

2023 PNG Update

Title: Determinants of Commercial Bank Interest Rate Spread in PNG – an Empirical Analysis

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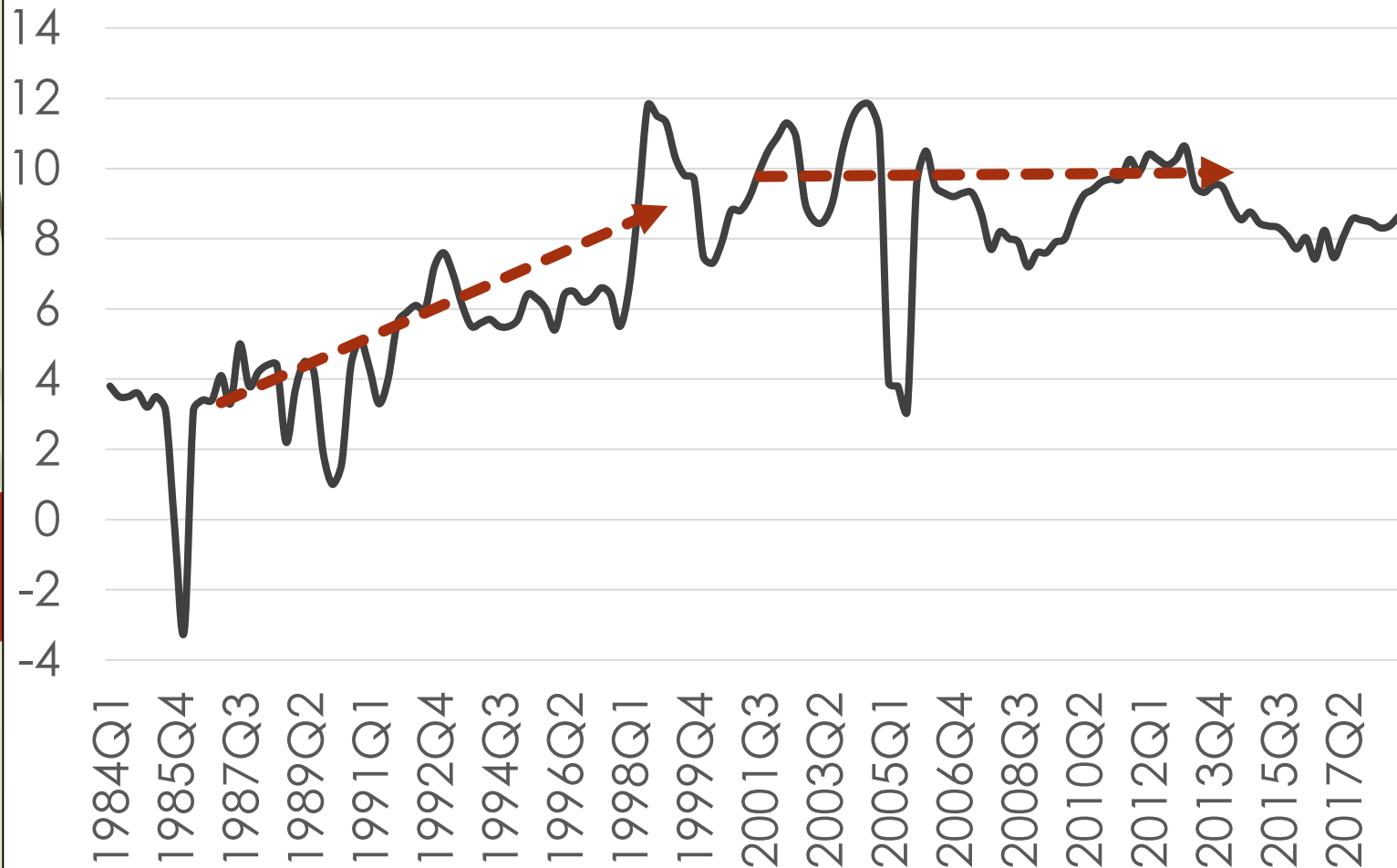


Outline

1. Background and motivation
2. Research question
3. Literature review
4. Data and methodology
5. Results and discussion
6. Conclusion, policy considerations & further research

1 (a). Background and motivation

Interest rate spread in PNG (%)



What is interest rate spread?

- difference between lending and deposit rates
- Bank dealership model (Ho & Sanders, 1981) - core business of banks as financial intermediaries (pooling funds from depositors and channelling to economic agents)
- Since 2004, spread for PNG remain high at around 9% (second highest among PICs (Rebei, 2014))
- High spread persisted - even after financial liberalisation in early 2000

1 (b). Background and motivation



Why study interest rate spread?

