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Session 1.B: Dealing with Uncertainty and Change in Projecting Non-interest Income and Expense in Stress

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Modeling Non Interest Income and Expense

Benefits of Statistical Modeling	Limitations of Statistical Modeling

- Easy to understand and explain

- Easily fits into established processes

- Directly ties to historical information

- Math is defendable

- Has a direct tie in to macro economics

- Easier to tie in to 14A line items

- Factors other than macroeconomics have larger impacts to some of the line items

  - o Mergers, regulatory changes – Durbin,
  - o Business strategies – free checking
  - o Lawsuits, marketing rollouts, divestitures

- Meaningful correlations difficult to find

- Historical Data not always available

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Modeling Non Interest Income and Expense

Evolution of non interest income and expense forecasting at BBVA

- Initial approach – 2014 filing to model all non interest income plus salaries using linear regression

    o Developed models at the CCAR 14A line item level
    o Numerous validation issues raised on these models
    o Governance and challenge was difficult as the CCAR level not the level reviewed by management making it difficult to incorporate in Business as Usual processes.
    o Model results in some cases yielded counterintuitive results
    o Had to develop alternate forecasting methodologies to effectively challenge model results

- Revised approach – 2015 filing developed models from the alternative forecasts used in 2014 in addition to linear regression models that do work efficiently

    o Relate income/expense levels to appropriate metrics (i.e NSFs to deposit levels) with extensively documented assumptions
    o Approach salaries expense through "scenario" discussions with Lines of Business with HR oversight.
    o Run sensitivity analysis on aggregated non interest income and expense results

Evolution of Statistical Modeling – Salaries

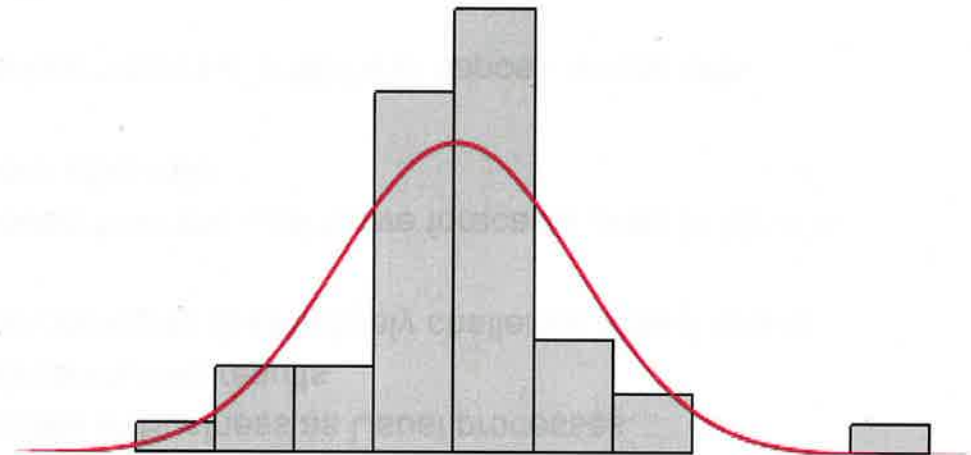## Jan 2014 filing – linear regression model

Salaries Model Residual Test

Variants Used:

CPI
Fed funds

Summary of Fit:

Rsquare	0.873594
Rsquare Adj	0.803369
Root Mean Square Error	0.018925
Observations (or Sum Wgts)	43

Durbin Watson:

DW	2.0227154
Autocorrelation	-0.0151
Prob<DW	.03816

Summary Statistics:

Mean	-8.01e-15
Std Dev	0.0151735
Std Eff Mean	0.0023139
Upper 95%Mean	0.0046697
Lower 95% Mean	-0.0467

