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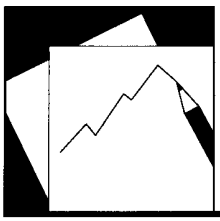

IMF Working Paper

Determinants of Interest Rate Spreads in Solomon Islands

Nooman Rebei

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Determinants of Interest Rate Spreads in Solomon Islands

Prepared by Nooman Rebei [+]

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Abstract

Bank interest rate spreads in Solomon Islands are high by regional standards. This paper examines the determinants of bank interest rates including bank specific, banking sector, macroeconomic, and legal indicators. The results show that the scale of operation, overhead costs, concentration index, and some macroeconomic variables (i.e., monetary policy rates and real growth) significantly influence interest rate margins. The paper particularly focus on the influence of the banking sector structure and finds strong evidence of bank collusion.

JEL Classification Numbers: E43, E44, G21, O56

Keywords: Solomon Islands, banking spreads, financial intermediation.

Author's E-Mail Address: nrebei@imf.org

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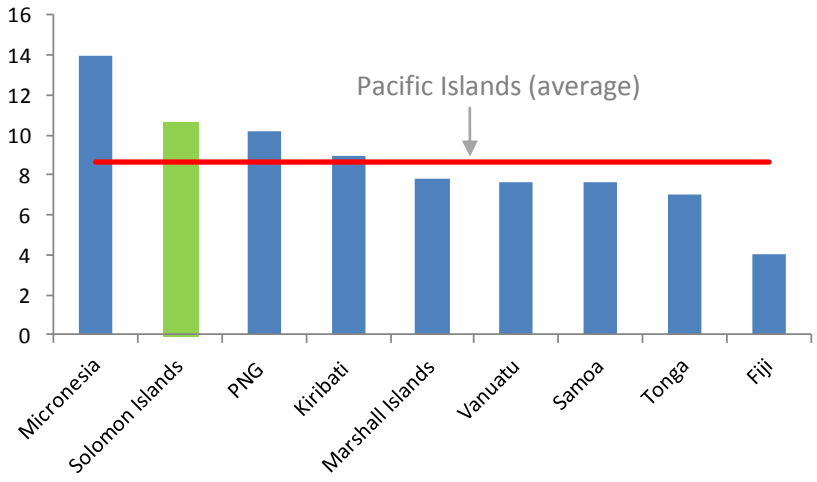
I. INTRODUCTION

Deposit-lending rate spreads are large in Solomon Islands compared with the rest of the Pacific Island countries, despite their recent decline. Several studies have looked at the causes and implications of high spreads in other regions. However, very few studies have addressed the banking sector in the Pacific Islands, and almost none has considered the case of Solomon Islands. This paper, which examines the determinants of interest rate spreads in Solomon Islands, aims to address this gap. Unlike previous empirical studies, this paper focuses on local banks by using detailed quarterly bank and macroeconomic data. In addition, interest rate spreads are very heterogeneous in the region and finding common lessons from a panel analysis can be misleading (see Figure 1).

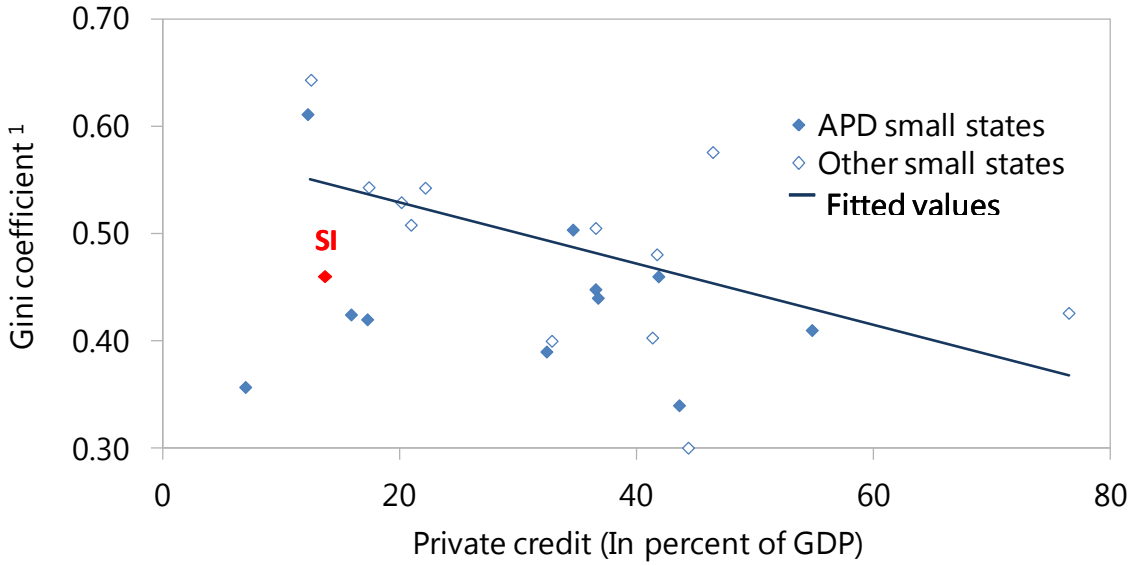
Figure 1: Pacific Island Countries: Interest Rate Spreads of Commercial Banks



Sources: Country authorities; *IFS*; and IMF staff estimates.
Note: Annualized interest rates. Kiribati, Marshall Islands, and Vanuatu, 2011; Fiji, Micronesia, PNG, Samoa, Solomon Islands, and Tonga, 2012. Numbers are annualized spreads.

High bank spreads, among other factors, hinder the private sector's access to credit, which is an impediment to inclusive growth (see Figure 2). Therefore, it is important to identify the sources of high spreads in Solomon Islands in order to formulate potential reforms that can be implemented.

Figure 2: Small States—Asia and Pacific Region: Financial Development and Inequality



Sources: World Bank, *WDI*; ADB, *Key Indicators for Asia and the Pacific, 2012*; and IMF staff calculations.
[1] One indicates maximum inequality.

The structure of this paper is as follows. Section two provides the background and theory on interest rate spreads and their determinants. Section three describes the empirical methodology and discusses the estimation results. Section four examines the structure of the banking sector and investigates potential collusion in the banking sector. Section five provides a summary and conclusions, including policy recommendations.

