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Contents

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Guidelines for the MEFMI Forum

The MEFMI Forum is a bi-annual publication of pertinent research issues affecting the MEFMI[i] region. The overall aim of the publication is to provide a widely accessible and informative media for the regular exchange of pertinent ideas, issues, speeches, experiences, new developments and sound or good practice in macroeconomic and financial management.

Sharing and dissemination of pertinent information and experiences is one of the modes of delivery employed by the Institute. The MEFMI Forum, among other traditional and new information technology-driven mechanisms, plays a pivotal part in this regard.

These guidelines provide editorial policy guidelines that set the required quality standards for the Forum and lay down procedures for the sourcing and submission of contributions for publication.

The following are guidelines for the publication;

1) The Forum shall be published twice a year. The MEFMI Forum shall be published and disseminated through the office of the Editor-In-Chief which is supported at various stages by the Editorial Committee from within the MEFMI Secretariat.

2) Contributions should be made in the English language and shall ordinarily be published on a continuous first-come-first-served basis, thus allowing for the deferment of some successful articles received late to subsequent issues of the Forum.

3) Contributions shall be published on a voluntary basis, with modest honoraria being paid to only defray personal expenses incurred. Special contributions may be occasionally commissioned on an exceptional case-by-case basis.

4) Contributions submitted for publication should be related to macroeconomic and financial management. The contributions should be incisive, informative and as far as possible original, with proper acknowledgement of the work of others used, so as to avoid plagiarism. Contributions will only be published with the authors' consent and their acceptance of liability for content and implications of their contributions.

5) Personal details, such as authors' names, titles, designations, name of employers and recent photographs may be inserted into respective contributions for ease of identification and reference.

6) The Editor-In-Chief shall reserve the right to edit or decline to publish articles that are inconsistent with the above guidelines and / or to annul part or all of any honoraria that may be due to the affected contributions.

7) Prior written permission and /or acknowledged reference to the relevant issue of the Forum should be cited for any use of materials published in the Forum. The Forum shall be open for contributions and readership from a wide, diverse and expert stakeholder base from within the relevant MEFMI client institutions, member States, partners and other regional and international peers and networks.

8) The Forum shall be distributed to stakeholders and other relevant parties in hard copy and / or in electronic form, including through posting on the MEFMI website.

9) In addition to complying with the editorial guidelines as set out above, contributions should meet the following specific criteria for eligibility for publication:

i.   Contributions should be relevant to macroeconomic and financial management;

ii.   The contributions should be topical, analytical and applied than being of a purely research or theoretical slant;

iii.   Contributions should be concise and brief, within a maximum limit of 5000 words, excluding diagrams and other necessary illustrations;

iv.   Contributions need to properly acknowledge others' work, including appending of relevant bibliographies, references, etc;

v.   Where appropriate, prior clearance or authentication by employers or relevant authorities should be sought in cases where country-sensitive or country-specific information is involved.

10) Contributions should adhere to the following lay-out:
   i.   Title
   ii.   Author and Designation
   iii.   Abstract
   iv.   Introduction
      a.   The issues/problem
      b.   Purpose / objective/s
      c.   Scope
   v.   Methodology
   vi.   Analysis and Interpretation
   vii.   Conclusion / Recommendations
   viii.   References using the Harvard style

11) There should be adherence to the following submission procedures:
   i.   Meeting submission deadlines, i.e. articles should be received 2 months prior to date of next publication;
   ii. Submission of contributions in both hard and soft /MS-Word copies.

12) MEFMI shall not under any circumstance be held liable for contributions published through the Forum, and a disclaimer to this effect shall be inserted into every issue of the Forum.

Foreword

By The Editor-In-Chief

The articles in this issue address some of the critical areas of concern affecting MEFMI member states and client institutions.

One such area is banking supervision in which market risk remains a challenge for many supervisors, and yet it still is a growing source of profit and conversely, vulnerabilities on banks' balance sheets. As stated in the article **Perspectives on Market Risk in Banking Institutions**, it is essential that banks have a comprehensive risk management process in place that effectively identifies, measures, monitors and controls exposure to market risk.

The article on **Net Interest Rate Margins in Zambia - The Role of Competition Dynamics** looks at the Zambian banking sector and the impact of mobile technology in addition to Government's liberal policies that have substantially eased barriers to entry for new market participants in the banking industry. It can thus be predicted from standard economic theory that these factors should lead to two important outcomes: improvements in accessibility to financial services and a reduction in the cost of lending due to competitive pressure. However, interest rates seem to remain persistently high and market shares remain concentrated in the largest few firms. As a result, intermediation specifically bank lending is low and interest margins are high compared to the rest of the world. Whether or not different policy approaches succeed in reducing lending rates will depend on an understanding of how banks determine the interest rates that they charge. Several studies have investigated the factors that determine lending interest rates. Some of these factors have been identified as the cost of funds, credit risk, liquidity risk, operational efficiency, government borrowing, macroeconomic stability, etc. However, the literature on the role of competition dynamics on interest rates is very scanty especially in Africa. This article on Zambia attempts to address this gap.

The issue of sovereign wealth management remains key amongst decision makers across the African continent. The article titled **Role of Central Banks in Managing a Country's Natural Resources Revenue: International Experience and Institutional Considerations for MEFMI Countries** is a contribution to the ongoing policy discussion among MEFMI member states on optimal management of current and future natural resource revenues and how to draw on existing practices and relevant country examples to apply to Africa specific context. Establishment of a SWF in itself will not help a country achieve its stated objectives unless its creation is the result of sustainable and credible rules based fiscal policy and is complemented by a range of other policies and institutions. Not least important in this discussion is the policy decision on how much of natural resource revenue should be directed toward domestic investment and how much should be accumulated in foreign assets to serve a specific objective, and what should be the optimal mechanisms and institutional arrangements to achieve both of these goals.

I would like to express my sincere gratitude to all the contributors to this issue of MEFMI Forum for the well thought and insightful articles. I look forward to more contributions in future issues from both member countries and technical partners.

PERSPECTIVES ON MARKET RISK IN BANKING INSTITUTIONS

By Mrs. Sipho Makamba – *MEFMI Programme Manager, Financial Sector Management Programme and Mr. Bob Takavingofa, Senior Bank Examiner, Bank Supervision, Reserve Bank of Zimbabwe*

ABSTRACT

Banking institutions in their intermediary role borrow short, through deposit mobilisation, and lend long. Further, banking institutions facilitate the exchange of currencies in the economy through their treasury operations, thus enable global trade. This role exposes banks to various forms of risks including liquidity risk, resulting from the mismatches in liability and asset maturities, credit risk and market risk. Supervisors in the MEFMI region have over the years enhanced their capacity to examine and monitor credit and liquidity risks through on-site examinations and off-site surveillance. Market risk, however, remains a challenge for many a supervisors in the region and yet it remains a growing source of profit and conversely, vulnerabilities on banks' balance sheets.

The management of market rate risk is therefore critical to the stability of any banking institution. It is essential that banks have a comprehensive risk management process in place that effectively identifies, measures, monitors and controls exposure to market risk. This process must be subject to appropriate board and senior management oversight. From a regulator's perspective, it is also essential to know what to assess with regards to market risk during on-site and off-site examinations. In this regard, this paper discusses measurement and assessment of market risk with a focus on the MEFMI region.

1. INTRODUCTION

A review of different reports generated by the IMF in collaboration with the World Bank on the Financial Sector Assessment Programmes (FSAPs) and Reports on the Observance of Standards and Codes (ROSCs) as well as countries' own self assessments for compliance with the Basel committees' Core Principles for Effective Bank Supervision, notes that supervisors in the region still struggle with the assessment of market risk which is enshrined in Core Principle 23 and 24.

Within the MEFMI region[1] supervisors continue to work towards enhancement of their supervisory processes. MEFMI is committed to ensuring that regulators meet their regulatory obligations effectively and efficiently by continuing to provide technical assistance at regional and country specific level to ensure that its members keep up with their regulatory requirements.

This discussion is aimed at providing guidance to MEFMI member states on Market risk, including its measurement framework and examination techniques. The focus is on market risk namely interest rate risk and foreign exchange rate risk. The other components of market risk (commodity risk and equity risk) are not assessed due to their insignificance on bank's balance sheet in the MEFMI region. Further, in most jurisdictions in the MEFMI region banking institutions are not permitted to undertake trading in equities and commodities. The discussion also covers a few red flags to watch out for during on-site examination process and guidance from the recent work of the Basel Committee on Bank supervision just before a conclusion.

Definition

Market Risk[2] is defined as the risk of losses due to adverse changes in interest rates, foreign exchange rates, commodity prices or equities prices. For banking institutions in the MEFMI region the major source of market risk is interest rate and foreign exchange rates changes as most jurisdictions do not allow banks to trade in commodities and equities.