- One of the commonly asked questions during policy discussions at BPNG
- wide spread implies market inefficiencies. Negative implications on financial intermediation process (Hanson and Rocha, 1986)
- combined with the liquidity overhang in the banking system, high spread posed challenges for Bank of PNG to influence bank lending through the interest rate channel (Ofoi & Sharma, 2021).
- PNG, like any other developing country - underdeveloped capital and financial markets. Need for debt/capital raising are predominately dependent on the banking sector.
- establishing the factors that determine the spread is important. Enable policymakers to identify and rectify challenges causing high spread. Enable efficiency in the intermediation process critical for economic growth (Chirwa & Mlachila, 2004)

2. Research question



- What are the determinants of commercial bank interest rate spread in PNG?

3. Literature Review

Authors	Country/Region	Methodology	Conclusion
Were & Wabua (2014)	Kenya	Panel-data regression	<ul style="list-style-type: none"> - bank-specific factors were significant in the determination of spreads - macroeconomic factors (economic growth and monetary policy) were not highly significant
Manamba (2014)	Tanzania	ARDL	<ul style="list-style-type: none"> - High interest rate spreads are significantly determined by lack of competition among financial institutions and diseconomies of scale in the financial system. - it was established that as proportion of liquid assets increases, the bank liquidity risk decreases, leading to lower interest rate spreads.
Jamaludin et al. (2015)	Pacific Island Countries	SVAR	<ul style="list-style-type: none"> - size of the economy is negatively correlated with spreads, confirming the importance of scale - high loan loss provisions and non-performing loans increase the cost of credit, as does banking system concentration. - higher institutional quality is associated with lower spreads in the PICs
Rebei (2014)	Solomon Islands	SVAR	<ul style="list-style-type: none"> - using bank specific and macroeconomic data: established that scale of operation, overhead costs, concentration index, the policy rate and real GDP growth, significantly influence interest rates spreads.
Gounder & Sharma (2012)	Fiji	Panel-least-squares & Random Effects Model	<ul style="list-style-type: none"> - net interest margin has a positive association with implicit interest payment, operating cost, market power and credit risk, and a negative association with the quality of management and liquidity risk.
Chand (2015)	PNG	NRI publication (general qualitative/quantitative analysis)	<ul style="list-style-type: none"> - acknowledged that the margin in PNG is high, compared to similar resource-endowed countries - lending and deposit rates in PNG are weakly affected by monetary policy

4(a). Data and methodology

Dependent variable: Interest rate spread

Independent variables: Fiscal balance, T-bill (364-day) rate, real effective exchange rate, ratio of loans to deposits, total liquid assets on total assets, external liabilities as a ratio of total assets, ratio of admin expense to interest income (both macroeconomic & in-house variables were considered)