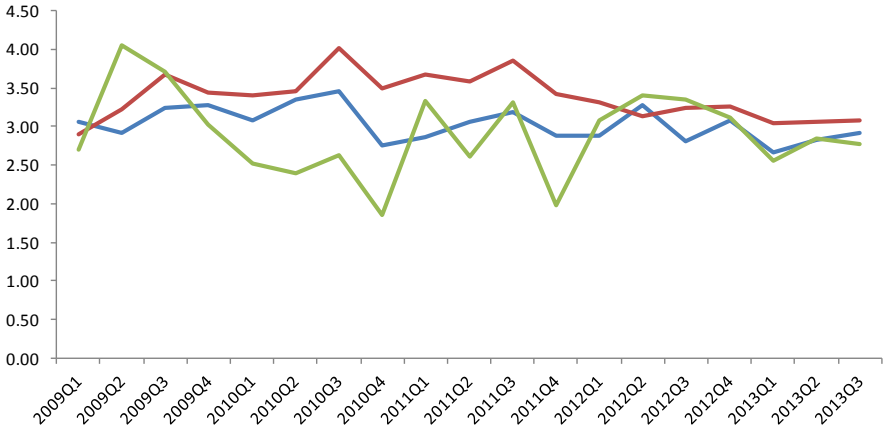
II. THE FACTORS BEHIND HIGH INTEREST RATE SPREADS

To capture the different aspects of the banking sector in Solomon Islands, this paper uses bank-level data collected and published on a quarterly basis by the Central Bank of Solomon Islands (CBSI). Our panel dataset contains quarterly balance sheet and income statement data on every commercial bank for the 2009Q1-2013Q3 period. Data from the International Monetary Fund's *World Economic Outlook (WEO)* and *International Financial Statistics (IFS)* were used to identify other macroeconomic aggregates.

Bank spreads measure the gap between the amounts a bank pays the providers of funds and what it receives from users of bank credit. The literature distinguishes among different definitions of bank spreads. The most common definitions are: (i) a narrow definition, which is described as the difference between interest income over loans and the interest expense

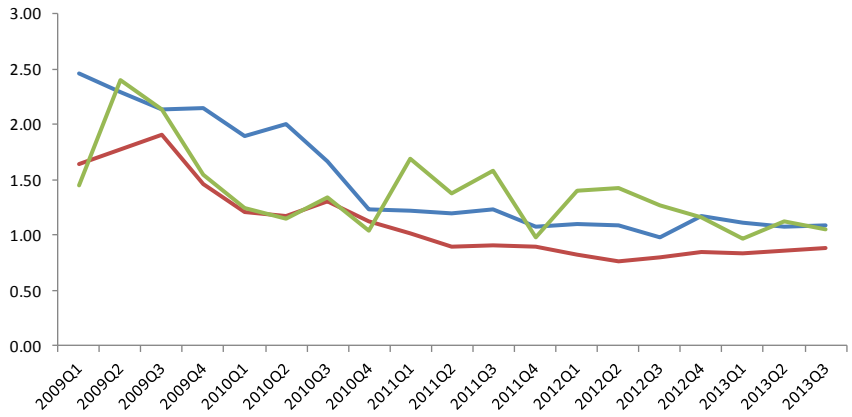
over deposits; and (ii) a broad definition, which corresponds to the bank's total interest income minus total interest expense, divided by total interest-bearing assets. [1]

Figure 3: Spreads of Commercial Banks (narrow definition) [1]



Sources: CBSI and IMF staff calculations.
[1] The interest rate spread for the three banks—Australia and New Zealand Banking Group Limited (ANZ), Bank South Pacific (BSP), and Westpac Banking Corporation (WBC)—is calculated by taking the total interest received by banks on loans during one quarter divided by the total loans for that period and subtracting from it the total interest paid on deposits throughout the quarter divided by total deposits. Numbers are displayed as quarterly percentages.

Figure 4: Spreads of Commercial Banks (broad definition) [1]



Sources: CBSI and IMF staff calculations.
[1] The interest rate spread for the three banks in the graph is defined as the difference between the quarterly interest income and quarterly interest expense divided by the total amount of assets during the same period.

[1] See Brock and Rojas-Suarez (2000) for a detailed discussion of the definitions of interest rate margins.

Figures 3 and 4 show that in the period between 2009Q1 and 2013Q3, bank-specific interest rate spreads in Solomon Islands remained high regardless of the adopted methodology to measure them. Figure 3 shows some persistence of bank spreads, which may indicate low competition in the banking industry. This raises concerns about the effectiveness of the credit channel for monetary policy transmission and would influence the appropriate policy stance for the monetary authorities.[2] It may also raise concerns about financial stability because investors tend to undertake risky projects to compensate for high lending rates, leading to increased default risks. This is the "concentration-fragility" view of the relationship between market power and bank soundness, which holds that a concentrated market weakens stability. Another view—the "concentration-stability" view—argues that larger banks in concentrated banking sectors reduce financial fragility, among other reasons, because they tend to increase profits and build up high "capital buffers." This makes them less prone to liquidity and macroeconomic shocks (see, for example, Berger, 1995, Uhde and Heimeshoff, 2009, and Mirzaei and others, 2013).

In what follows, key determinants of interest rate spreads of banks in Solomon Islands will be examined using a set of bank-specific variables, the main banking industry characteristics, and macroeconomic conditions. Different authors use the same classification of variable categories including Gelos (2006) for the Latin America region; Crowley (2007) for the English-speaking African countries; and Samuel and Valderrama (2006) for the Caribbean countries. The selection of variables has been guided by the abundant existing literature, but data availability for the banks in Solomon Islands is taken into consideration.

A. Characteristics of Banks in Solomon Islands and the South Pacific Region

Before focusing on bank-specific indicators, we start with comparing selected indicators of Solomon Islands banks with those in the region. [3] Although, this is not reflected in the empirical analysis—where we consider only time series for the domestic banks—this should shed some light on the general characteristics of banks in Solomon Islands and the major variables that should be identified as potential sources generating high interest rate spreads.

