month while adhering to the casino's operational constraints.



Campaign Outcome: Performance Summary

Based on the projected values:

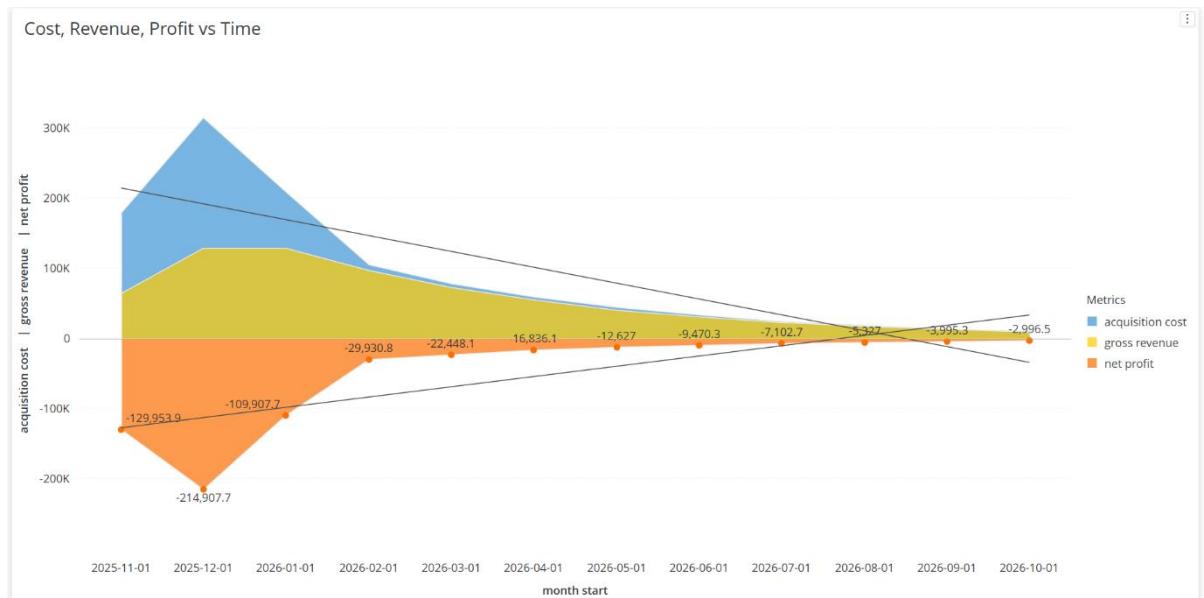
1. Campaign is Not Profitable

Across all 12 months, **net profit remains negative**, meaning the campaign fails to recover acquisition and reward costs.

A monthly analytics cycle may detect this too late — therefore:

- Weekly or daily prediction models should be used for faster decision-making.

- Short-term fluctuations must still be interpreted carefully, since wagering behavior is heavily influenced by events, promotions, and large player swings.



2. Acquisition Cost Must Be Reduced

- The model has a CAC of **~\$60 per player**, which is high relative to expected lifetime value.
- To improve ROI:
 - Segment users by country, signup channel, age, betting intensity, etc.
 - Shift budget toward high-LTV (Lifetime Value) segments.
 - Experiment with cheaper channels (e.g., affiliates, retargeting audiences, influencer deals, niche advertising).

A more efficient spend directly improves profitability without changing product mechanics.

3. Focus on Increasing Wager Volume (Not Just House Edge)

Increasing house edge is possible but may:

- Hurt player retention
- Reduce engagement
- Lower long-term value

Instead, improving wagering volume is the healthier goal (Missions, VIP tiers, Streak rewards, Personalized bonuses etc.). Even small increases in wagering materially improve revenue without harming the user experience.

4. Player Base is Declining

Over the 12-month simulation:

- Total active players **drop significantly**
- This reduces wagering, revenue, and overall campaign potential

We need to try and scale acquisitions after CAC optimization, improve retention and stabilize churn.