2 Interest Rate Risk Types and Sources

Interest rate risk is the exposure of a bank's current or future earnings and capital to adverse movements in interest rates. Movements in interest rates may be direct, that is affecting the whole banking system due to changes in market factors; or a single issue affecting specific banking institutions or a single bank. Bank

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[1] MEFMI region refers to countries that are members of MEFMI namely, Angola, Burundi, Botswana, Kenya, Lesotho, Malawi, Mocambique, Namibia, Rwanda, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe.
[2] Market risk covers a number of factors that may not be covered by this paper. Readers are encouraged to read broadly in order to get a full understanding on some of the more detailed aspects of market risk should they wish to.

specific or idiosyncratic market risk may arise due to impairment of the bank's brand due to bad publicity or performance related challenges resulting in other market participants requiring higher interest rates on their funds held by the bank to offset the perceived increase in risk.

Fluctuations in Interest rates affect a bank's earnings through changes in its net interest income and also affects the underlying value of the banks' assets, liabilities and off-balance sheet (OBS) financial instruments because the present value of future cash flows change.

Banks, by nature of their business, assume short term liabilities and create longer term assets. This inherently means that they pay interest on liabilities that is less than the interest they receive on assets generated. For example, a bank can source a USD30, 000 – 1 year deposit at 3% and issue a 2 year fixed rate of USD30, 000 loan at 5%. The bank in this case will benefits from the 2% spread and gets USD600 in interest income.

Banks encounter interest rate risk in several ways including re-pricing risk; yield curve risk, basis risk (also known as spread risk); and optionality risk. The types of interest rate risk are described briefly below.

2.1. Types of Interest rate risk

Re-pricing risk is the most common and discussed form of interest rate risk in the region and arises from timing differences in the maturity (for fixed rate) and re-pricing (for floating rate) of banks assets, liabilities and off-balance-sheet (OBS) positions. From an income statement perspective, re-pricing impacts the frequency with which cash flows can adjust to reflect market conditions, impacting the bank's net income streams. From a balance sheet perspective, re-pricing impacts the balance sheet valuation and the economic value of the entity. Where there are re-pricing mismatches, this may expose a bank's income and economic value to unanticipated fluctuations as interest rates vary.

Yield Curve risk is the risk of experiencing an adverse shift in market interest rates associated with investing in a fixed income instrument. In banking institutions, it arises when unanticipated shifts of the yield curve have adverse effects on a bank's income or underlying economic value. These changes will be evident in the slope (steeper or flatter) or shape (bend) of the curve. For example, a 90-day deposit which is invested in a 2 year Treasury Bill may experience a rise in 90-day interest rates while long term rates may decline. This could lead to a thinning of spreads resulting in declining net interest income.

Basis risk is the risk arising from imperfect correlation in the changes of interest rates in different financial markets or on different instruments with otherwise similar re-pricing characteristics. Differences in interest rate changes can give rise to unexpected changes in the cash flows and earnings spread between assets, liabilities and OBS instruments of similar maturities or re-pricing frequencies. For example, a bank that has a matched position where a USD30 000, 90-day deposit at a 3% floating rate, is invested in a 90-day 5% floating rate security. Rates on the deposit may rise by 2% while rates on the security rise by 1% resulting in the spread tightening by 1% point.

Optionality risk is the risk that a financial instrument's cash flows (timing or amount) can change at the exercise of the option holder, who may be motivated to do so by changes in market interest rates. Lenders are typically option sellers, and borrowers are typically option buyers (as they are often provided a right to prepay e.g. of mortgage loans). The exercise of options can adversely affect an institution's earnings by reducing asset yields or increasing funding costs.

Examples of instruments with embedded options include loans which give borrowers the right to prepay balances, various types of bonds and notes with call or put provisions and various types of non-maturity deposit instruments which give depositors the right to withdraw funds at any time, often without penalties.

3.   Measurement Approaches for Exposure to Interest Rate Risk

There are a number of ways in which banking institutions can choose to measure interest rate risk. The common ones in the region include duration and GAP analysis discussed below. It is also common for some banks to, in addition to duration and GAP analysis, also adopt sophisticated methods such as Value at Risk either inherited from their group structures in the case of international and regional banks or customized to their business in addition to the above. Nevertheless, banks have to demonstrate to the supervisor that they understand the measurement methods that they use and have put in place appropriate mitigants to manage the risk.

Duration is a measure of the sensitivity of the price (the value of the principal) of a fixed income investment to a change in interest rates. Duration is measured in years. The evaluation of an income stream is the present value of all future cash flows at a specified discount rate. For each of the cash flows associated with an instrument, the present value is derived with the formula;

$$PV = \frac{FV}{(1+r)^n}$$

Where:
PV (Present value)
FV (Future value)
r (Discount rate per period)
n (number of periods to the cash flow)

As the discount rate (r) changes, the PV changes. Duration is a measure of the sensitivity of the price (current value) of a fixed income investment to a change in interest rates. The bigger the duration number the greater the interest rate risk or sensitivity of Bond value to changes in rates.

Macaulay duration is an indication of the weighted average time to maturity of the instrument and is derived from the following formula;

$$D = \frac{\sum_{t=1}^{n} t * CF_t}{(1+r)^t} \Big/ P$$

Where:
CF (individual cash flows)
t (time to the cash flow)
P (price of the instrument)
n (number of periods to the cash flow)
r (discount rate per period)

Modified duration is given by:

$$MD = \frac{D}{1+r}$$

r (discount rate per period)
n (number of periods)
If interest rates change, while cash flows are held constant, the present value of the cash flows changes. The direction of the change depends also on the direction of the change in interest rates. This is the balance sheet effect. It is important to recognize that a change in interest rates affects the value of the instrument. Duration measure is therefore used to estimate the effect of a change in interest rates on the values of assets using the following formulae.

Impact of IRR change = -MD*P*Δr

Where :
MD (modified duration)
P (current price)
D (duration measure)
Δr (change in yield)

It would be applied separately to each instrument and the effect on the balance sheet.

Gap Analysis…

The re-pricing gap is a measure of interest rate risk that links changes in interest rates to changes in net interest income (NII). The gap quantifies the impact of parallel shifts in the yield curve on earning and capital of the institution.

In calculating the gap, it is necessary to first identify interest rate sensitive assets and liabilities that a banking institution is holding on its balance sheet. The next step is selecting a series of time buckets for example, 30 days, 60 days or 90 days and allocating all rate sensitive assets and liabilities into these time buckets based on their time to reprice. The periodic GAP is then calculated as the difference between the assets and liabilities on these time buckets and a cumulative GAP for each time bucket also calculated.
The gap (G) over a given time bucket is defined as the difference between the amount of rate-sensitive assets (SA) and rate-sensitive liabilities (SL) denoted in the formula below:

$$G = SA - SL$$

A **positive gap** which is referred to as an asset sensitive gap, implies that there are more rate sensitive assets than liabilities in that time bucket. Similarly a negative gap is also termed a **liability sensitive gap**. Should interest rates rise a bank with a positive gap will experience increases in net interest income as income on assets will rise higher than cost of liabilities for that specific re-pricing frequency (maturity bucket). Inversely, should interest rates fall a bank with a positive gap will experience a decline in net interest income. This is demonstrated using Table 1 below.

Table 1: Example of Gap Analysis

Maturity Bucket	0 - 30 days	31-60 days	61-90 days	91 - 180 days	181 - 270 days	271 - 365 days
INTEREST RATE SENSITIVE ASSETS:						
Treasury Bills	-	-	6,606,684	18,005,968	7,548,690	2,638,422
Government Bonds	191,594,890	30,000,000	11,606,685	-	6,340,422	28,794,695
Loans	30,465,452	1,859,157	547,300	6,499,787	-	14,707,714
Overdrafts	141,557,330	-	-	-	-	-
TOTAL INTEREST RATE SENSITIVE ASSETS	363,617,672	31,859,157	12,153,985	24,505,755	13,889,112	46,140,831
INTEREST RATE SENSITIVE LIABILITIES :						
Demand Deposits	435,584,152	-	-	-	-	-
Saving Deposits	17,068,402	-	-	-	-	-
Fixed and Notice Deposits	415,725	704,628	-	29,640	-	-
Amounts Owing to Local Banks	1,290,975	-	-	-	-	-
Total Interest Rate Sensitive Liabilities	454,359,255	704,628	-	29,640	-	21,866,495
Repricing Gap	(90,741,583)	31,154,529	12,153,985	24,476,115	13,889,112	24,274,336
Cumulative Mismatch	(90,741,583)	(59,587,053)	(47,433,068)	(22,956,953)	(9,067,841)	15,206,494

The impact of the gap may be managed through:

- Assets and liabilities matching. The bank matches its interest rate sensitive assets and liabilities to limit its exposure to reinvestment and refinancing risk.

- Forward rate agreements. This is a transaction where two parties agree to transact at a pre-specified rate, on a future date with a known notional amount. It could be used to hedge the risk that rates may move against a held position.

Although gap analysis is commonly used in the region for its simplicity, its main limitation is that it assumes a parallel shift in the yield curve and ignores other possible changes in the yield curve such as twists and curvature risks that can happen in a real trading environment. Further, in practice, different assets and liabilities negotiated by a bank can have differing degrees of sensitivity to interest rates changes in which case it may under estimate potential impact on earning or capital. Because of this limitation, gap analysis use is recommended for assets and liabilities which mature within one year.

Few banking institutions also uses value-at-risk to measure interest rate risk. This tool shall be discussed and defined in detail under foreign exchange risk measures.