Banks in Solomon Islands show clear evidence of high profitability compared with regional and international standards. Besides, Solomon Islands banks show a higher degree of risk aversion owing to the excessive accumulated levels of equity to average assets. Credit risk, as measured by loan loss to gross loans, does not appear to be excessively high in Solomon

[2] The spread is widely considered as an indicator of the efficiency of financial intermediation. High spreads can alter financial intermediation because they can discourage potential savers owing to low returns, and increase financing costs for borrowers, reducing investment and growth opportunities (Mirzaei and others, 2013).

[3] Additional cross-country comparisons are provided by Tumbarello, Cabezon, and Wu (2013)

Islands compared with Australia; and is moderate compared with the South Pacific region in recent years. Finally, Solomon Islands banks exhibit relatively prominent salary and other noninterest expense to average assets compared with other islands in the region and Australia.

Table 1: Selected Bank Indicators [1]

	Number of commercial banks	Return on average assets	Equity to average assets	Loan loss reserves to gross loans	Gross noninterest expense to average assets	Nonsalary, noninterest expense to average assets
Samoa	4	5.9	18.2	3.7	5.7	3.2
Solomon Islands	3	7.6	17.6	3.3	6.7	3.5
Tonga	3	3.8	15.2	5.1	5.3	2.9
Vanuatu	4	3.5	11.0	4.1	2.6	1.5
Average Small Island States		**5.2**	**15.5**	**4.0**	**5.1**	**2.8**
Fiji	5	3.7	8.8	2.7	4.1	1.6
Papua New Guinea	4	5.0	13.1	4.0	4.0	2.8
Australia	14	1.2	5.8	0.8	1.8	1.0

Sources: Davis and Vaught (2011); central bank prudential data; and IMF staff estimates.
[1] All numbers, except the number of commercial banks, are percentages calculated based on average yearly data covering the period 2000-2009.

More disaggregated quarterly bank specific data are used in the following sections to better understand the determinants of bank spreads in Solomon Islands.

B. Bank-Specific Variables

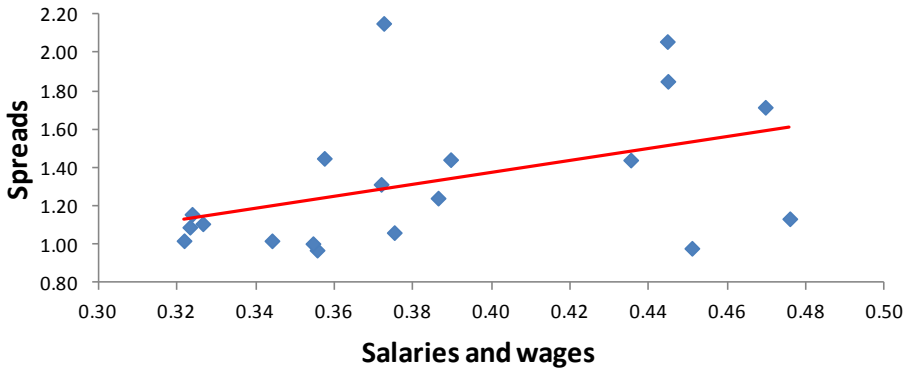
In this section, we use the broad definition of interest rate spreads, that is, the quarterly net interest income as a percentage of total interest-bearing assets (called interest margins hereafter). Relationships between bank spreads and a set of selected bank-specific variables are examined. As a start, these relationships are explored visually using scatter plots, and the mechanism and intuition through which each variable could affect spreads are discussed. [4]

[4] All scatter plots reflect the relations between average spreads and the averages of the selected explanatory variables. The observations in the figures below represent combinations of average observations for each quarter; and therefore could be interpreted as time series.

Several empirical studies find a positive relationship between operating costs and interest margins. Many banking studies, including Park and Weber (2006), Claeys and Vander Vennet (2008), Tregenna (2009), and Mirzaei and others (2013), found that low operational efficiency is reflected in high bank margins. These results provide support for the structure-conduct-performance (SCP) paradigm, which posits that banks can pass high operating costs (almost) fully onto customers in highly concentrated markets. One way to account for this is to include an index for the management quality—generally measured with the ratio of non-interest expenses to total assets—as an explanatory variable. The present analysis uses three disaggregated measures of operating costs: (i) salaries and wages, which are scaled by total assets, and are expected to have a positive effect on spreads; (ii) depreciation and occupancy costs as a ratio of net fixed assets, and which are expected to have a negative impact because they may contribute to improving banks' productivity; (iii) and other costs as a ratio of total assets which are expected to have a positive effect. [5]

In principle, the higher the overhead costs in the banking sector the larger the required spreads to compensate for the additional costs. Figures 5 and 7 confirm the presence of this relationship for salaries and wages and other costs. This result is consistent with the findings of Berger and others (1987) who argue for the positive correlation between the relative scale of banks and agency costs. Surprisingly, spreads exhibit the same positive relation with respect to capital costs (see Figure 6); however, some period outliers seem to drive this result which can be mitigated in the formal empirical analyses.

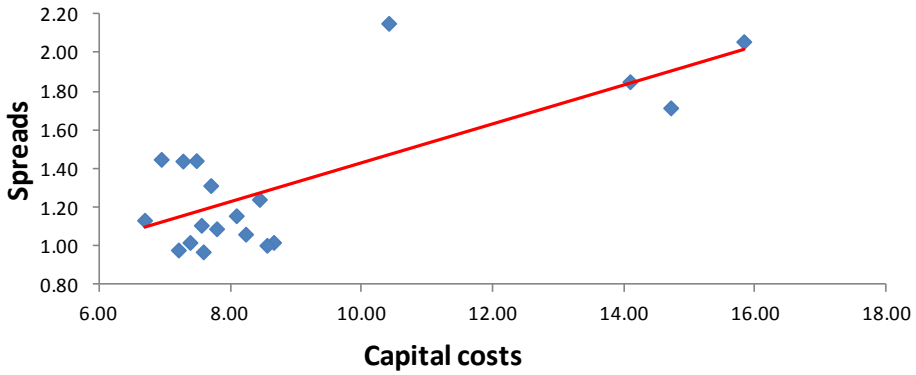
Figure 5: Average Spreads and Staff Costs



Sources: CBSI and IMF staff calculations.