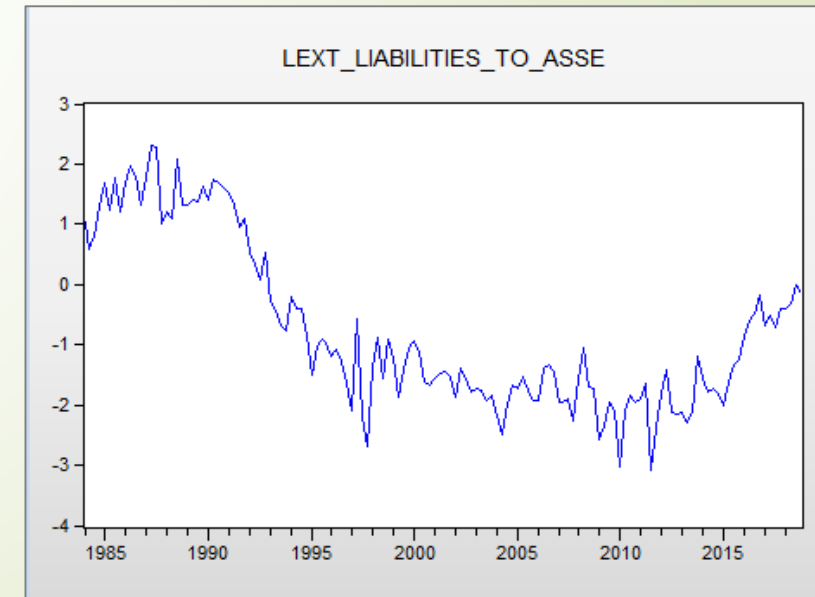
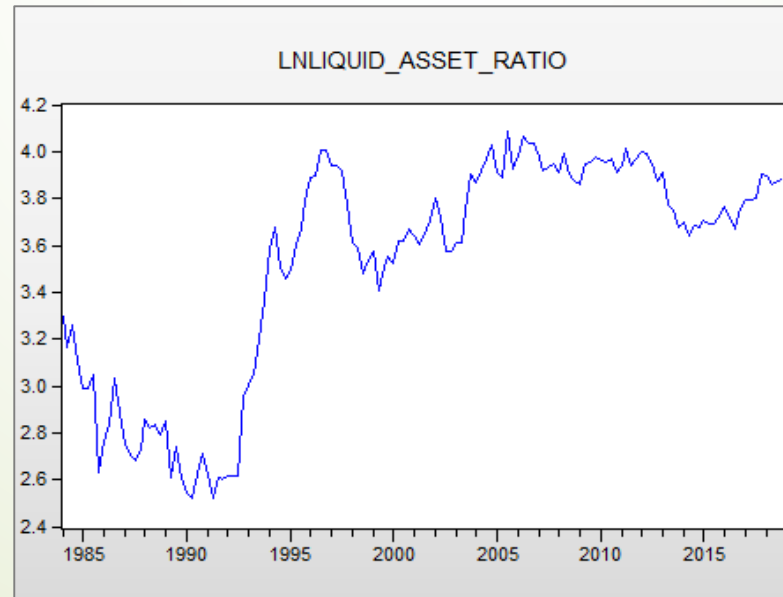
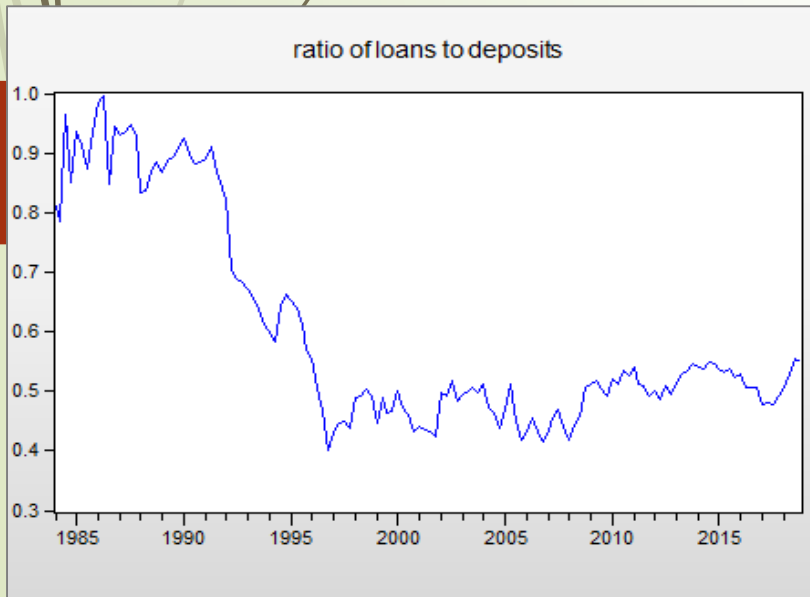
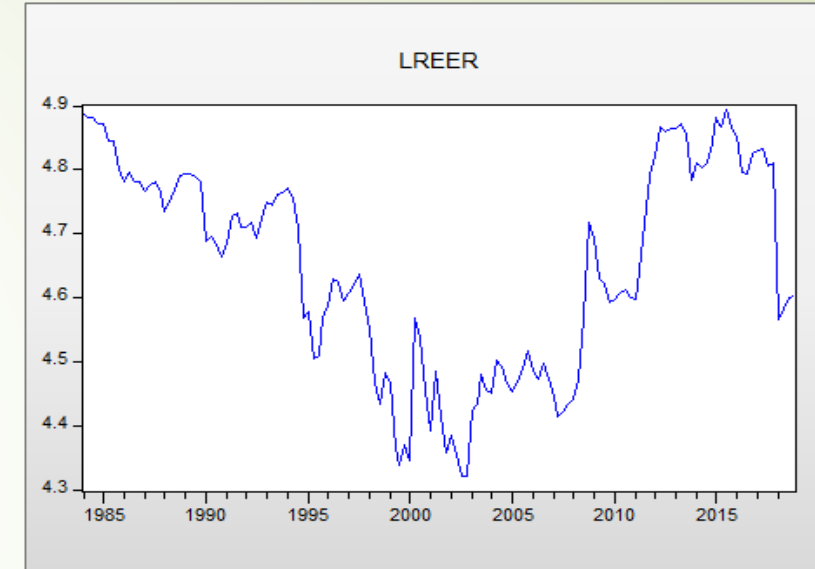
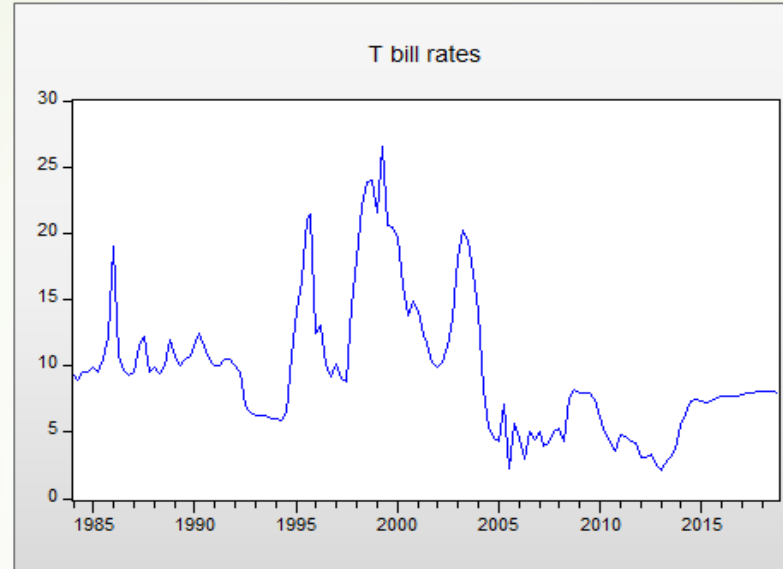
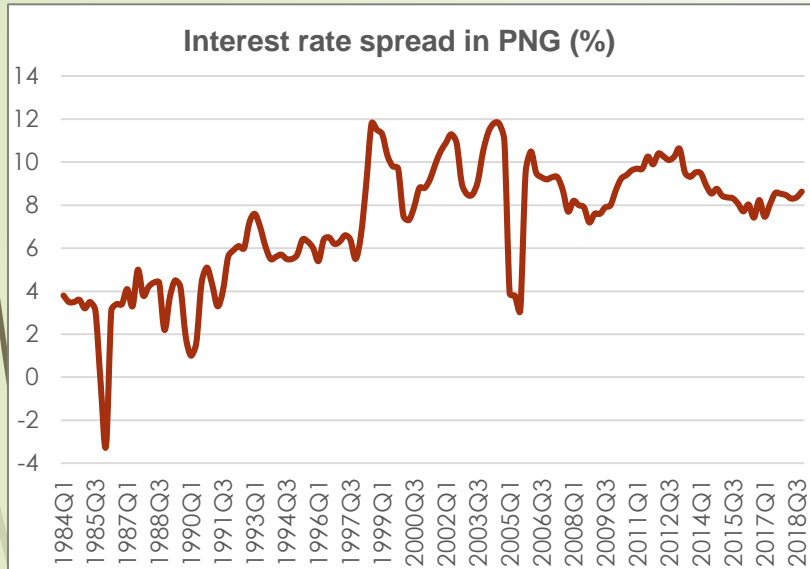
Long run augmented ARDL model