4. Foreign Exchange Risk and Sources

Banks are exposed to foreign exchange risk by virtue of their interaction in international and domestic markets. Foreign exchange risk is defined as the risk of loss due to adverse movements in foreign exchange rates and can pose a significant risk to the bank's earnings and capital adequacy. In both the trading and banking book, domestic currency values of assets, liabilities, off balance sheet items and transactions will be negatively affected by movements in currency rates.

In banking institutions, foreign exchange risk exposure mainly arises from:

a) Trading in foreign currencies in spot, as a market maker or position taker;

b) Holding foreign currency positions in the banking book - loans, bonds, deposits or cross-border investments; and

c) Engaging in currency derivative transactions including forwards, option transactions.

4.1 Measurement Approaches for Exposure to Foreign Exchange Rate Risk

Tools and techniques that are used by banking institutions to measure and monitor exposure to foreign exchange rate risk range from simple to quite complex tools depending on the particular banks' risk profile. The widely used method by financial institutions in the MEFMI region is the net open position and stress testing.

Some banking institutions with active trading desks that are active in trading currencies also use value-at-risk (VaR) model. Broadly, value at risk is defined as the maximum loss at a given level of confidence over a given time horizon.

Value-at-Risk calculation

The VaR calculation depends on 2 parameters:
- The holding period, i.e., the length of time over which the foreign exchange position is planned to be held. The holding period even be 1 day for trading book exposures; and
- The confidence level at which the estimate is planned to be made. The usual confidence levels are 99 percent and 95 percent.

Assuming a holding period of x days and a confidence level of y%, the VaR measures what will be the maximum loss (i.e., the decrease in the market value of a foreign exchange position) over x days, under normal conditions. Thus, if the foreign exchange position has a 1-day VaR of $10 million at the 99 percent confidence level, the bank should expect that, with a probability of 99 percent, the value of this position will decrease by no more than $10 million in 1 day in normal market conditions. In other words, the bank should expect that the value of its foreign exchange rate position will decrease by no more than $10 million on 99 out of 100 trading days, or by more than $10 million on 1 out of every 100 usual trading days.

To calculate the VaR, there exists a variety of models. Among them, the more widely-used are:

1) the historical simulation, which assumes that currency returns on a firm's foreign exchange position will have the same distribution as they had in the past;

2) the variance - covariance model, which assumes that currency returns on a firm's total foreign exchange position are always (jointly) normally distributed; and

3) Monte Carlo simulation, which assumes that future currency returns will be randomly distributed.

The historical simulation is the mostly used approach in the region by banks that use VaR in their risk management process.

Whereas the VaR methodology can be used to measure a variety of types, helping banks in their risk management, it however does not define what happens to the exposure for the $(100 - z)$ % point of confidence, i.e., the worst case scenario. Since the VaR model does not define the maximum loss with 100 percent confidence, banks often set operational limits, and stop loss limits, in addition to VaR limits (Papaioannou and Gatzonas, 2002).

Stress Testing

A stress test is a projection of the financial condition of a banking institution under a specific set of adverse but plausible conditions. Stress tests can be done as sensitivity analysis, where a single risk factor is stressed, or as scenario analysis where multiple risk factors are stressed simultaneously. Banking institutions must use stress tests to supplement their market risk measurement and management techniques as they help to evaluate the effectiveness of various mitigating management in place including vulnerability to solvency risk.
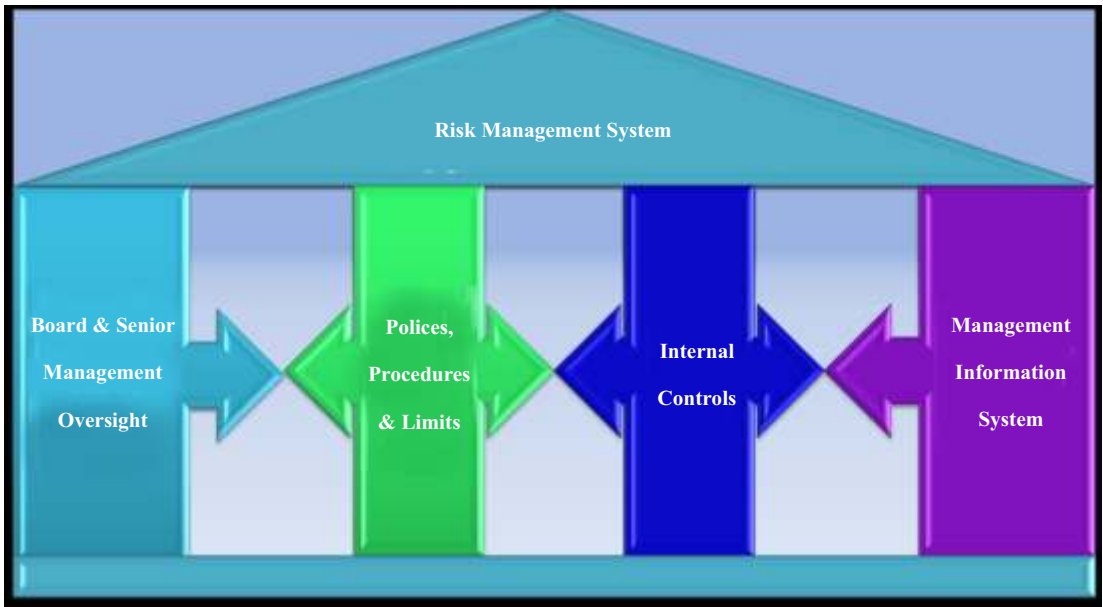
5.   Market Risk Management Framework

A sound market rate risk management framework involves the application of four basic Pillars in the management of assets, liabilities and OBS instruments namely:

i.   Appropriate board and senior management oversight;

ii.   Adequate risk management policies, procedures and limits;

iii.   Comprehensive internal controls and independent audits; and

iv.   Robust information management systems.

The specific manner in which a bank would apply these elements in managing its market rate risk will depend on the **complexity and nature of its business strategy** and activities, as well as on the level of market rate risk exposure. The duties of the individuals involved in the risk measurement, monitoring and control functions must be sufficiently separate and as relevant, independent from the business decision makers and position takers to ensure the avoidance of conflicts of interests. The risk management framework system can be summarized in the chart below.

Chart 1: Risk Management System

Effective board oversight is the cornerstone of sound risk management. The board of directors is responsible for overseeing the establishment, approval, implementation, and annual review of market risk management strategies, policies, procedures, and risk limits. The board should understand and regularly review reports that detail the level and trend of the institution's market risk exposure.

The board or an appropriate board committee should review sensitivity to market risk information at least quarterly. The information should be timely and of sufficient detail to allow the board to assess senior management's performance in monitoring and controlling market risks and to assess management's compliance with board-approved policies.

Senior management is responsible for ensuring that board approved market risk strategies, policies and procedures are appropriately executed. Management should ensure that risk management processes consider the impact that various risks, including credit, liquidity, and operational risks could have on market risk.

In that regard, senior management should clearly define the individuals and/or management committees responsible for managing market rate risk and should ensure that there is adequate separation of duties in key elements of the risk management process to avoid potential conflicts of interest. Control functions could be inbuilt in business units and an independent market rate risk management function established with clearly defined duties that are consistent with the nature and complexity of their activities. Board and senior management oversight can be further summarized in the chart 2 below.

Chart 2: Board and Senior Management Oversight
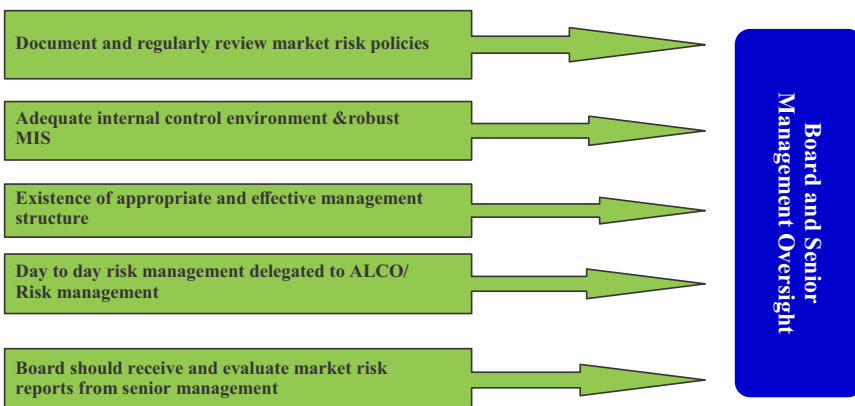
New products usually present a challenge in banks as sometimes, these are introduced without the necessary understanding of their inherent risks. Banks should ensure that new products are subjected to adequate procedures and controls before being introduced or undertaken as part of their operations.

With regard to interest rate risk management, banks should have systems that capture all material sources of interest rate risk and that assess the effect of interest rate changes in ways that are consistent with the scope of their activities. The assumptions underlying the system should be clearly understood by risk managers and bank management.

Limits must be established and enforced on activities and implemented to maintain exposures within levels consistent with the respective banks' internal policies. In addition, banks should measure their vulnerability to loss under stressful market conditions – including the breakdown of key assumptions – and consider those results when reviewing and updating their policies and limits for market rate risk.