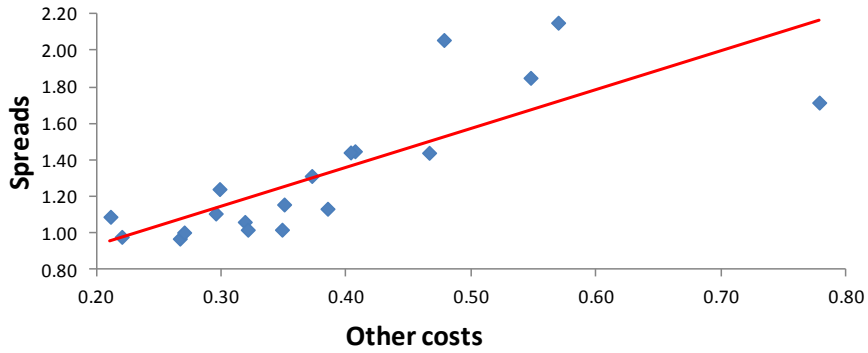
[5] The main reason behind disaggregating overhead costs is that their components may have a heterogeneous impact on the interest charged to borrowers (e.g., staff costs versus capital costs).

Figure 6: Average Spreads and Physical Capital Costs



Sources: CBSI and IMF staff calculations.

Figure 7: Average Spreads and Other Costs

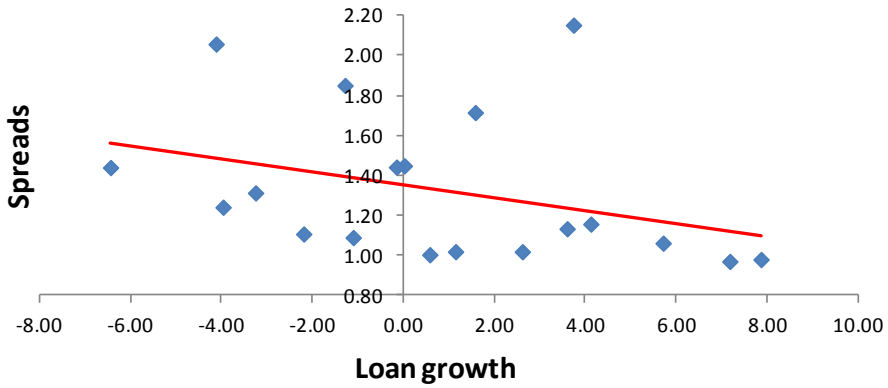


Sources: CBSI and IMF staff calculations.

Another important determinant of a bank's interest margins is the scale of operations. However, the relationship between these two variables is ambiguous. On the one hand, increasing the scale of operations may lead to lower average costs, which in turn can translate into smaller spreads when a bank faces competitive pressures to pass on cost savings to customers. On the other hand, a bank's cost is, in part, affected by its managers' risk-taking behavior. Deficient risk management functions and poor asset quality feed into a higher amount of nonperforming loans; and borrowers can face higher spreads. Using the growth rate of loans as a proxy of this variable, Figure 8 shows a negative correlation, which is

consistent with the low share of loans in total assets and the moderate financial inclusion in Solomon Islands. [6, 7]

Figure 8: Average Spreads and Scale Operations



Sources: CBSI and IMF staff calculations.

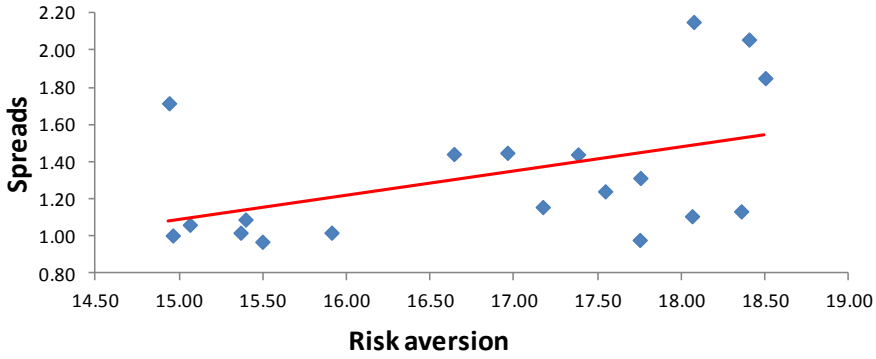
An additional bank-specific variable that should be considered in bank spreads' analysis is the extent of risk aversion. A more risk-averse bank will hold more equity in its capital structure; and, in order to lower profit variability, its managers will tend to secure their deposit base by offering higher deposit rates. Accordingly, risk aversion is proxied by the ratio of equity to total assets. Figure 9 shows a positive correlation between bank averages of interest spreads and the risk aversion index. [8]

[6] The effect of a growing bank loan portfolio (and therefore size) on margins has been proved to be positive by Goddard and others (2011) who argue that banks with larger growth of loan portfolios benefit from economies of scale and, to some extent, benefit from increased market powers generating abnormally large margins. We believe that this should not happen in the case of an economy with low financial inclusion—a very low level of bank loans to the private sector—as shown in Figure 8.

[7] Focusing on the time aspect justifies using growth rates of loans. In fact, all the variables in the regression, as described in the following section, are stationary.

[8] Another explanation is proposed by Mirzaei and others (2013). The ratio of equity to total assets is employed as a measure of capital strength. Capitalization is seen as the main source to cover loan losses. Well-capitalized banks increase their creditworthiness, which reduces their costs of funding, lowers the risk of bankruptcy, and increases their margins.

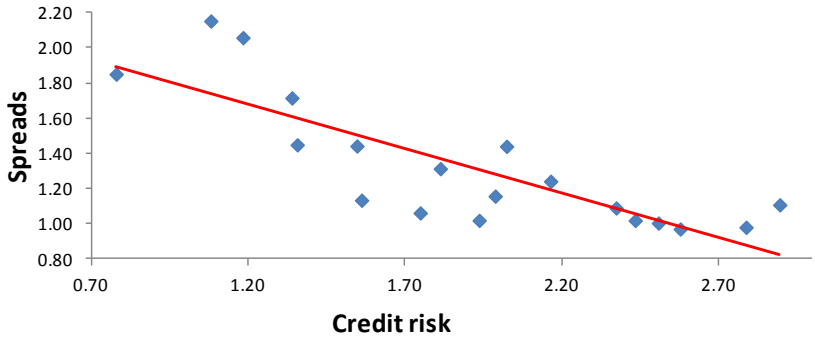
Figure 9: Average Spreads and Risk Aversion



Sources: CBSI and IMF staff calculations.