$$\begin{aligned} \ln Intspread_t &= \beta_0 + \sum_{i=0}^m \beta_{1i} \ln Fiscal_bal_{t-1-i} + \sum_{i=0}^n \beta_{2i} Tbill\ rates_{t-i} + \sum_{i=0}^o \beta_{3i} \ln reer_{t-i} + \sum_{i=0}^p \beta_{4i} \ln loan_deposits_{t-i} + \sum_{i=0}^q \beta_{5i} \ln liquid_assets_{t-i} \\ &+ \sum_{i=0}^r \beta_{6i} \ln liabilities_assets_{t-i} + \sum_{i=0}^s \beta_{7i} \ln adminexp_interestincome_{t-i} \end{aligned}$$

Short-run ECM

$$\begin{aligned} \Delta \ln Intspread_t &= \alpha_0 + \sum_{i=0}^m \vartheta_i \Delta \ln Fiscal_bal_{t-1-i} + \sum_{i=0}^n \varphi_i \Delta Tbill\ rates_{t-i} + \sum_{i=0}^o \theta_i \Delta \ln reer_{t-i} + \sum_{i=0}^p \phi_i \Delta \ln loan_deposits_{t-i} + \sum_{i=0}^q \psi_i \Delta \ln liquid_assets_{t-i} \\ &+ \sum_{i=0}^r \xi_i \Delta \ln liabilities_assets_{t-i} + \sum_{i=0}^s \delta_i \Delta \ln adminexp_interestincome_{t-i} + \lambda ECM_{t-1} + \varepsilon_t \end{aligned}$$

4(b). Data and methodology



4(c). Data and methodology

Model diagnostics – all tests were passed!