Banks should have adequate information systems for measuring, monitoring, controlling and reporting interest rate exposures in general and interest rate exposures separately in the banking book and the trading book. Reports must be provided on a timely basis to the bank's board of directors, senior management, and where appropriate, to individual business line managers.

Banking institutions must have an adequate system of internal controls over their interest rate risk management process. A fundamental component of the internal control systems involves regular independent reviews and evaluations of the effectiveness of the system and, where necessary, ensuring that appropriate revisions or enhancements to internal controls are made. The results of such reviews should be available to the Supervisor of Banks upon request.

6. Factors to Consider when conducting on-site examination on market risk

Supervisors conducting on-site inspections of banking institutions have to determine that the bank that they are examining has adequate market risk management process that takes into account their risk appetite, risk profile, market and macroeconomic conditions and the risk of a significant deterioration in market liquidity - prudent policies and processes to identify, measure, evaluate, monitor, report and control or mitigate market risks in a timely basis.

Whereas the strategy of examining a bank's market risk may be determined by the examiner in charge as guided by the scope of the actual examination, the basic framework for examining market risk can be guided by the table below.

Table 1: Framework for Examining Market Risk

Determine Sources of Market Risk	• Review ALCO packs & balance sheet • IRR reports • FX risk reports
Determine the level of Market risk exposure	• Net open position • IRR repricing gap in relation to capital • Assess market risk stress testing results
Determine the adequacy of Board & Snr mngnt oversight	• Review ALCO & Board minutes • Is the Board adequately informed on Market risk
Determine adequacy of policies & risk management systems	• Board approved • Risk tolerance and limits • Do policies facilitate the risk management cycle
Determine market risk msrmnt systms are appropriate for the nature & complexity of activities.	• Determine the type of market risk measurement system used • Are reports on exposures produced timely and comprehensively • Does it facilitate manual intervention

When these areas have been examined, a report can be compiled for the function and a rating assigned.

Red flags:

The typical red flags to watch out for when examining interest rate risk include
   a) Significant decline in net interest income. This indicates two possible scenarios; that either yields on assets are falling faster than the cost of funds or cost of funds is rising faster than yields on assets. In the circumstances, the affected bank must have strategies to stabilise net interest income.
   b) High or increasing volume of assets with embedded options, such as residential mortgages. This exposes the bank to increased prepayment risk when interest rates rise thereby decreasing forecasted margins on assets (loans) due to reinvestment risk.
   c) High level of long-term assets to total assets. A high concentration of assets with maturities longer than three years could reduce a bank's ability to react to changing interest rates and expose it to increased interest rate risk. Most banks have short term liabilities. These are then intermediated into longer term assets. There is a limit to maturity transformation.
   d) Adverse changes in the level and trends of aggregate interest rate risk exposure. Incremental interest rate risk exposures to the balance sheet if not done strategically may expose the bank to interest rate risk that is beyond its tolerance level.
   e) Noncompliance with the board's established risk tolerance levels and limits. The inability of management to provide reports that identify and quantify the major sources of the bank's interest rate risk in a timely manner and describe assumptions used to determine interest rate risk may be indicator that something is not right.
   f) Lack of an independent review or audit of the interest rate risk management process. The inability of management to ensure that there is an independent review could mean that they operate with an impaired own judgement or may be an indication they are hiding something.
   g) Absence of meaningful risk limits. Lack of limits or failure to observe the set limits could signify lack or weak controls which could expose the bank to high risk.
   h) Unauthorized or frequent exceptions to the interest rate risk policy. Also pointing to weak governance oversight which could expose bank to high risk.
   i) When sensitivity analysis shows that marginal changes in market interest rates results in significant adverse movements in Net Interest Income.

7. **Latest Guidance on Market Risk from the Basel Committee**

The Basel Committee issued the revised **Minimum Capital Requirements for Market Risk** on the 14th of January, 2016. The revision is the first on market since the amendments were made in 1996 to then Basel I to incorporate market risk in the capital calculation.

The main highlights of the new document relate to the redefining of 3 things. First is the revision of the boundary between the banking book and trading book. The definition of what qualifies as the banking book and trading book have been redefined to reduce incentives for a bank to arbitrage its regulatory capital requirements between the two regulatory books, while continuing to respect banks' risk management practices. Stricter limits will be applied to the transfer of instruments between the banking book and trading book.

The second revision relates to the internal models approach. The internal model approach has been enhanced to make it more coherent to take into account tail risks and market illiquidity, and the effort is to make it more granular and to address constraints on capital due to hedging and portfolio diversification.

The third revision relates to the revised standardised approach. The standardised approach has been revised so it remains suitable for banks with limited trading activity while also sufficiently risk sensitive to serve as a credible fall back for the internal models approach. This is particularly relevant for banks whose internal models are found to be inadequate in certain areas by their supervisors and, as a consequence, are not permitted to be used to determine regulatory capital requirements. The full revised document can be found on the BIS website.

The implementation of the revisions to MEFMI countries will facilitate effective risk identification of market risks, however, skills remain a major constrain in this regard. It may therefore necessary for MEFMI to intensify capacity building of supervisors in market risk measurement and assessment.

8. Conclusion

Market risk is dynamic. It should be managed together with other risks such as credit risk and liquidity risk. The board of directors has the ultimate responsibility for understanding the nature and the level of market rate risk taken by the bank. It should approve business strategies that establish or influence the market rate risk, the risk appetite, and risk management policy of the bank and review same annually. Senior management is responsible for ensuring that the bank has adequate policies and procedures for managing interest rate risk on both a long-term and day-to-day basis. At least once a year, senior management must review the interest rate risk management policies and procedures to ensure that they remain sound and appropriate.

Stress testing should be an integral part of managing market rate risk. Model validation and back-testing to assess Model appropriateness and effectiveness should be done at least annually.

References:

Allen, S.L., 2003, Financial Risk Management: A Practitioner's Guide to Managing Market and Credit Risk, (Hoboken, New Jersey: Wiley).

Bank of International Settlements, 2005, Quarterly Review, (Basle, Switzerland: BIS); September.

Basel Committee on Banking Supervision, Minimum Capital Requirements for Market Risk, January 2016

Basel Committee on Banking Supervision, Revision to the Basel II Market Risk Framework (updated as of 31 December 2010), February 2011, www.bis.org/publ/bcbs193.pdf.

Bank of Israel - Proper Conduct of Banking Business Directive (1) Management of Interest Rate Risk, 05/2013. www.boi.org.il.en

ERM – Risk Management Framework – KPMG, 2013

Jacque, L., 1996, Management and Control of Foreign Exchange Risk, (Norwell, Massachusetts: Kluwer Academic Publishers).

Jorion, P., and S.J. Khoury, 1996, Financial Risk Management: Domestic and International Dimensions, (Cambridge, Massachusetts: Blackwell Publishers).

Hakala, J., and U. Wystup, 2002, Foreign Exchange Risk: Models, Instruments, and Strategies, (London: Risk Publications).

Holton, G.A., 2003, Value-at-Risk: Theory and Practice, (San Diego, California: Academic Press). International Swaps and Derivatives Association, In

Fabozzi, Frank, J. (2000), *Fixed Income Analysis,* Frank J Fabozzi Associates, New hope Pennslyvania, pp 39, 255.

Jayanthi, M., and Umarani, R. (2014) Asset-Liability Management in Banks, CKPM Business Review, pp 10-25

Mutimba, P. (2015), *Asset Liability Management,* Todays Accountancy magazine, January – March 2015, pp 56 – 59.

MEFMI Database – Presentations on Risk Management, 2013 – 2015.

Papaioannou, M., and E.K. Gatzonas, 2002, "Assessing Market and Credit Risk of Country Funds: A Value-at-Risk Analysis," in *Global Risk Management: Financial, Operational and Insurance Strategies, International Finance Review,* Vol. 3, ed. by J.

J. Choi, and M. R. Powers, (Amsterdam: Elsevier), pp. 61–79.

NET INTEREST RATE MARGINS IN ZAMBIA - THE ROLE OF COMPETITION DYNAMICS

Emmanuel Chokwe[1]

ABSTRACT

Using the Error Correction Model, this paper utilizes quarterly bank-level time series data to explain the determinants of lending interest rate margins in Zambia. The findings reveal that competition as measured by the HH Index is negatively related to the Net Interest Margin (NIM), favoring the E-S hypothesis to the S-C-P hypothesis. However, comprehensive analysis of the peculiar market situation in the Zambian banking sector reveal that market contestability and potential competition considerations still explain the noticed empirical observations. Thus, the banking industry's expectation of the authorities' long term policy stance or posture as regards market contestability matters to NIM levels in the Zambian banking industry. Other factors that influence NIM levels are values of NIM lagged one period and yield rates on government securities. Non-performing loans and CPI were insignificant supporting other studies which argue that qualitative considerations take precedence in the determination of lending interest rates in Zambia.