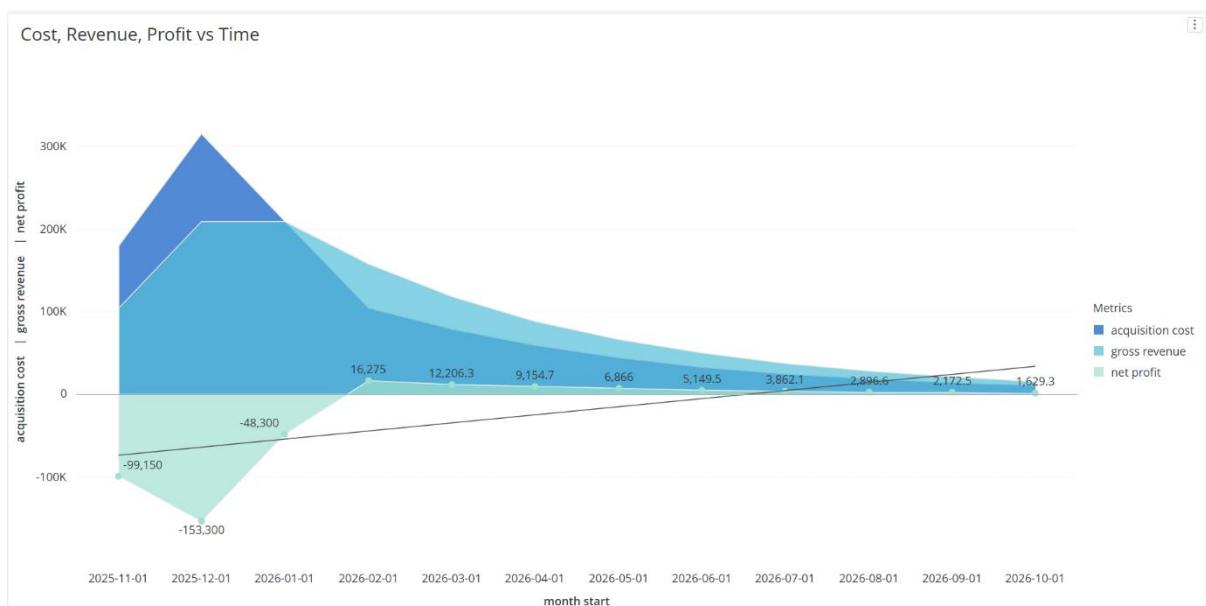
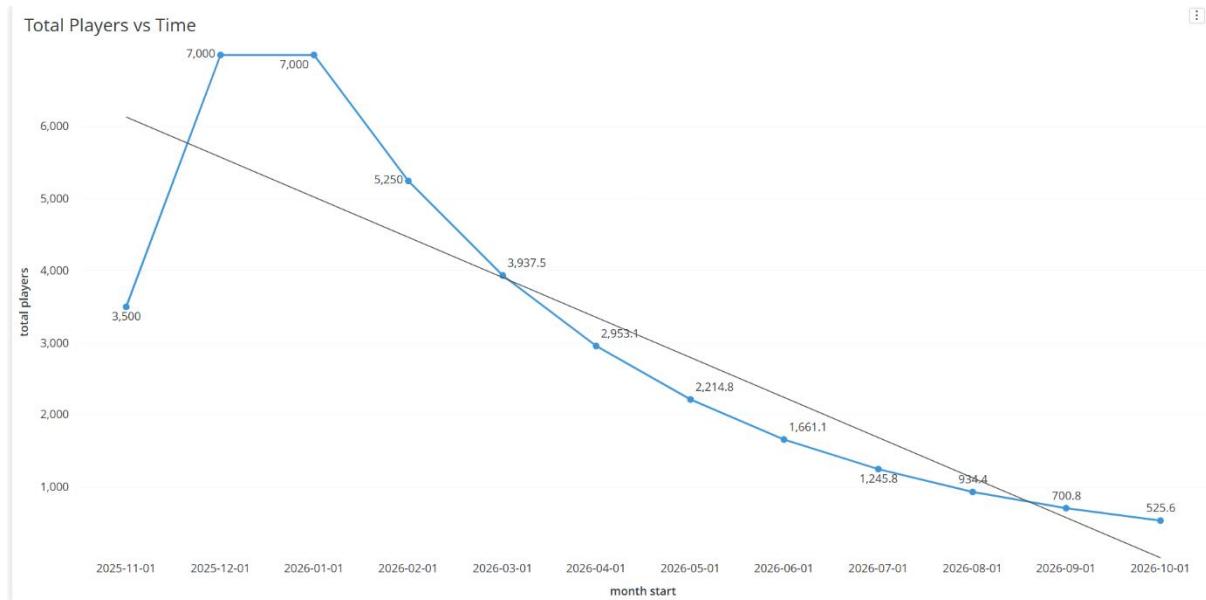


