

PPNR Modeling

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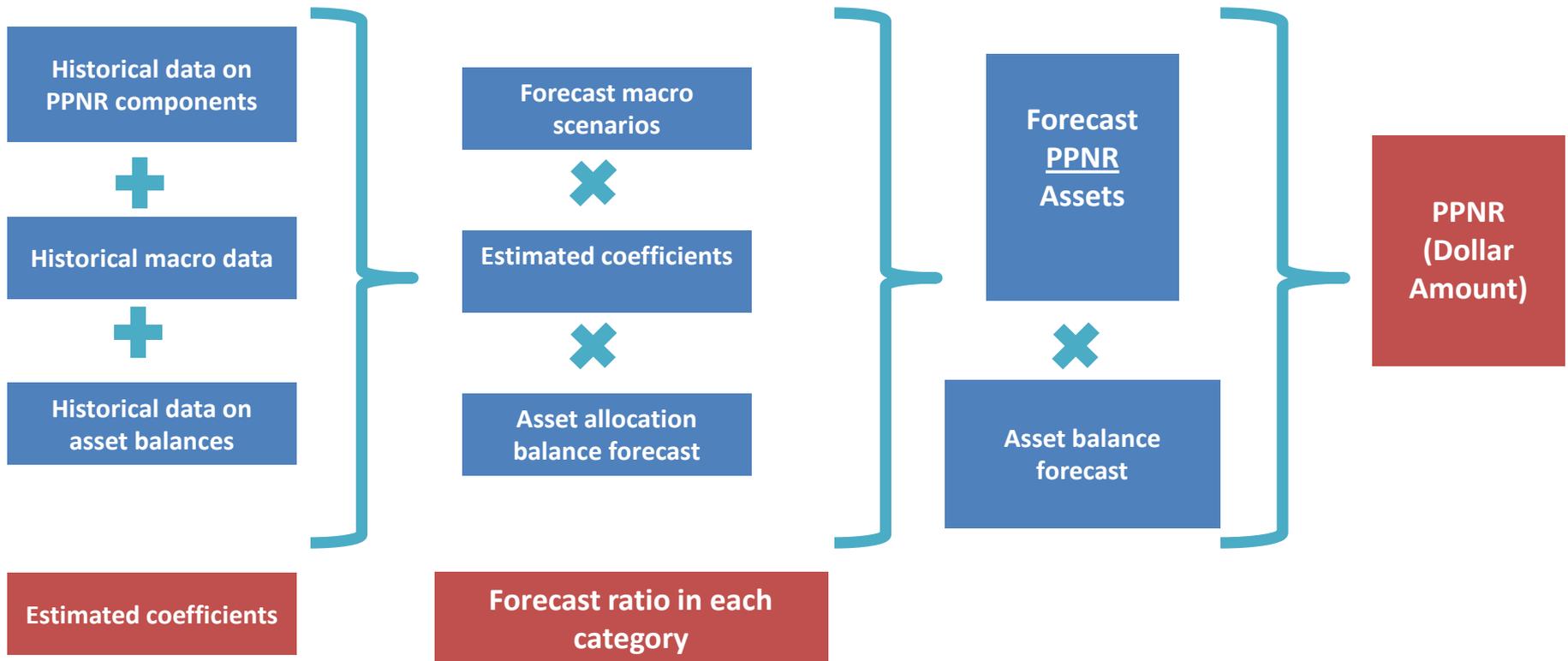
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An econometric approach to PPNR modeling

- **Begin with a historical time series** of actual or pro forma data assuming that all merged entities were part of the ultimate acquirer as of the beginning of the sample
 - Pro forma allows for firm fixed effects and autoregressive model
- **Macro variables** based on those forecast in scenario
 - Can add other variables, but then you need to know how they vary with those forecast in scenario
- **Historical relationship** between macro variables and revenue components (normalized by asset balances) is estimated and projected into the future for a panel of banks
- **Firm specific differences** arise in model by: controlling for bank asset allocation, fixed effects, allowing coefficients to differ with bank or bank type

Predicting PPNR

- Basic idea: [1] estimate historical relationships; [2] input macro scenario; [3] estimate evolution of balances; [4] plug into each model to generate forecasts; [5] combine to produce PPNR projection.



Model specification overview

- **Macro variables**

- Different variables matter for different components of PPNR

What can make this approach firm specific?

- **Lagged dependent variable** i.e. the dependent variable in question for the same firm in the previous calendar quarter
- Controls for firm characteristics: **size** and the **composition of assets**
- Can include **BHC dummies** or fixed effects
- Can separately estimate for different firms or firm types

How to capture acquisitions? Pro forma

- Pros

- Accounts for current geographic reach and diversification of business
- Does not confuse trends generated by acquisitions with organic business trends

- Cons

- Summation of separate businesses does not allow for economies of scale or changes to integrated businesses
- Data can be difficult to get

How to capture business changes? Ratios

- Pros
 - Smooths acquisitions
 - Does not confuse trends generated by acquisitions with organic business trends
 - Allows for revenues to be associated with appropriate asset investment
 - Captures changes in business focus
- Cons
 - Some revenue streams may not vary with balance sheet assets (i-banking, asset management)
 - Requires link between PPNR and balance sheet models for internal consistency

Model choices – Levels of ratios

- Pros
 - AR captures persistence of revenue
 - Prevents model from generating unrealistic results because model is grounded in historical level rather than change
 - Can converge to historical mean (bank level or industry level)
- Cons
 - False sense of security from high r-squared
- Other choices: changes in levels, changes in levels of ratios

What's a good model?

- Based on data
 - When judgment replaces data, should be a good reason
- Consistent with historical performance
- Consistent with recent trends in industry and bank-specific
- Consistent with economic intuition – revenue should not increase in a crisis, recent bad trends should not become good in a crisis, etc.
- Good budgeting for normal times may not be a good framework for predicting stress outcomes

What's a good model?

Test	Pros	Cons
Adj-R squared	<ul style="list-style-type: none"> Methodologically sound 	<ul style="list-style-type: none"> Easy to over fit with limited data May produce odd results if macro variables are correlated
vs. actual realizations (1Q ahead)	<ul style="list-style-type: none"> Traditional forecasting test 	<ul style="list-style-type: none"> Good performance in baseline \neq good performance in stress
vs. 2007-8 actual realization	<ul style="list-style-type: none"> Relevant stressed data 	<ul style="list-style-type: none"> Business may have changed
vs. actual in recession	<ul style="list-style-type: none"> Relevant stressed data 	<ul style="list-style-type: none"> Business may have changed
Base vs. Stress	<ul style="list-style-type: none"> Reality check 	<ul style="list-style-type: none"> Hard to know what the absolute level of difference should be