1.   INTRODUCTION

Since the early 1990s, the Zambian banking sector has been substantially liberalized and interest rate controls discontinued. Particularly in the last decade, the relatively stable macroeconomic outturn and the advent of new technology principally mobile technology in addition to Government's liberal policies has substantially eased barriers to entry for new market participants in the banking industry. It can thus be predicted from standard economic theory that these factors should lead to two important outcomes: improvements in accessibility to financial services and a reduction in the cost of lending due to competitive pressure. However, interest rates seem to remain persistently high and market shares remain concentrated in the largest few firms[2]. As a result, intermediation specifically bank lending is low and interest margins are high compared to the rest of the world[3].

The widespread concern about the high cost of borrowing prompted monetary authorities under the then newly elected Government in 2011 to institute a series of policy measures aimed at reducing lending interest rates soon after taking over power. The reserve requirements and core liquid asset ratios were both reduced by 200 basis points in the same year. Later in April 2012, corporate income tax for banks was reduced from 40 to 35 percent. Further, in early 2013 it was made compulsory for banks to link their lending rates to the new Bank of Zambia policy rate and in the same year the central bank subjected commercial bank lending rates to a legal maximum of 18.25% in what was seen as the most direct interventionist approach in the post-liberalization era by the Central Bank[4]. However, evidence so far demonstrates that these measures achieved very little if any to rein in the perceived high lending interest rates. As a matter of fact, the average lending rate has already breached 26% in the first quarter of 2016 rebounding to the pre-cap levels of 2011 before the sweeping measures were taken in the industry. This follows the removal of the legal limit in the last quarter of 2015.

The banking sector plays a fundamental role in economic growth, as it is the basic element in the channeling of funds from lender-savers to borrowers-spenders. Crucially, financial intermediation affects the net return to savings and the gross return to investment. The spread between these two returns mirrors Bank Interest Margins. It could also be interpreted as an indicator of the efficiency of the banking system[5]. Obviously, the lower the banks' interest margin, the more efficient and the lower the social costs of financial intermediation will be[6]. In this sense, it is important that this work of intermediation by the banks is carried out with the lowest possible cost in order to achieve greater social welfare.

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[2] Francis Z.M, Chungu K, Owen M, Tobias R, and Joe S (2014); "Determinants of Bank Lending Rates in Zambia: A Balance Sheet Approach". Bank of Zambia Working Paper No. WP/02/2014

[3] Calixte Ahokpossi, Determinants of Bank Interest Margins in Sub-Saharan Africa, IMF Working Paper - African Department (WP/13/34), IMF, 2013

[4] Commercial bank circular number 25/2012 capped lending rates at 9 percent above the Bank of Zambia policy rate, which at the time was 9.25 percent.

[5] Ash Demirgiic, Kunt and Harry Huizinga, Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence, The World Bank Economic Review, Vol 13, No. 2, P. 379-408

[6] J. Maudos, J. Fernandez de Guevara , Factors explaining the interest margin in the banking sectors of the European Union, Journal of Banking & Finance No.28 (2004), P. 2259–2281

Whether or not different policy approaches succeed in reducing lending rates will depend on an understanding of how banks determine the interest rates that they charge. Several studies have investigated the factors that determine lending interest rates. Some of these factors have been identified as the cost of funds, credit risk, liquidity risk, operational efficiency, government borrowing, macroeconomic stability, etc.

This notwithstanding, relatively few studies have looked on structural factors such as the levels of competition. Two strands of literature try to explain how lending interest rates are determined from the structural point of view. The Efficient Structure (E-S) hypothesis postulates that efficiency gains from a concentrated market structure will have a positive impact on lending interest rates through economies of scale and therefore lower net interest margins. According to this hypothesis, firms possessing a comparative advantage in production become large and, as a natural consequence, the market becomes more concentrated.[7] On the other hand, the Structure-Conduct-Performance (S-C-P) hypothesis predicts higher interest rates from market concentration as a result of both tacit and non-tacit collusion since costs of collusion are lowered. These two diametrically opposed theorems have led to substantial ambiguity in the literature on market structure and interest rate margins. For instance, Federico S. Mandelman found that changes in the market structure do not affect the mark-ups while S. Corvoisier and R. Gropp found only a marginally significant effect at the 15% level. Others such as Calixte Ahokpossi and Ash Demirgiic, Kunt and Harry Huizinga have found statistically significant results.

In practice and perhaps more importantly, policymakers have an interest in promoting banking sectors that are both stable and efficient. Stability clearly requires sufficient banking profitability and hence could call for high net interest margins. On the contrary, economic efficiency requires banking spreads that are not too large. As such, balancing the two equally important aspects (stability and efficiency) is a challenge to monetary authorities. A prerequisite to formulating effective banking policies is thus to understand the determinants of bank profitability and interest margins.[8]

In view of this dichotomy of both theoretical constructs and empirical results, what model can explain the developments in the financial sector in Zambia? Can the high lending interest rate margins amidst a relatively stable macroeconomic environment, favorable technological improvements and an enabling government policy be explained by the S-C-P model? Is the E-S model appropriate for the Zambian situation? While there are many factors that determine net interest rate margins, this article takes a structural approach as postulated by Michael Porter's S-C-P approach and Paul Samuelson's E-S approach. Thus, the Article aims at bridging the gap in the literature on interest rates determination in Zambia. In so doing, it will provide valuable lessons to both monetary and fiscal authorities in guiding the course of interest rates and by implication net interest margins in Zambia and beyond.

2.   Statement of the Problem

The favorable macroeconomic outturn as shown in table one in the last decade in Zambia is broadly expected to impact positively on the lending interest rates and net interest rate margins but interest rates seem to have remained higher than could be inferred from economic fundamentals. This outcome negates some of the objectives of the monetary authorities in terms of reducing the cost of credit as well as financial inclusion in terms of access to credit.

In a liberalized market dispensation, the cost of money is broadly expected to be indicative of the fundamentals in the economy. Thus, the observed inertia by lending interest rates in Zambia to speedily and fully adjust to the economic fundamentals could be indicative of structural rigidities in the economy. This is the main problem which this article tries to address. This problem is one of the Major policy conundrums confronting policy makers in Zambia as evidenced by the many policy interventions in the recent past which prima facie seem to be sterile. The effect of market structure on lending interest rates in Zambia has been largely unexplored. It is therefore of vital significance that this question is empirically examined.

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[7] Federico S. Mandelman, Business Cycles: A Role for Imperfect Competition in the Banking System, Federal Reserve Bank of Atlanta Working Paper Series, Working Paper No.2006-21, November 2006
[8] Supra, Note 2

Table 1: Developments in key macroeconomic indicators

	Real GDP (RGDP)	RGDP per capita(K)	Inflation	GNS (% of GDP)	Lending Rate (Zambia)	Lending Rate (SSA)
1986 - 1995	-0.66	6092	93.0	10.3	55.4	21.4
1996 - 2005	4.5	4909	24.6	9.8	48.9	21.8
2006 - 2015	7.6	7309	9.2	32.7	23.8	15.3

Source: IMF (WEO) 2015, WB (WDI) and BoZ; Author's Calculations

3. Objectives and Significance

The overall objective of the study is to identify the factors that affect the lending interest rate margins in Zambia but with a special focus on market structure. In this regard, the article will attempt to address the effect of market structure on interest rate margins in Zambia although there might be other explanatory variables of lending interest rate margins. Thus, the primary variable of interest is market structure and the specific objective of interest is determining the effect of competition on lending interest rates in Zambia. Other specific objectives are as follows:

(i) To determine the effect of inflation on net interest rate margins in Zambia.
(ii) To determine the effect of Treasury yield rates on net interest rate margins in Zambia.
(iii) To determine the effect of non-performing loans (credit risk) on net interest rate margins in Zambia.

This article is hugely significant as there is an established link between financial sector development and economic development in general. Based on an analysis of concrete evidence, a World Bank research demonstrates that finance-led economic growth is pro-poor. The more affordable and accessible finance is, the more business ideas and innovative inventions will be realized thereby creating employment and the much needed incomes to households. As a result, both high- and low-income households feel the benefits of financial sector development. The most recent example of finance led growth which has lifted millions out of poverty is in the emerging and emerged markets of the Asia pacific region. In these regions, access to affordable finance especially microfinance played a critical role in reducing poverty.

The financial sector in Zambia is generally under-developed with only about 21.4% of adult Zambians reported to be banked as compared to 15% in 2005 and very low use of formal products on offer on the market. It is further reported that levels of access in Zambia are the lowest overall in the Southern African countries where the Finscope survey has been undertaken.[9] With the incidence of poverty estimated at 60%, one way to reducing poverty is to make the much needed finance widely accessible and affordable. By exploring and understanding the influence of structural factors that impact on the lending interest rates, this article is particularly important to policy makers who grapple with poverty reducing policies on a daily basis especially in Zambia and in the sub-region.

4. An overview of the Zambian financial sector

Alongside the rise in inflation, interest rates short up immediately after the economic reforms of the early 1990s. However, as inflation rates and other macroeconomic fundamentals eased, interest rates generally declined until recently. The developments in deposit rates, however, differ widely according to the type of account and amounts deposited. Typically, large depositors obtain interest rates that are close to those on government Treasury bills as opposed to small depositors. Developments in the other variables of interest namely CPI, Non-Performing Loans and yields on government securities particularly the 91 day treasury bill which is the most liquid security also showed the same trend. Chart 1 below shows the developments in the various types of interest rates namely the Weighted Lending Base Rate (WLBR), Net Interest Margin (NIM), Average Savings Rate and the Actual Lending Rate (Lending Rate).

