UofA Forecasting Discussion
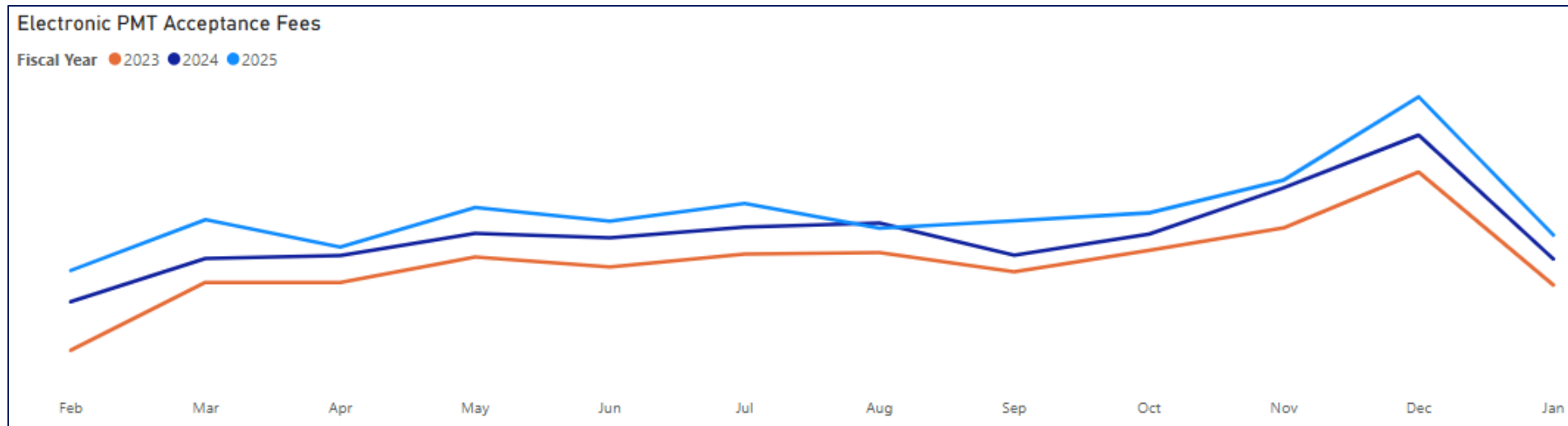
April 2025

Forecasting Examples

1. Generalist: Payment Acceptance Cost

2. Generalist: Maintenance & Repairs

3. Data Science: Fulfillment Center Forecasting

Example 1 – Payment Acceptance Cost

Electronic PMT Acceptance Fees
Fiscal Year ●2023 ●2024 ●2025

Method: Driver-Based

- Channel-specific sales growth rates (Corporate Team)
- Tender mix and basket size (deduces transaction mix)
- Contractual rates for 48 different tenders

Planning / Forecasting

- Holt-Winters at individual tender level: base level, growth trend extrapolation (various), seasonality overlay
- Fit within Corporate Sales projections (combination of formulaic and manual)
- Apply contractual rates + any anticipated changes

Horizon

- LRP: 5-year horizon, executed in mid-summer, simplified and extrapolation, heavily top-line driven, BAU + initiatives
- Plan: Fiscal year-ahead developed in late summer / early fall
- Forecast: Monthly recast of FYF, including year-to-go

Other Considerations

- Cost of Inaccuracy (low; natural hedge vs sales)
- High degree of mix stability driven by consumer behavior
- Ability to shape (limited outside contracts and processing)