Empirical research in the field clearly finds a positive relationship between bank interest spreads and interest credit risk, which influences margins positively, suggesting that banks add a default risk premium to loan rates. The default risk is captured through the ratio of non-performing loans (NPLs) to total loans. Intuitively, the ability to pass on the costs of NPLs to borrowers via increased margins allows commercial banks to maintain positive returns. Surprisingly, this relation does not seem to be supported by a simple relation between historical averages of spreads and credit risks (see Figure 10).

Figure 10: Average Spreads and Credit Risk



Sources: CBSI and IMF staff calculations.

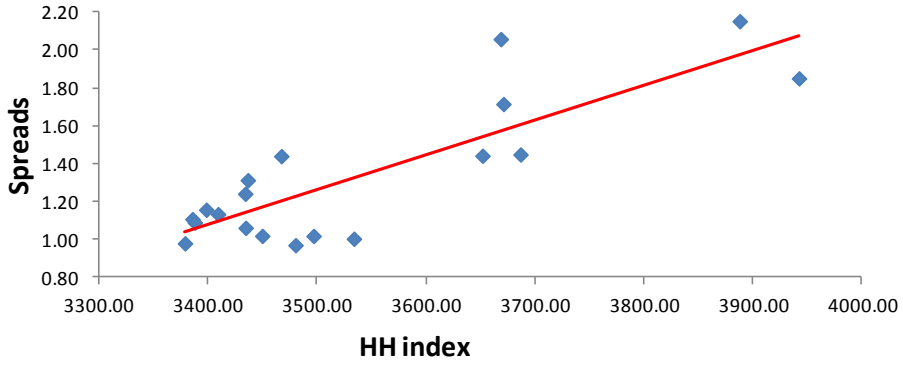
C. Sector-Specific Variables

The Herfindahl-Hirschman index (HH index) is viewed in the literature as a measure of concentration—the extent to which a few banks dominate market shares in respect of total assets, loans, or deposits. The HH index is a standard measure of consolidation in any industry and it is defined as the sum of the squared deposit, asset, or loan shares of all the banks in the market. By construction, the HH index has an upper value of 10,000 in the case

of a monopolistic firm with a 100 percent share of the market; the index tends to zero in the case of a large number of firms with very small market shares.

In the present context, the HH index is measured as the sum of squares of banks' market shares of the banking industry's total assets, total deposits, or total loans. Generally, banks in highly concentrated markets earn monopoly rents, because they tend to collude. Collusion may result in higher rates being charged on loans and lower interest rates being paid on deposits. As in many studies presented in banking literature (see for instance Goddardand others, 2011), we find a positive relation between concentration and bank spreads (Figure 11).

Figure 11: Average Spreads and Market Concentration



Sources: CBSI and IMF staff calculations.

D. Macroeconomic Variables

Clearly, an unstable and unfavorable macroeconomic and policy environment is perceived as more risky and banks may compensate for it by requiring wider margins. To test for this assumption three main indicators are used, which are commonly employed in the literature to assess the impact of macroeconomic conditions on the interest rate spreads.

The first indicator is expected inflation. In an inflationary environment, bank costs generally rise, leading to higher borrowing costs for the private sector. Further, high inflation is generally associated with an unstable and unpredictable economic environment. In other terms, higher inflation is expected to lead to higher inflation-adjusted spreads if it causes banks to charge a risk premium. We propose using actual inflation as a proxy for expected inflation.

The second indicator is policy interest rates. Commercial banks usually use short-term deposits to finance long-term loans. This maturity transformation is an important function of commercial banks and is an important influence on pricing decisions for loans. The effect of an increase in the regulated interest rate—on central bank *Bokolo* bills—is twofold. First, this should increase the interest requested on loans, and deposit interest rates would react following the specificities of the banking market. Second, a second-round effect can take place through the reaction of the real sector—lower growth and high risks on loans. One should expect that the first-order effect will dominate. As a proxy we use the three-month *Bokolo* bill interest rate.

The third factor is real GDP growth. A larger economy might be expected to allow for economies of scale and greater competition which drives down interest spreads. At the same time, if real GDP growth slows down, banks are confronted with increased credit risk and they charge higher interest to borrowers. However, it is possible that a larger economy allows for greater specialization and deeper financial markets in which riskier borrowers have better access to funds. The latest scenario is only expected to occur if the economy is already at high levels of private sector access to financial products, which is not the case in Solomon Islands.

These factors are analyzed in the empirical results, below.

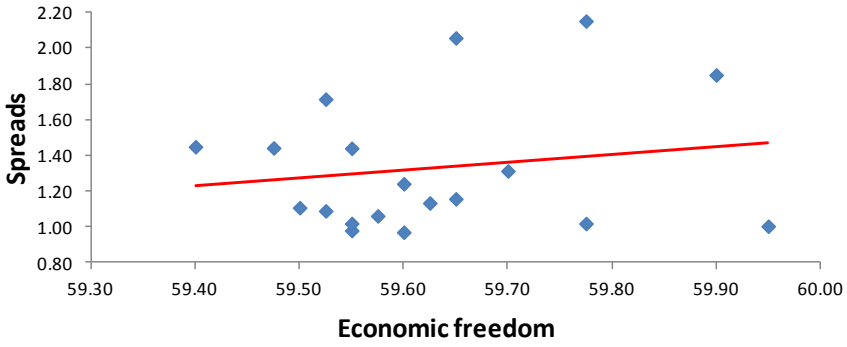
E. Legal and Economic Environment

Experts generally agree that the main barriers limiting credit supply in Solomon Islands include insufficient investor protection in addition to family land tenure—which makes property rights unclear and limits the ability to use land as collateral—as well as bottlenecks in land registration. To reflect this feature in the empirical analysis we adopt the *Index of Economic Freedom* (*IEF*). This index is very tractable since it covers ten elements of economic freedom, some of which are particularly relevant in this framework, such as property rights, entrepreneurship, and, most importantly, the evolution of land ownership. [9] Moreover, the strength of legal rights—also captured by the *IEF*—can measure the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending.