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[9] Finscope Survey, 2015

**Chart 1: Developments in the nominal interest rates**
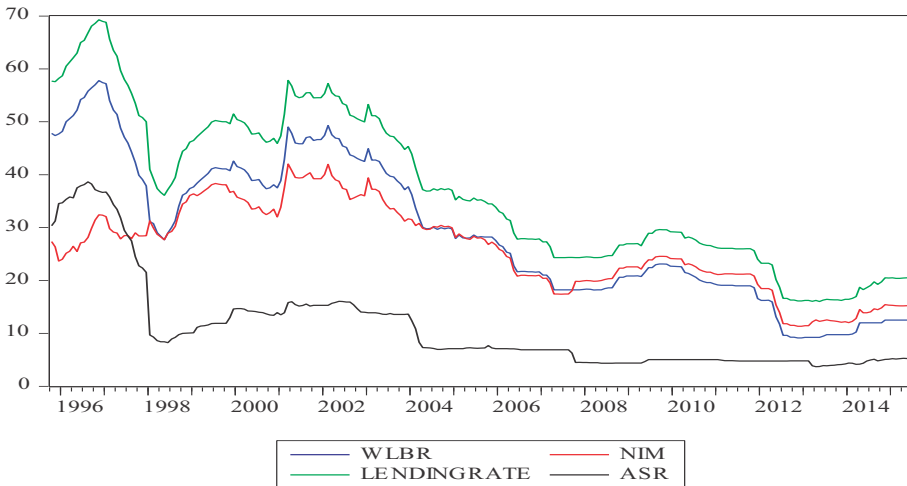
Source: Bank of Zambia; Authors' calculations

On the structural side, the Government embarked on the Financial Sector Development Programme (FSDP) in 2004. The FSDP highlighted the dominance of foreign owned banks with a few locally owned banks. Overally, the FSDP has helped in improving the governance and regulatory infrastructure of the banking sector as a response to the challenges of the 1990s which witnessed the failure of some commercial banks.

In view of these structural changes and the relative stability in the economy, the past decade has seen an increase in the number of commercial banks. Out of 13 commercial banks in 2006, seven were subsidiaries of foreign banks; one joint venture with majority foreign ownership; four domestic private banks and a public sector bank. Post 2006, six more subsidiaries of foreign banks have been registered, bringing the total number of banks in Zambia to 19, with foreign ownership rising to 14. This has raised the competitive landscape as incumbents try to beat competition arising from the new entrants and at the same time protect themselves from potential competition arising from the authorities' seemingly liberal attitude towards new entry.

Chart 2: Competition in the Banking Industry
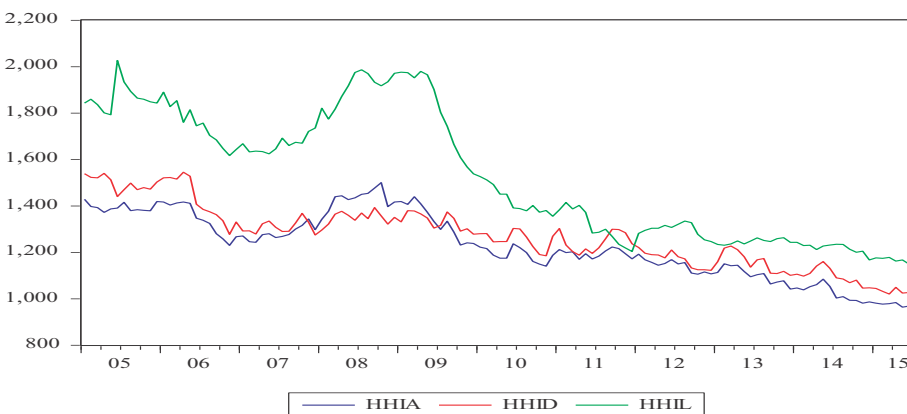
Source: Authors' calculations

Beside the increase in the number of participants, several indicators show a growing banking sector in Zambia. Gross assets, deposits and loans have increased at phenomenal rates. At the end of 2011, the banks' nominal asset size stood at K27.8 trillion (30% of GDP) which was about three times higher than the K10.7 trillion held in 2006 (27.7% of GDP). Yet, the Zambian banking system continues to exhibit monopolistic tendencies with few large banks dominating the sector. The HH Index as shown in table two reveal that the banking industry is moderately concentrated with the largest four commercial banks commanding above 60% of the market share whether in terms of Assets, Deposits or Loans. This is consistent with the findings of Anthony Musonda Simpasa in 2013. Nevertheless, as can be noted in chart

1 above, the dominance of the four largest banks in deposits, loans and total assets has been diluted as a result of market capture by smaller banks and new industry entrants, an indication of growing competitive intensity.

In addition, the banking industry in Zambia is largely profitable and resilient as can be shown by the net interest margin in chart 1. Although the margin has been declining over the years, non-balance sheet sources of income remain an important source of income for commercial banks. These include treasury securities, realized gains on foreign exchange transactions and fee income among others. The 2008 global financial crisis only had a small effect on the local banking industry as a whole. Most commercial banks hold capital balances above the regulatory threshold which is indicative of the relative strength and stability of the Zambian banking sector. To boost the banks' capital position and strengthen their resilience, the authorities raised regulatory capital further and introduced a tiered structure in April 2012. The minimum capital requirement for local and foreign banks was raised from US$2 million to US$20 and US$100 million respectively. It was widely expected that the new capital requirements would boost banks' lending to the private sector.

Table 2:   Market structure in the Zambian banking industry

Date	HHIL	HHIA	HHID
Jun-05	2,026.8	1,390.5	1,440.1
Jun-10	1,391.4	1,236.9	1,303.2
Jun-15	1,149.4	968.9	1,027.3

Source: Bank of Zambia, Authors' calculations

5. LITERATURE REVIEW

While the factors that determine net interest margins have been substantially investigated, little attention has been paid to the role of competition especially in the developing world. As such, the literature presented in this part concentrate on the effect of competition on lending interest rate margins and will only touch on the other factors tangentially.

5.1   Theoretical literature

Theoretical literature can be grouped into two broad classes: monetary and non-monetary (real analysis) theories. Non-monetary theories tend to be broad, philosophical explanations of why interest rates exist, and seem only remotely concerned with the actual determination of the rate of interest in the money market. Monetary theories on the other hand are concerned with the many and volatile forces which move short-term interest rates. Monetary theorists have postulated several frameworks to explain what determines interest rates and indeed interest rate margins in an economy. The classical theorists in particular have proposed that the real rate of interest is determined by the marginal productivity of physical capital in a positive manner. This basic notion has been extended to include other influences in different theories such as the time preference theory, the liquidity preference (or cash balances) theory, the loanable funds theory, and the rational expectations theory. [10]

5.1.1   Loanable Funds Theory

The loanable funds theory is a long-run theory of interest rate determination and is most appropriate for explaining long-term interest rates. It attempts to identify the causes of interest rate variations by analyzing the supply and demand for credit. According to this theory, the rate of interest is determined at that level which equates the supply of securities with their demand. In other words, the forces of real investment demand and real saving (productivity and thrift) determine the interest rate. [11]

The intersection of the saving and investment schedules produces the equilibrium rate of interest, also referred to as the natural rate of interest. According to the loanable funds theory, given an exogenous shock, the system maintains itself in equilibrium at full employment by changes in the equilibrium rate of interest.

[10] Rose (2003) and Madura (2006)
[11] Froyen (1996)

This theory has been criticized for separating the real economy from the financial and money markets. Smith (1984) has argued that money and finance cannot be neutral and the money rate can affect the natural rate. The notion of a 'real' economy separate from money and credit relations forms an unreliable and insecure premise on which to base dynamic analysis.[12] The other weakness of the loanable funds framework is that the quantities demanded and supplied in the loanable funds market are flows and, as such, are modeled in the same way as goods and services within the market model. Accordingly, the quantities specified are cumulative amounts occurring over the course of the designated period. The interpretation of the equilibrium price in this type of market model is the average price of transactions that take place over the period. However, the fact that debt securities prices and, therefore, interest rates are well-known to actually change by the second, calls for an explanation of these higher frequency interest rate dynamics that the loanable funds theory does not provide.

Further, by focusing on flows during a given period, the approach completely overlooks events leading up to that period that also affect the period's interest rates. This means that the loanable funds approach implicitly ignores the pre-existing stock of debt securities, the size of which indisputably affects the price of debt securities during the period and, therefore, the interest rate. By ignoring the pre-existing debt securities, the loanable funds approach implicitly assumes away all secondary debt securities markets and their important roles in determining interest rates. A conspicuous problem that stems from assuming away existing stocks of alternative assets is the approach's clumsiness in capturing the influence of money demand as well as money supply on the interest rate. Given that the money supply is a stock, it is not surprising that the loanable funds' flow approach is poorly equipped to capture such effects. It is the loanable funds' weakness in this area that increases the value of liquidity preference theory as an additional theory of interest rate determination.