- ADF & PP test for unit root
- Heteroscedasticity & serial correlation test (LM & Breusch Pagan Godfrey)
- Model stability (CUSUM & CUSUM sum of squares)
- Lag selection criteria (AIC & HQ)

Cointegration

- The bounds test result is significant at 1 per cent: the F-statistic (11.95) exceeds the upper bound $I(1)=3.19$ limit.
- Therefore, we can conclude that the variables are cointegrated. This means that the variables have a long-run relationship
- Therefore, results for the long and short-run relationships can be estimated using the ARDL bounds test model.

CointEq(-1)*	-0.89*** (-12.5)
F- Statistics:	11.95*** (3.19)
Rsquared	0.94
Adjusted Rsquared	0.87

Note: * indicates 10%, ** 5% and *** 1% level of significance

5(a). Results and discussion

Short-run result and discussion

Short run results (ECM)	
$\Delta(\text{spread} (-2))$	0.10*** (4.24)
$\Delta(\text{log_of_government_balance})$	-0.04*** (-2.17)
$\Delta(\text{treasury_bill_rate} (-2))$	0.29*** (3.25)
$\Delta(\text{treasury_bill_rate} (-3))$	0.54*** (7.14)
$\Delta(\text{treasury_bill_rate} (-4))$	0.35*** (4.80)
$\Delta(\text{log_REER} (-4))$	-5.19** (-2.35)
$\Delta(\text{log_ratio_of_loans_to_deposits} (-1))$	-5.7** (-2.36)
$\Delta(\text{log_liquid_asset_ratio} (-1))$	-8.29*** (-4.24)
$\Delta(\text{log_external_liabilities_to_assets} (-1))$	0.79*** (3.43)
$\Delta(\text{log_external_liabilities_to_assets} (-3))$	0.50** (2.28)
$\Delta(\text{log_admin_expense_to_total_revenue})$	1.45* (2.10)
$\Delta(\text{log_admin_expense_to_total_revenue}(-1))$	-1.35** (-2.16)
CointEq(-1)*	-0.89*** (-12.5)
F- Statistics:	11.95*** (3.19)
Rsquared	0.94
Adjusted Rsquared	0.87

Note: * indicates 10%, ** 5% and *** 1% level of significance, figures in brackets indicates t statistics values.

- In the short run: variables that are statistically significant include:
 - past interest rate spread
 - 364-day T-bill rate
 - liquid asset ratio
 - government deficit balance
 - real effective exchange rate
 - external liabilities to assets
 - administrative expenses to total revenue
- Sign on the coefficient of the error correction term is negative as expected and is statistically significant.
- Around 89 per cent of the disequilibrium between the independent variables and the interest rate spread is corrected within one quarter.

5(b). Results and discussion

Long-run result and discussion

Long-run results (ARDL)	
Government_balance	-0.6 (-1.23)
Log_Treasury_bill_rates	-0.36* (-1.91)
Log_REER	2.95 (1.02)
Log_Loans_to_deposits_ratio	4.77 (1.26)
Log_Liquid_assets_ratio	11.69*** (3.13)
Log_External_liabilities_to_assets_ratio	-0.13 (-0.23)

Note: * indicates 10%, ** 5% and *** 1% level of significance, figures in brackets indicates *t* statistics values.

- In the long run: **364-day T-bill rate** and **commercial bank liquid** asset ratio are statistically significant in explaining changes in the interest rate spread.
- 1.0 percent increase in 364-day T-bill rate will reduce the interest rate spread by 0.36 per cent
- 1.0 percent increase in the liquid asset ratio will increase the interest rate spread by 11.69 per cent

6. Conclusion, policy considerations & further research

- ❑ Both macroeconomic variables and in-house variables were significant in explaining interest rate spread in PNG
- ❑ Following variables are significant in explaining interest rate spread:
 - government's fiscal operations
 - REER
 - commercial banks' external positions
 - cost of doing business (admin expense/total revenue)
 - liquidity conditions
- ❑ There are some similarities in the results compared to the studies reviewed on peer economies as discussed in the literature review.
- ❑ Further research
 - More study to cover specific banking sector variables?
 - Consideration of other important macroeconomic variables (KFR, inflation, GDP)

End of presentation

Thank you. Any questions?