[9] The index is published on an annual basis by the Heritage Foundation (heritage.org) and measured based on ten quantitative and qualitative factors, grouped into four broad categories, or pillars, of economic freedom: (i) rule of law (property rights, freedom from corruption); (ii) limited government (fiscal freedom, government spending); (iii) regulatory efficiency (business freedom, labor freedom, monetary freedom); and (iv) open markets (trade freedom, investment freedom, financial freedom). Each of the ten economic freedoms within these categories is graded on a scale of 0 to 100. A country's overall score is derived by averaging these ten economic freedoms, with equal weight being given to each.

Figure 12 shows an ambiguous relation between spreads and the *IEF*, which is slightly positive and clearly led by some outliers in the sample.

Figure 12: Average Spreads and Economic Freedom



Sources: CBSI and IMF staff calculations.

III. EMPIRICAL FINDINGS FROM A POOLED REGRESSION

A. Methodology

The length and size of our sample poses some challenges in terms of data handling when the analysis is conducted on an individual bank. To that extent, the analysis of panel data brings additional information, reduces the phenomenon of multicollinearity of the variables, and increases the number of degrees of freedom. The latter would implicitly enhance the power of the tests and thus the degree of trust in their results. [10]

In what follows we estimate four versions of the model specified as:

$$\boldsymbol{SPREAD_{i,t} = f\left(X_{i,t}, HHindex_t, Macro_t, Legal_t, \varepsilon_{i,t}\right)} \qquad (1)$$

In this equation *i* denotes bank *i* and *t* denotes a quarter *t*. The vector of bank-specific variables, $\boldsymbol{X_{i,t}}$, contains COST_STAFF, COST_PCAPITAL, COST_OTHER, LOANS_GROWTH, RISK_AVERSION, and CREDIT_RISK.

> **SPREAD** is defined as net interest income as a percentage of total assets or (interest income – interest expense)/total assets

[10] We run alternative bank-specific time series estimations and the regressions seem to suffer from several problems mainly owing to the small sample of the individual bank data.

COST_STAFF stands for the cost related to salaries and wages and measured as salary and wages/total assets

COST_PCAPITAL denotes the cost of implementing new physical capital and identified as costs of occupancy and depreciation expenses/total assets

COST_OTHER corresponds to other costs/total assets

LOANS_GROWTH is a measure of the scale of operation identified as the quarterly growth rate loans and advances

RISK_AVERSION captures the degree of bank risk aversion measured as equity/total assets

CREDIT_RISK is defined as net NPLs/ total loans

HH index stands for the Herfindahl-Hirschman index and is defined as the sum of the squared bank loans/total loans

Macro comprises variables measuring the macroeconomic environment; specifically, we use inflation (INFLATION), *Bokolo* bill interest rates (INTEREST RATE), and real GDP growth (GROWTH)

and **Legal** denotes the Index of Economic Freedom (LEGAL).

Model (1) exhibits only the bank-specific variables, $\boldsymbol{X_{i,t}}$. Model (2) encompasses bank specific and sectoral variables, $\boldsymbol{X_{i,t}}$ and $\boldsymbol{Y_t}$. Further, Model (3) displays the macroeconomic variables, $\boldsymbol{Z_t}$, in addition to the others. Finally, Model (4) extends Model (3) by considering the legal and economic environment index as an additional explanatory variable.

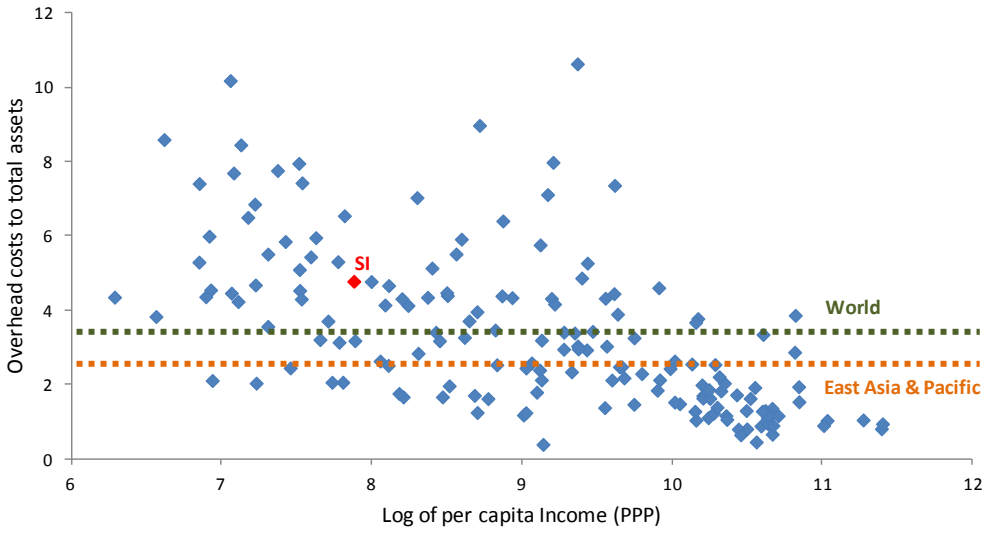
Using pooled EGLS (estimated generalized least squares) to take into account the cross-section heterogeneity, the alternative specifications of the model are estimated using the SUR method. Standard errors and covariances are calculated with (panel-corrected) cross section weights (PCSE) to obtain robust estimate of the cross-section residual covariance matrix.

B. Empirical Results

A negative relationship was found between spreads and the scale of operations, which is statistically significant through the alternative specifications of the regression. This result suggests that banks in Solomon Islands would pass on lower rates to the borrowers assuming a surge in the volume of lending. In particular, an increase of 10 percent in total loans generates about a 1 percent decline in bank spreads.

The first regression results highlight the role of bank-level factors in determining banking spreads. The results showed in Table 2, column (1) suggest that the main drivers of spreads' fluctuations are related to the quality of management, proxied by the operating costs; and more particularly to the capital, and other costs. The results are statistically and economically significant. Besides, the results are largely robust to the inclusion of banking sector, macro, and legal variables; further, salary and wages become more significant in explaining interest rate spreads as suggested in columns (2) , (3), and (4). According to the results of regressions, a fall in salary and wages (other) costs of one percentage point would be associated with a drop in interest spreads by 0.5–0.7 (0.6–0.7) percentage point. This result is robust to the model specification and remains significant regardless to the version of estimated equation.