Chart 3: The loanable funds model
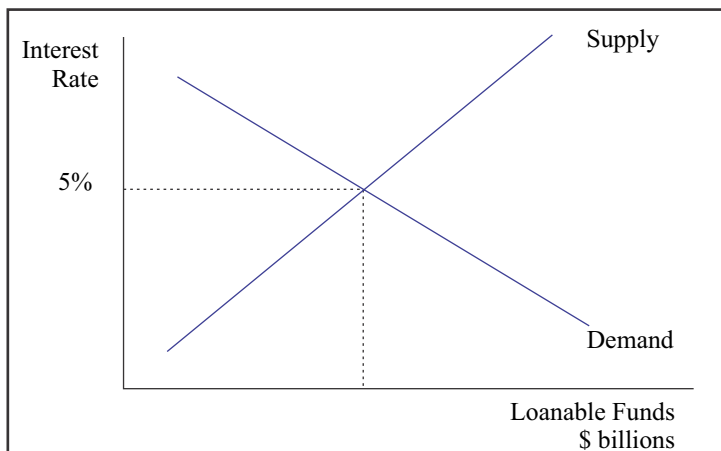
Source: Authors' drawings

### 5.1.2   The Liquidity Preference Theory

In view of the weaknesses of the loanable funds theory, J.M Keynes propounded the liquidity preference theory. According to Keynes, the interest rate is not the reward for thrift, but a reward for holding assets less liquid than money in an uncertain environment. That is, the rate of interest is not the 'price' which brings into equilibrium the demand for resources to invest with the readiness to abstain from present consumption, rather it is the 'price' which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash. The liquidity preference theory can be defined as a theory of the demand for money that depends, amongst other things, on the interest rate. Keynes argued specifically that the demand for money is inversely related to the interest rate: the higher the interest rate the less the quantity of money demanded. Secondly, the higher the degree of illiquidity of an asset, the higher the compensation necessary to convince wealth holders to accept the risks it represents. In an uncertain world, people seek a degree of liquidity and it is this demand for liquidity that is a major element in the determination of interest rates.

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[12] Smith, 1984

Nonetheless, the liquidity preference theory occasionally proves to be erroneous in its predictions regarding changes in money supply and money demand on the interest rate. For instance, an increase in expected inflation causes money demand to fall which, if considered in a strict liquidity preference context, reduces interest rates. This prediction is unequivocally wrong.

The other critique of the Keynesian model that the theory is incomplete and inadequate because, like the loanable funds theory, it also assumes that the level of income is known since income is assumed to be unique and stable at full employment equilibrium[13]. In addition, the narrow focus of the theory makes it ineffective at capturing other very important determinants of the interest rate. For example, the sale of new securities would cause their prices to fall and interest rates to rise. Since the money supply is unchanged, the liquidity preference theory could only represent the change by an increase in money demand. Further, the liquidity preference perspective does not provide a straightforward reason why money demand would increase as a result of an increase in the stock of bonds.

Chart 4: Liquidity Preference Theory
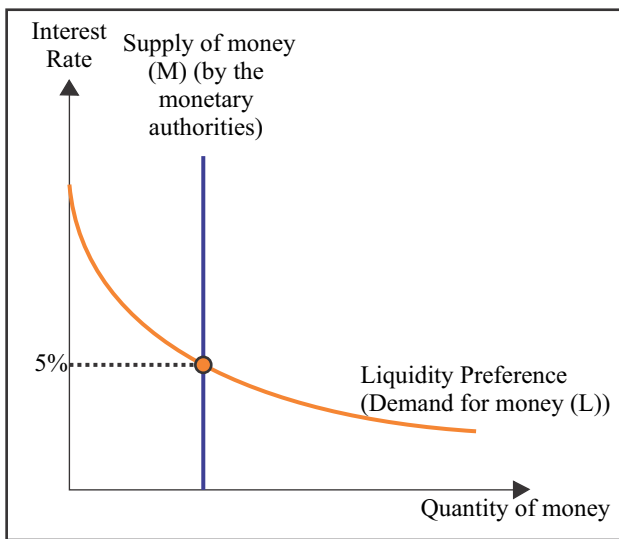
Source: Authors drawings

5.1.3   The Time Preference Theory

The theory of time preference is premised on the assumption that individuals have different preferences in terms of when to consume. For instance, individual A may prefer a dollar today to two dollars tomorrow while individual B may prefer the opposite. If this is the case, then they can trade; individual B can give-up one dollar to individual A today so that he can be given two dollars tomorrow with the one extra dollar being the rate of interest. More formally, time Preference is the insight that people prefer "present goods" to "future goods", and that the social rate of time preference, the result of the interactions of individual time-preference schedules, will determine and be equal to the pure rate of interest in a society.[14]

The time preference theory has been criticized for its simplistic approach that interest rate is determined by individuals having different preferences in terms of when to consume. It can however be shown that this time preference will not generate interest unless it is the case that at a zero rate of interest the demand for loans to finance current consumption is greater than the amount being saved. The reason that the savers are not consuming part of their income in the present is because they assume that by saving them they can accrue even greater benefits at some point in the future. The borrowers could borrow from the savers if they were willing to pay at least this interest, plus a series of premia such as risk, liquidity, et cetera. The savers are saving because they expect the value of these savings to be worth more when they expect to consume them; as such, the ratio of the present to future values would be the rate of interest that these savers earn.

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[13] Rousseas (1972)
[14] Jeffrey M. Herbener et al, The Pure Time-Preference Theory of Interest, 2011

5.1.4   The Rational Expectations Theory

The key assumption behind this theory is that buyers of bonds do not prefer bonds of one maturity over another, so they will not hold any quantity of a bond if its expected return is less than that of another bond with a different maturity. Bonds that have this characteristic are said to be perfect substitutes. Note that what makes long term bonds different from the short term bonds are the inflation and interest rate risks. Therefore, this theory essentially assumes away inflation and interest rate risks. That is, interest rate on the long bond is the average of the interests on short term bonds expected over the life of the long term bond. Thus, interest rates of different maturities will move together. Therefore, if the current short-term rate changes, it will have very little impact on a long-term rate because an average smoothens out large volatilities. In this regard, short term rates are expected to be more volatile.

The expectations theory is criticized for failing to explain why long-term yields are normally higher than short-term yields, in other words, why the yield curve is normally upward sloping. If the short term rates are low now, they are expected to go up in the future. In that case the yield curve will be upward sloping. On the other hand, if the short rates are high now, they are expected to go down and in that case the yield curve will be downward sloping. Now, at a given point in time, short-term yields are as likely to be high as they are to be low. Therefore, they are as likely to go up as they are to go down in the future. That means that the expectations theory predicts that the yield curves are as likely to be upward sloping as they are to be downward sloping. Thus, the expectations theory cannot explain why the yield curve is usually upward sloping.

5.1.5   The S.C.P and the E.S Hypotheses

Over the last decade, the Zambian banking system has been subject to increasing competitive pressures. This follows the successful deregulation during the past 20 years or so. Nevertheless, competition may be diminished through the concentration of market power within a few commercial banks. In the literature, the impact of market structure on the pricing behavior of banks is generally summarized by two opposing hypotheses.[15]

One suggests that concentration generally reduces the costs of banks to collude either tacitly or otherwise. Thus banks will use the market power to extract rents. This is referred to as the Structure – Conduct – Performance (S-C-P) hypothesis. According to this model, market performance (profits, price, product quality, etc.) depends on market conduct (pricing behavior, legal tactics, merger, collusion, etc.) that in turn depends on market structure (number of buyers and sellers, barriers to entry, etc.). Thus, this theory predicts a link between interest margins (performance) and market concentration (structure). In this paper, the S-C-P hypothesis implies that a positive relationship between bank interest margins and market structure reflect non-competitive pricing behavior in concentrated markets. In other words, based on this hypothesis the marginal effect of concentration would be to increase interest rates as it is associated with less competitive behavior and, hence, higher margins. However, it is worth noting that higher contestability could result irrespective of the market structure in part be due to recent technological advances which have resulted in an overall increase in competition, irrespective of the level of concentration.[16]

The Efficient Structure (E-S) hypothesis on the other hand suggests that concentration would increase the overall efficiency of the sector. Based on this hypothesis, concentration is due to more efficient banks growing more rapidly than less efficient banks, or more efficient banks taking over less efficient ones. If this is the case, at least up to some point, banks would price their services more competitively, rather than less competitively. Thus, based on the E-S hypothesis, the marginal effect of concentration on the interest rate would be to reduce interest rates because a more concentrated market would be evidence of a more efficient size of banks.