Forecasting & Campaign Simulation

1. Experimental Changes & Observations

To understand the impact of key campaign parameters on profitability, I experimented with several variables:

- **HOUSE_EDGE increased to 5%** while keeping all other factors constant.
 - Observation: The overall trend remained similar — net profit was still negative, showing that a single change was not sufficient to turn the campaign profitable.



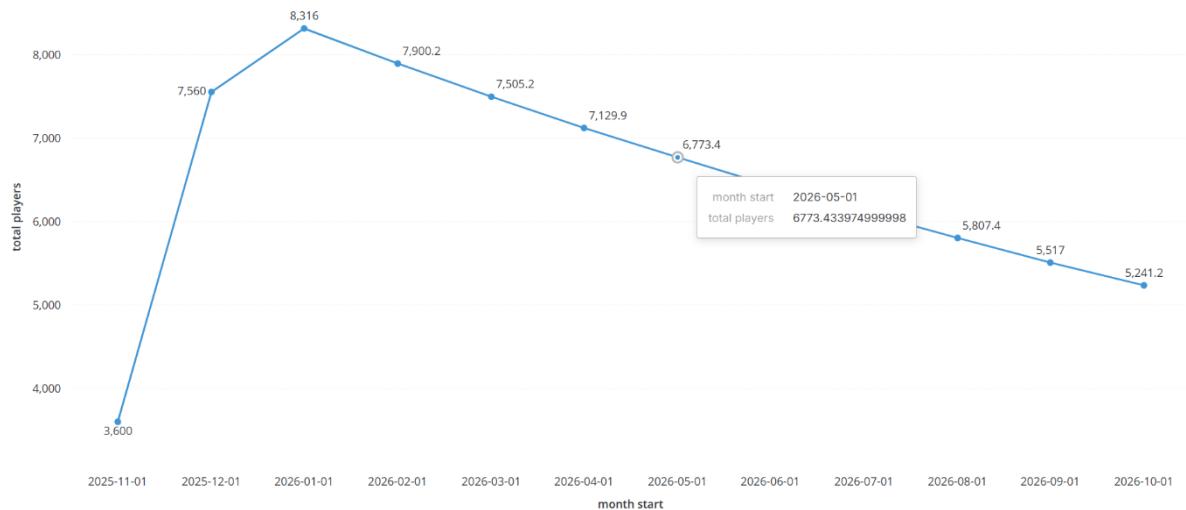
Other variables such as retention, wager multiplier, or acquisition cost were also tested individually, but each resulted in similar negative trends, so these individual experiments are not shown here.