Figure 13: Relation between Banks Overhead Costs and Income



Sources: IMF staff calculations.

To support the empirical result showing the high correlation between overhead costs and banking spreads, we compare the magnitude of those costs in Solomon Islands to other countries during 2011. Figure 13 contrasts the overhead costs to total assets in 166 countries classified based on their per capita income adjusted by purchasing power parity (PPP). The figure shows a clear negative relation between banks' overhead costs and income. In addition, Solomon Islands is among the top quintile with the highest banking costs in the sample (also higher than the world's average and East Asia and Pacific Low Income countries' average).

The finding on the effect of risk aversion is consistent with the theoretical interpretation in the sense that it positively affects spreads. For instance, an increase in the ratio of equity to total assets of 10 percent generates an increase in interest spreads by 2 percent. This result becomes significant at the 10 percent level in models (3) and (4). On the other hand, NPLs

have an insignificant impact on the interest rate spread in all versions of the estimated models.

The HH index gauges the degree of market concentration and might show the opportunity to earn excess rates of return via collusion. Table 2 unambiguously shows that changes in the concentration of the respective banking sector are positively correlated with bank spreads. The elasticity is statistically significant in the different specifications. This result is somewhat expected given the small number of banks in Solomon Islands (only three banks).

In a highly inflationary environment we predict this variable to be a significant determinant of profitability. [11] Inflation in Solomon Islands remained relatively low and stable during the period we are considering in this study partly owing to the stability of exchange rates. Hence, the different versions of the regression do not show any evidence in favor of a close relation between spreads and inflation.

The relatively high policy interest rates significantly explain bank spreads. According to the results of regressions, a fall in the central bank interest rates of one percentage point would be associated with a decline of spreads by roughly eight basis points. It is relatively normal for a country using sterilization through issuing the *Bokolo* bills to have high interest rates. Greater exchange rate flexibility could reduce the cost of sterilization, keep interest rates low, and hence reduce the spreads in the medium term—*Bokolo* bill rates are already low a the end of the sample.

In line with the existing literature, a strong negative elasticity is expected between the overall economic activity and spreads in the banking sector. During booms, business opportunities are more available and the perceived risk is lower for commercial banks. Therefore, spreads are expected to contract if growth increases. Growth is negatively affecting spreads with a statistically significant estimated elasticity of -0.06 in our sample.

The quality of the regulatory regime and economic environment, proxied by the Index of Economic Freedom, was found to have a positive effect on lowering spreads in the regression; however, the coefficient is not statistically significant (see Model 4).

Finally, the impact of noninterest income on spreads is identified by introducing an additional bank specific variable in the regression—the ratio of total noninterest income to total assets, which is highly related to foreign exchange operations in Solomon Islands. This variable is expected to illustrate the implementation of the new CBSI regulation in 2011 aiming to narrowing the foreign exchange margin, which should force banks to engage more in the lending market and lower spreads. Although not reported in Table 2, the sensitivity of interest spreads to noninterest income is found to be weak and statistically not significant. [12]

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[11] Various studies find a positive correlation between spreads and inflation (see Honohan, 2003 and Gelos, 2006).

[12] We alternatively test the coefficient of a dummy variable that captures the new policy implementation in 2011; and the result remains the same.

Table 2: Factors Explaining Interest Spreads

	(1)	(2)	(3)	(4)
	Bank-specific variables			
LOANS_GROWTH	-0.008	-0.014 ***	-0.010 ***	-0.010 ***
	(0.006)	(0.004)	(0.004)	(0.004)
COST_STAFF	0.582	0.762 **	0.531 *	0.557 *
	(0.451)	(0.334)	(0.284)	(0.304)
COST_PCAPITAL	0.020 *	0.001	-0.002	-0.002
	(0.011)	(0.010)	(0.011)	(0.011)
COST_OTHER	0.730 ***	0.659 ***	0.560 ***	0.558 ***
	(0.177)	(0.152)	(0.151)	(0.152)
CREDIT_RISK	0.009	0.007	-0.009	-0.008
	(0.014)	(0.010)	(0.011)	(0.012)
RISK_AVERSION	0.022	0.020	0.021 *	0.022 *
	(0.016)	(0.013)	(0.012)	(0.012)
	Industry characteristics			
HH index	…	1.58E-03 ***	8.10E-04 ***	8.31E-04 ***
		(1.72e-4)	(1.99e-4)	(2.38e-4)
	Macroeconomic variables			
INFLATION	…	…	-0.008	-0.006
			(0.017)	(0.018)
INTEREST RATE	…	…	0.090 ***	0.086 ***
			(0.024)	(0.030)
GROWTH	…	…	-0.049 **	-0.051 **
			(0.023)	(0.024)
	Legal Aspect			
LEGAL	…	…	…	-0.046
				(0.180)
INTERCEPT	0.226	-5.198 ***	-2.410 *	0.207
	(0.339)	(0.680)	(0.744)	(10.238)
R-squared	0.561	0.853	0.914	0.913
Adjusted R-squared	0.509	0.832	0.895	0.892
Durbin-Watson statistic	1.218	1.696	1.742	1.749

** Significant at 0.10; **significant at 0.05; ***significant at 0.01.*

IV. A FURTHER LOOK AT THE MARKET STRUCTURE

In this section the structure of the banking sector is evaluated by identifying the impact of a change in the interest rate spread in one bank on the other banks. Formally, we estimate a vector autoregression model of the form:

$$\boldsymbol{SPREAD_t = A(L) \times SPREAD_t + \mu_t,} \qquad \text{(2a)}$$

where

$$\boldsymbol{SPREAD_t = \left[SPREAD_t^{Bank\,1}, SPREAD_t^{Bank\,2}, SPREAD_t^{Bank\,3}\right]'} \qquad \text{(2b)}$$

and $\boldsymbol{A(L)}$ is a lag matrix.

