

CCAR-Aligned Net Interest Income (NII) Forecasting Model – MA Champion vs. OLS Challenger

Objective: Build a CCAR-style forecasting model to project quarterly Net Interest Income (NII) and assess sensitivity under a recession stress scenario, following SR 15-18 Model Risk Management guidelines.

Data & Methodology

Data: Quarterly data from FRED, spanning 2008Q2–2024Q1. Variables modeled as quarter-to-quarter changes (Δ NII is the dependent variable).

Model	Role in Final Report	Description
Moving Average (MA)	Champion	4-quarter rolling average baseline, selected due to superior out-of-sample performance.
OLS Regression	Challenger	Linear model using Δ GDP, Δ Unemp, Δ Rate. Used for Stress Testing despite poor fit.

Key Results

OLS Model Coefficients (Trained on 70% data; $R^2=0.082$)

Variable	Coefficient (Magnitude)	P-value	Significance
Δ GDP	+2.034	0.295	Insignificant
Δ Unemp	+1202.3	0.423	Insignificant (Non-intuitive positive sign)
Δ Rate	+870.9	0.157	Insignificant

Backtesting Performance (Out-of-Sample: 2019Q3 – 2024Q1)

Metric	OLS (Challenger)	MA (Champion)	Winner
RMSE	7067.8	6343.13	MA
MAPE	1.8925	2.1341	OLS

Champion Selection: The Moving Average model is selected as the Champion due to the significantly lower RMSE, which is preferred for assessing volatility and tail risk.

Stress Test & Model Risk

Stress Scenario: Severe Adverse Shock (Δ GDP=−500B, Δ Unemp=+3.0pp, Δ Rate=+1.0pp).

Metric	Result	Interpretation
Predicted Δ NII (using OLS)	+4302.48 Million USD	Counter-intuitive positive change
Stress Impact	+2.87% change	Relative to average NII level of 149,700 Million USD.

Diagnostics Summary (on Training Data):

Test	Statistic/P-value	Model Risk Status
Durbin-Watson (DW)	2.02	OK (No strong autocorrelation)
Breusch-Pagan (p)	0.5623	NO heteroskedasticity

Conclusion & Next Steps

The OLS model's poor fit, insignificant variables, and counter-intuitive stress test result confirm the SR 15-18 decision to select the robust Moving Average model as the forecasting Champion.

Model Limitation: The OLS model must be heavily restricted or discarded for scenario analysis; its coefficients do not reflect expected economic theory.

Recommendation: Deploy the MA model for forecasting. For scenario analysis, recommend building a new Challenger model, such as a VAR or ARIMA with exogenous variables, and incorporating granular bank-specific data (loan volumes, funding costs) to capture interest rate effects accurately.