Example 2 – Maintenance & Repair

Maintenance & Repair Expense
Fiscal Year Name ● FY2023 ● FY2024 ● FY2025
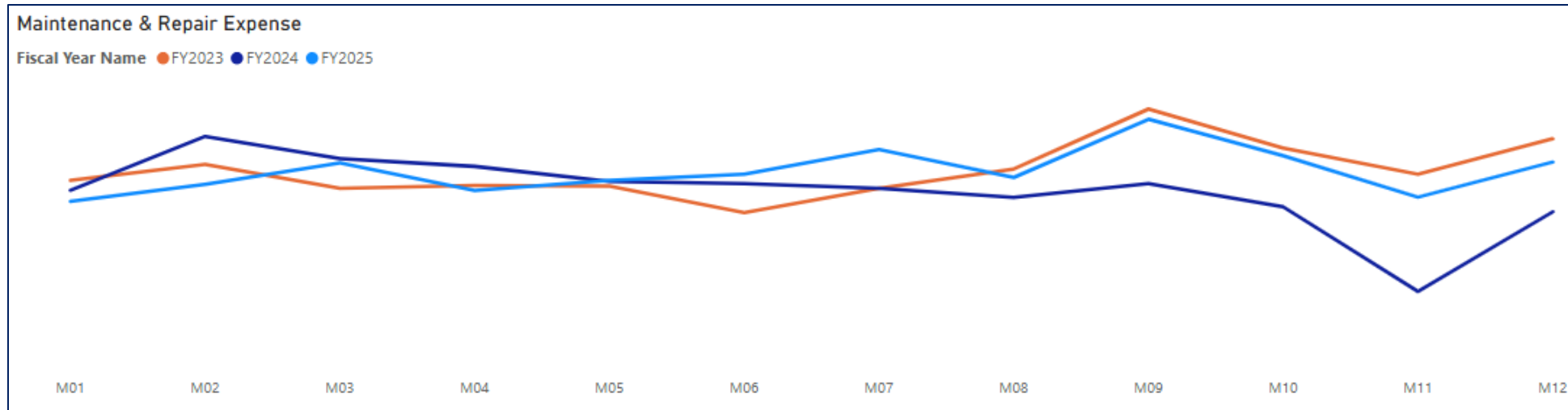
Method: Simple Hybrid w/ Roll-Ups

o   Over 100 unique lines, 30 sub-categories, and 7 major categories involving well over 1,000 associates

o   Array of drivers: work orders, geography, labor rates, degree of fix, supply costs, age of fleet, service delivery model, etc.

o   Reactive break-fix vs proactive (discretion); OpEx vs CapEx

Planning / Forecasting

o   Decentralized planning at expense line level using various basic methods

o   Roll-up at finance level; validation against historical norms

o   Apply top-down Go-Gets followed by reallocation of total based on multiple rounds of alignment

Horizon

o   <u>LRP</u>: 5-year horizon, executed in mid-summer, simplified and extrapolated, BAU + initiatives

o   <u>Plan</u>: Fiscal year-ahead developed in late summer / early fall

o   <u>Forecast</u>: Monthly recast of FYF / year-to-go based on trending with decision overlays

Other Considerations

o   Decisioning / pacing heavily influenced by other area variances

o   Forced oversimplification for explainability and execution

o   Intentional top-down vs bottoms-up tension

o   Progressively less volatile as you roll-up from line level to sub-categories to the overall spend package

Example 3 – Fulfillment Center Forecasting

IB Cases — Inbound | **Fulfillment Center** | **OB Cases** — Outbound | **Store**

Method: Multi-Model Best-Fit

o Dozens of different model types explored / utilized

- <u>Statistical</u>: various forms of regression

- <u>Time Series</u>: ARIMA, Prophet, ETL (Holt-Winters)

- <u>Machine Learning</u>: Random Forest, Auto Tune Model, and Gradient Boosting

- <u>AI</u>: Neural Networks

o Use multiple years of rolling data; exclude actuals for specific horizon in question and attempt to predict using sophisticated Monte Carlo simulation across the models

o Take cohort of models / input combinations closest to the pin and further evaluate qualitatively (e.g., explainability) and quantitatively (outlier treatment) prior to selection

Horizon

o Short-Range: within a month

o Mid-Range: ~30-90 days

o Long-Range: 3-18 months

Other Considerations

o Sophisticated effort involving significant tech investment in tools and platforms plus full-time data science teams

o Extremely high cost of inaccuracy drives this level of investment

o Production deployment of data source changes/updates coupled with short model run-times are critical

o Interpretability / traceability b/w forecasted value and actual still critical