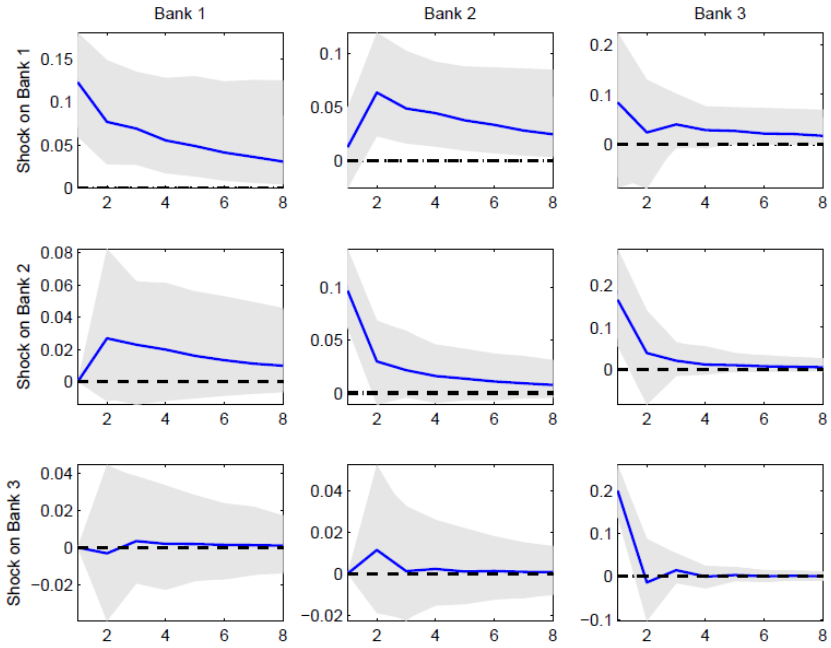
A Cholesky identification scheme is used assuming that the biggest bank (in terms of total assets)—Bank 1— is the one that affects the two other banks contemporaneously. Then, Bank 2 is ranked second; so its decisions would affect Bank 3 spreads immediately and those of Bank 1 with a one-quarter lag. Finally, Bank 3 would influence the two other banks only during the next quarter.

The impulse-response functions of bank-specific spreads to idiosyncratic shocks, as well as the confidence intervals, are reported in Figure 14. Results show that the different banks change spreads in a coordinated fashion. In particular, following the first scenario—an unexpected increase of spreads by Bank 1—the two other banks react immediately through a mild but significant increase in interest spreads. It is worth noting that, following the same shock, Bank 3 decides to change interest spreads by virtually the same amount as in Bank 1. The same thing happens following a shock that originated in Bank 2. On the other hand, the biggest bank does not seem to be significantly responsive to shocks in other banks' spreads.

To test the robustness of the latest findings, we run the same exercise using shocks on lending rates. Figure 15 shows the same pattern as in Figure 14, with highly correlated bank reactions to lending rate adjustments by their pairs.

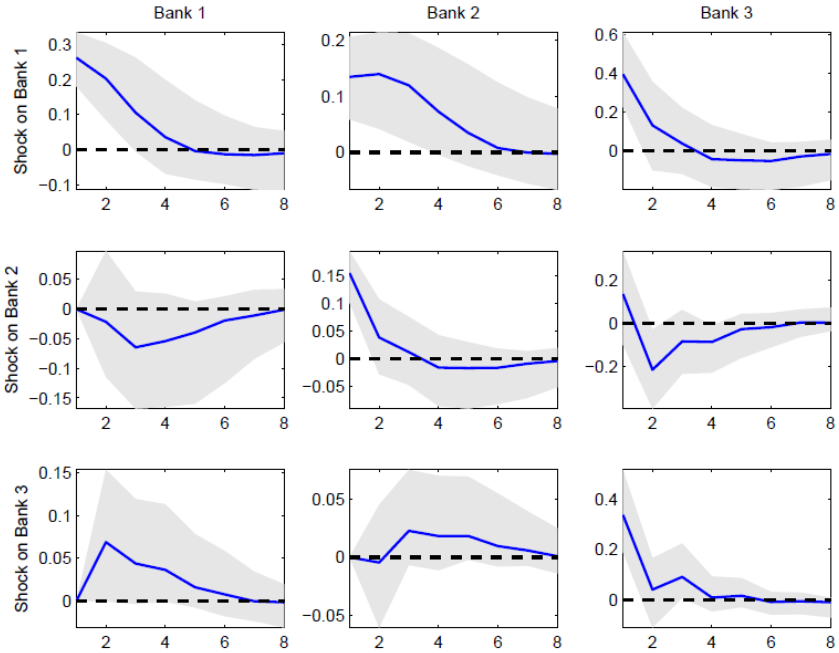
As we cannot empirically test for the identification strategy, we conduct a final exercise where the arrangement of variables is alternated and assess the robustness of the presence of collusion. The results are not reported here, but the impulse-response functions are very similar especially following the period where an idiosyncratic shock on spreads materializes. Consequently, we see this result as additional evidence of the significant influence of high banking market concentration on spreads as reported in the previous section.

Figure 14: Impulse-Response Functions to Shocks on Bank-Specific Spreads [1]



[1] We construct bootstrap confidence intervals for impulse response functions from the structural vector autoregression. Solid blue lines correspond to 50th percentiles and the shaded areas identify 90 percent confidence intervals.

Figure 15: Impulse-Response Functions to Shocks on Bank-Specific Lending Rates



V. CONCLUSION

This paper finds that bank spreads and overhead costs are significantly and positively correlated. The scale of operations is another impediment to lower the cost of borrowing from banks in Solomon Islands. Besides, the results reported in this paper also suggest that high market power and bank concentration tend to increase the possibility of using market power and collusion. Some scope exists for increasing competition in the banking sector in Solomon Islands, but financial deepening also requires the development of non-bank institutions. These include finance companies, foreign exchange dealers, and micro-credit institutions, which have the potential to be competitive, apart from the main commercial banks. Financial inclusion initiatives, such as lowering the cost of remittances and mobile phone banking, could also help foster private sector development.

Another policy issue is the central bank lending rate. The empirical findings suggest that increases in the central bank lending rate are likely to increase net interest margins. Furthermore, a less supportive legal and economic environment in Solomon Islands contributes to larger intermediation costs; although the result is not significant. This argument is very often used to explain the limited access to bank loans. Although the empirical result is insignificant, this does not mean that policy makers should ignore potential reforms with this area.

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