- **Hybrid Scenario:** I then applied a combined, slightly optimized set of changes (hybrid approach) to estimate potential improvement:

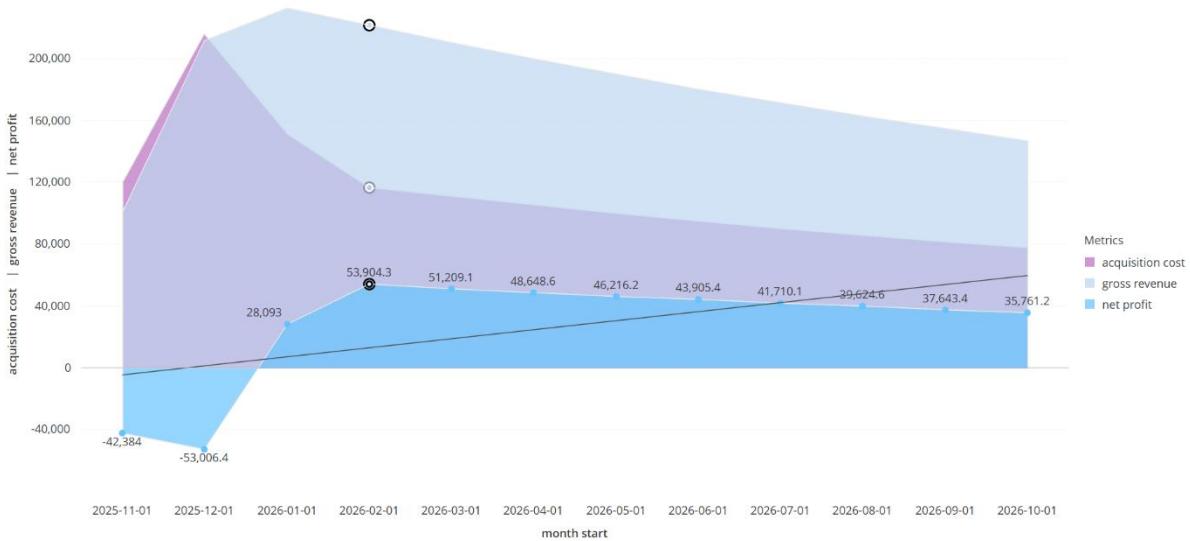
Variable	Original Value	Updated Value	Notes
HOUSE_EDGE	3.095%	4%	Slightly increased casino margin
WAGER_MULTIPLIER	6	7	Players wager more per deposit
ACQ_COST_PER_PLAYER	\$60	\$40	Reduced acquisition cost
DEFAULT_GROWTH_RATE (4 TH MONTH ONWARDS)	0.25	0.35	
RETENTION_RATE	0.50	0.60	Higher player retention assumption

- Result: **12-month net profit = \$331,325.58**, showing improved trends and profitability under this hybrid scenario.

Total Players vs Time



Cost, Revenue, Profit vs Time



2. Enterprise Forecasting Approach

I propose a **closed-loop 12-month forecast model**, similar to enterprise performance management:

Steps:

1. Monthly/Weekly Forecast & Monitoring

- Predict metrics: total players, deposits, wagering, gross revenue, net profit.
- Compare actual vs. forecasted values to detect deviations.

2. Gap Analysis

- Identify where performance is below or above target.
- Determine root causes (e.g., low retention, high CAC, low wagers).