Evolution of Statistical Modeling – Salaries

Results and adjustments

Salaries Expense

Legend:
- Modeled Base
- Modeled Stress
- Budget

Y-axis: Qtrly amts in millions

X-axis: 2013Q4, 2014Q1, 2014Q2, 2014Q3, 2014Q4, 2015Q1, 2015Q2, 2015Q3, 2015Q4
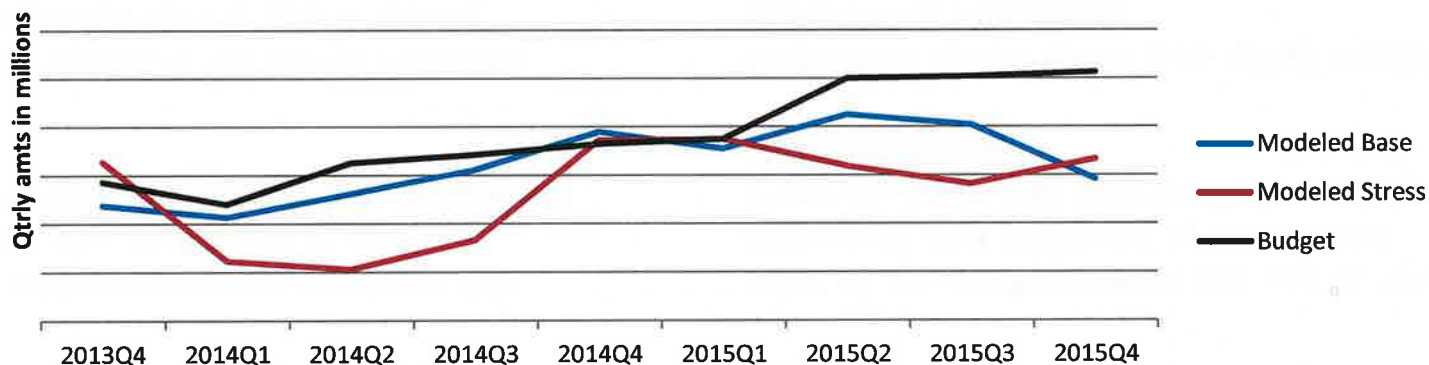
Challenges with results

- Results do not include strategic initiatives

- Results do not include recent increases in average salaries per FTE – increase in more specialized employees and decrease as operational efficiencies from previous mergers.

- Model results decline immediately as indices drop – question whether Management could respond with HR reductions that quickly. Governance questions need for conservatism.

- Model is run at aggregate level and not by Line of Business whereas some groups (Risk) may need to add expense and others (Sales) may reduce expense.

- Results not consistent with actual management decisions in 2007/2008 time frames.

Alternative Forecasting Methodologies Considered

Salaries - 2014 filing	Salaries Enhancements – 2015 filing

Salaries - 2014 filing

- Used management overlays in the stress to remove the forecasted immediate reduction in salary related to reductions in headcount.

- Factored in severance costs and delayed execution of any reduction actions.

- Used overlays to freeze merit increases for one year consistent with historical actions.

- Discussed additional salary expenses with those groups who may need to add resources as indicated by the recent financial crisis.

- Documented impact of workforce reduction in narrative but did not include in results.

Salaries Enhancements – 2015 filing

- Developed a qualitative model to analyze salaries expense by line of business and key staff area.

- Held meetings with the appropriate areas and discussed in detail the stress scenario and what it would mean for their respective area.   All discussions are documented in detail.

- After all groups forecasted the results, the aggregate was reviewed by the Capital Planning Team and Human Resources for reasonableness.

- Qualitative model taken through all model governance processes.

Alternative Forecasting Methodologies Considered

Other non interest items

- Continue to try linear regression correlations where they will work and are practical. Don't force it.

- Model at levels that management understands and can effectively challenge.

- Use Line of Business expert judgment to determine how to model or alternatively forecast items in a stress situation.

- Use current model governance processes to ensure effective challenge and independent review regardless of methodology used.

- Determine metrics that can be used to forecast items – i.e. number of checking accounts, income per account ,transactions per account

- Relate income and/or expense to balance sheet accounts that are tied to macroeconomic models– i.e. loan related legal expense relates to forecasted levels of non performing loans.

- Tie expenses associated with credit to the credit modeling processes – OREO expense relates to forecasted balances for OREO.

- Look for triggers for expense cuts in certain expenses under stress situations – janitorial, repairs, etc.