FRB Modeling Symposium - PPNR

June 25, 2014
Overview

- BB&T has developed a suite of econometric models and tools for PPNR forecasting.

- Categories include:
  - Major noninterest income and expense items (Insurance, BankCard, CheckCard, etc.).
  - Credit-related income and expense forecasts
  - Wholesale and retail loans and deposits

- Challenger models are also being developed for the most material noninterest income and expense categories.

- The CheckCard model was developed to forecast debit card income. This category is composed primarily of interchange income and associated fees.
BB&T Modeling Philosophy

- BB&T strives to build models consistent with business rationale and economic intuition.

- To achieve this goal, developers collaborate with line of business (LOB) managers to understand the fundamental drivers of revenue and expense.

- Developers also discuss data quality, availability, and relevance with LOB management to determine whether to rely upon internal data or to construct models using external data.

- LOB management provides insight into key factors that shape the modeling framework and approach:
  - Business strategy
  - Acquisitions
  - Regulation
  - Data availability
  - Strategic initiatives
  - Economic intuition
Internal vs. External Data

**Internal Data**

**Pros**
- Greater granularity
- Enables greater segmentation
- Specific to BB&T’s business mix

**Cons**
- Adjustments for one-time events
- Limited history

**External Data**

**Pros**
- Longer data series
- Limited adjustments for one-time events
- Consistent data definitions

**Cons**
- Not specific to BB&T’s characteristics
- Lacks granularity

- Regulatory data for debit card revenue was not readily available prior to the first quarter of 2008, so internal data was preferred.

- Generally, internal data is preferred when available given its greater relevance to BB&T’s business mix.
Internal Data Limitations

- Limited history
  - Internal data covered only the latest recession
    - Model responsiveness trained on retail sales activity specific to a single downturn

- Existing data impacted by acquisitions
  - BB&T has been acquisitive over time
    - Revenue spikes over time result in a non-stationary data series

- Exogenous factors influence debit card revenue
  - May require the use of event variables or model overlays
CheckCard Background

- Historically, baseline and stress projections were developed based on management’s judgment regarding the impact of indicators such as:
  - Activation
  - Penetration
  - Usage
  - Marketing initiatives, and
  - Macroeconomic scenarios

- As stress testing evolved, BB&T relied on its Service Charges model to provide a corroborative data point for the forecasting process.

- BB&T now models CheckCard income as a means of increasing transparency and repeatability. Retail sales and active debit cards are the model’s primary revenue drivers.

- The most significant challenges for developing the model were related to internal data consistency and relevance.
Internal Data

- BB&T began with monthly data on all debit card fees and accounts dating back to 2006.
- Differences in revenue were identified between BB&T’s servicing system and GL due to acquisitions during this time period:
Revenue Scaling

- The raw data required transformations to establish a stationary series and normalize for external factors.

- Required acquisition data were not available, so back-casting growth was not an option.

- Active accounts and debit card fees from acquisitions were maintained consistently by the LOB throughout the time series, so scaling revenues could offer a solution.

- Scaling revenue by the number of active accounts enabled management to ignore the timing in accounting for acquisitions.
  - Scaling by number of accounts properly separates the phenomena and allows the developer to project revenue with the appropriate factors.
  - These numbers were reconciled with reported numbers back to 2007.

- Event variables were also considered as a means of controlling the exogenous factors impacting the data.
Adjusted Revenue

- By isolating the revenues on a per card basis, the impact of DDA penetration on revenues is minimized and the effect of acquisitions is neutralized.

- Adjusted growth rates average 9.6% in 2007 compared to the average 2007 unadjusted rate of 25.5%.

- Adjusted rates observed during the recession reach (2.3%), giving management confidence in the model’s ability to sufficiently pressure revenues in stress scenarios.

Unadjusted: 12 month log difference in debit card revenue

Adjusted: 12 month log difference in debit card revenue per total active cards
Event Variables

- There are two breaks in the data series that require the use of event variables.
  - The Durbin Amendment causes a clear break in revenue growth
  - There is also a break in the series resulting in lower growth rates beginning April 2011

- The growth rate shift was likely due to product maturation and pricing changes.

- Event variables were added to allow retail sales growth to drive the bulk of the changes, resulting in a more conservative forecast.
CheckCard Model

- The model uses BB&T debit card revenue per card data to build an ordinary least squares (OLS) regression of CheckCard revenues against retail sales. We expect a positive coefficient indicating revenue improves as retail sales increase.

- Forecasted active debit cards are an input into the CheckCard model.

- The event variables improve the model’s statistics and the series break results in more conservative forecasts.

*The implied R² represents the adjusted R² beginning in 2008 and ending prior to the series break.*
Active Debit Card Projection

- To forecast active cards, the developer worked closely with the LOB to determine appropriate drivers.

- Due to acquisitions and reporting changes, assessing correlations with macroeconomic factors was not particularly useful.

- Regional employment at a six-month lag was identified as the primary driver of card growth.
  - Economically intuitive as account openings and activity displays a lagged relationship with employment.
  - Correlation between active cards and year over year log growth rates.

- This relationship is used as the basis for growing actual active cards over the forecast horizon.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Correlation</th>
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<tbody>
<tr>
<td>Consumer_Credit</td>
<td>45.8%</td>
</tr>
<tr>
<td>6 Month Lag</td>
<td>34.2%</td>
</tr>
<tr>
<td>NAT_Employment</td>
<td>47.9%</td>
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<tr>
<td>6 Month Lag</td>
<td>54.3%</td>
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<tr>
<td>NAT_Labor_Force</td>
<td>58.3%</td>
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<td>6 Month Lag</td>
<td>40.9%</td>
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<td>REG_Employment</td>
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<tr>
<td>6 Month Lag</td>
<td>56.9%</td>
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<td>GDP_Real</td>
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<tr>
<td>6 Month Lag</td>
<td>48.3%</td>
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<tr>
<td>Personal_Income</td>
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<td>6 Month Lag</td>
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<td>Disp_Income_Real_NAT</td>
<td>43.3%</td>
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<tr>
<td>6 Month Lag</td>
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Model Overlays

- To incorporate additional exogenous factors into modeled results, BB&T applies model overlays through a formalized challenge and review process.

- The CheckCard Model provides LOB management with the initial forecast for all scenarios.

- Managers consider model limitations, characteristics of the economic environment, and their knowledge of planned business initiatives when evaluating output.

- Challenge meetings further vet modeled results and overlays.

- For cases where modeled output is inconsistent with management expectations, documentation is provided to support overlays.
Regulatory Risk Overlay

- During the CCAR 2014 planning process, additional uncertainty surrounded the level of interchange rates as a result of the outstanding FRB appeal of the transaction cap court ruling.

- Through discussions with senior management, BB&T felt it would be prudent to include a regulatory risk overlay to the stress scenarios where the cap on interchange income was reduced to $0.07/transaction.

- The cap was assumed to go into effect in Q2 2014, the earliest possible effective date.
  - Baseline: $0.21 cap per transaction
  - Stress: $0.07 cap per transaction
Questions?