3. Action Planning

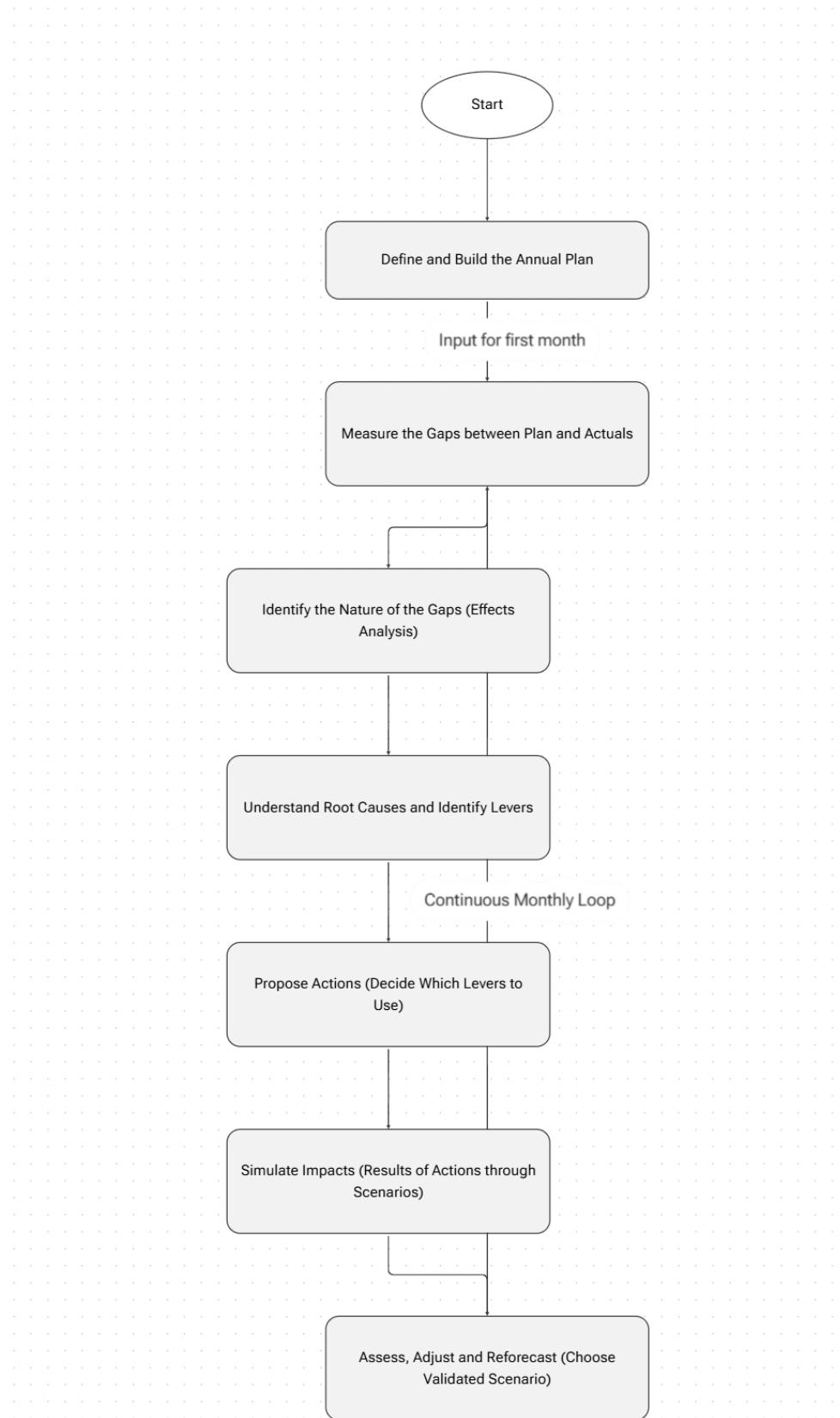
- Implement corrective actions (marketing adjustments, retention campaigns, bonus tweaks).

4. Feedback & Update Forecast

- Update the forecast based on actions taken and new data.
- Close the loop for the month/week and repeat for 12 months.

This **iterative approach** ensures continuous alignment with profitability and strategic goals.

3. Flow Chart for Closed-Loop Forecasting



4. Opportunities for Advanced Segmentation and Analysis

In the current approach, the forecasting model is purely **predictive**, focused on understanding future trends based on historical performance rather than performing **descriptive or classification-based segmentation**. However, future forecasts can be significantly improved by introducing **customer and performance segmentation**. Once key KPIs and target metrics are defined for each business function or team, the data can then be disaggregated further to understand differences across **customer types, player behaviour patterns, game categories, or other operational dimensions**. This segmentation would help identify **which groups are driving performance gaps, how improvement efforts should be prioritized, and what targeted strategies can be applied** to enhance growth, reduce churn, and improve profitability.