5.2   Empirical Literature

Empirically, three categories of factors that influence lending interest rates and interest rate margins have been identified. These include bank specific, industry specific and macroeconomic factors. Bank and industry specific factors include market power, operating costs, loan loss provisions, liquidity risk etc. At the macro level, factors such as taxation, inflation and the pace of economic growth have been found to be important.[17]

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[15] Berger, A., Hannan, T., 1989. The price-concentration relationship in banking. The Review of Economics and Statistics 71, 291–299
[16] S. Corvoisier, R. Gropp; Bank concentration and retail interest rates, / Journal of Banking & Finance No. 26 (2002), P. 2155–2189
[17] Supra, Note 1

Although there is a reasonably big volume of empirical literature on determinants of interest rate margins, most of it has been undertaken in western countries. Even in these countries, most of the empirical estimations have used panel data to compare interest rate margins in different jurisdictions. However, in Africa and particularly Sub-Saharan-Africa (SSA), the literature is scanty. To the best of my knowledge, there is no single study exclusively focused on Zambia that has attempted to explain the effect of market concentration on lending interest rate margins. This notwithstanding, using an unbalanced panel of 2582 observations in 41 sub-Saharan African countries (including Zambia) covering the period 1995–2008, the IMF concludes that the S.C.P hypothesis holds for the banking sector in SSA.[18] It was however found that the relationship between interest rate margins and concentration depended on bank efficiency. In particular, more efficient banks were able to charge higher margins in concentrated markets compared to inefficient banks after controlling for bank specific factors such as credit and liquidity risk, and country specific factors such as inflation and economic growth. This IMF paper is one of the very few papers that address the aspect of market structure in SSA although it differs in its methodological approach to this paper.

This IMF study nonetheless excluded certain banks due to data challenges as only commercial banks with comparable data were used. This constituted a major weakness of the study as it could have had the potential to substantially distort the industry structures in some countries where important banks were excluded from the sample. Secondly, the methodological approach of panel data estimation can only be used to make overarching conclusions about the association of market structure to interest rate margins at the national level and the question of whether or not this association can hold within national markets remains unanswered. Further, market structure was negatively signed and insignificant and only became positively signed and significant when it was interacted with bank inefficiency. This paper will attempt to improve on these observed weaknesses. Thus, the IMF's conclusion that the S.C.P hypothesis holds for the banking sector in SSA is only valid to the extent that there is inefficiency in the banking system. This finding may not be surprising given other findings which argue that the banking systems in SSA including Zambia are rather inefficient.

The other influential paper is that by S. Corvoisier and R. Gropp (2002) which found a weakly positive effect of concentration on interest rate margins in the Euro-zone area using a sample period from 1993 – 1999. At the 15% level of significance, increasing concentration increased banks' margins by 100–200 basis points, which is in support of the S.C.P hypothesis. Most other variables were insignificant, except for the stock market capitalization and the total assets of the banking system, both of which proxy for the substitutability of bank loans with arms-length finance. For loans and demand deposits, increasing concentration may have resulted in less competitive pricing by banks, whereas for savings and time deposits, the model was rejected, suggesting increases in contestability and/or efficiency in these markets. The HHI was used as a dummy variable and was the central variable of interest.

While adding significantly to the body of knowledge on interest rates and interest rate margins, the study unfortunately suffered from data challenges and utilized country level concentration measures and countrywide data on contractual interest margins instead of the more appropriate bank level data on interest rates and regional measures of concentration. Further, the time period was limited to seven (7) years from 1993 – 1999. The study also overlooked important variables such as liquidity risk, credit risk, inflation and government yield rates. This may have negatively affected the robustness of the results even though the methodology was panel data estimation. Similar to the IMF study cited above, the weaknesses of using panel data estimations in terms of making overarching instead of market specific conclusions also apply here.

Studying the effect of market structure on bank spreads in Europe and the United States of America from 1988 - 1995, A. Saunders and L. Schumacher found that the effect appeared to vary across countries.[19] The more segmented or restricted the banking system, in terms of geographic restrictions on branching and universality of banking services, the larger appeared to be the monopoly power of existing banks and the higher their spreads. In addition, the regulatory components in the form of interest-rate restrictions on deposits, reserve requirements and capital-to-asset ratios were found to have a significant impact on banks' NIMs. Further, macro interest-rate volatility was found to have a significant impact on bank NIMs. They used a two-stage time series regression of pure spreads on market structure and intermediation risk (interest-rate volatility) changes over time. As under the IMF study above, the conclusions of this study are overarching across nations and not within national boundaries.

[18] Supra, Note 2.
[19] A. Saunders, L. Schumacher; The determinants of bank interest rate margins: an international study, Journal of International Money and Finance No. 19 (2000) P. 813–832.

Similar to the studies cited above, Ash Demirgiic, Kunt and Harry Huizinga concluded that higher concentration resulted in higher interest rate margins in their study covering the period 1988 to 1995.[20] Banks in countries with more competitive banking sectors were found to have smaller margins and were less profitable. The bank concentration ratio positively affected bank profitability, and larger banks tended to have higher margins. On the other hand, a larger stock market capitalization to GDP ratio was negatively related to margins, suggesting that relatively well-developed stock markets can substitute for bank finance. Other variables were Taxes, Loan loss provisions, Net profits (all as a percentage of net interest income). The concentration variable was defined as the S3 Ratio. Economic and Institutional Indicators such as GDP per capita, inflation, tax rate, reserves/deposits, deposit insurance, number of banks, bank assets to GDP ratio and law and order were also included in the model. While the study exhaustively analyzed almost all the candidate explanatory variables, the time period covered was rather short. Further, the conclusions were based on international comparisons and national market dynamics were overshadowed.

In another study, J. Maudos, J. Fernandez de Guevara (2003) shows that the "pure" interest margin in the European Union depended on the competitive conditions of the market, the interest rate risk, the credit risk, the average operating expenses and the risk aversion of banking firms, as well as on other variables not explicitly introduced into the model (for example opportunity cost of reserves, payment of implicit interest and quality of management).[21] The study covered the period 1993 – 2000 and concludes that the increase in the degree of concentration of European banks as a consequence of the wave of mergers that took place in the 1990s may have caused a reduction in the pressure of competition, and therefore, an increase in the market power of banking firms, which in turn caused upward pressure on interest rate margins. Nevertheless, the adverse consequences of diminishing competitive rivalry had been counteracted by the effect of the fall in operating costs and credit risk. One of the most significant variables in the explanation of the interest rate margin was the level of average production costs.

Market power was proxied by the HHI and the Lerner index, Average operating costs was proxied by the quotient between operating expenses and total assets, Degree of risk aversion by equity to total assets ratio, Volatility of market interest rates by the annual standard deviation of daily interest rates, Credit risk by the loans to total assets ratio, opportunity costs of bank reserves by the ratio of liquid reserves to total assets and the quality of management by cost to income ratio. In comparison to other studies, this paper had the strength of using a direct measure of market power and also the risk of misspecification was mitigated by including several of the candidate explanatory variables. Nevertheless, as with other panel studies reviewed thus far, national market dynamics with regard to market structure were not fully captured.

Contrary to the findings of the other studies reviewed so far, Federico S. Mandelman found that changes in the market structure do not affect the lending interest rate markups.[22] Instead, the markups change because the threat of entry forces incumbents to set rates that deter entry. He found that bank spreads were thus more countercyclical in concentrated markets. Concentration (measured by the S3 ratio) was significant and again entered with a negative sign supporting the E-S hypothesis which predicts operational efficiency gains from banking consolidation.

However, including the entry of foreign banks variables exerted a significant negative effect on the margins, but also broke down the independent impact of the "Growth" variable by turning it small and insignificant indicating that foreign competition is also considered in strategic decisions. In summary, the pro-competitive effect of entry in the local banking system was found to be short-lived and vanished after one year. Finally, the study concluded that monopolistic power in the banking system reduced welfare of the household through two different channels. Firstly, the financial markup generated a permanent disintermediation between borrowers and entrepreneurs that resulted in lower steady-state levels of capital accumulation, output, and consumption. Secondly, the countercyclical pattern of such markups increased the volatility of real variables and thus reduced welfare. This study like other panel studies reviewed has a weakness of not assessing the effect of internal competition dynamics.

The Bank of Zambia (BoZ) conducted a semi-qualitative survey in 2010 in which the central bank analyzed how Commercial Banks determined lending interest rates.[23] The findings revealed that almost all the banks did not consider the interbank rate (a key monetary policy instrument at the time) in their determination of lending interest rates. Rather, qualitative or "judgmental" factors contributed

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[20] Supra, Note 4.
[21] Supra, Note 3.
[22] Supra, Note 6.
[23] Supra, Note 8.

significantly in the determination of commercial banks' base lending rates. It was found that there was only a weak correlation between the Weighted Lending Base Rate (WLBR) and the interbank rate (0.50) while there was a stronger correlation between the WLBR rate and the Open Market Operation (OMO) rates (0.72). While it was understood that the interbank rate represented the cost of short-term liquidity, it was evident that all banks, with the exception of one bank, did not take the interbank rate into account while only four banks indicated that they considered the BoZ overnight facility rate in their determination of the base lending rate. It was therefore concluded that the policy rate that was linked to the interbank rate or overnight rate could not have the desired effects on interest rates in the economy, as it would have no bearing on the banks' cost of funds.

Further, it was discovered in the same BoZ study that the ranking of factors depended primarily on the bank's profit motive. For example, the Treasury bill yield rates were considered by all banks, and by implication one was inclined to give them a relatively larger weighting in the lending interest rate calculation method. As such, a fall in the yield rates should commensurately have resulted in a fall in the WLBR. However, this was hardly the case as base lending rates seemed to be sticky downwards in response to declining Treasury bill yield rates. In addition, only half of the banks considered economic conditions. For instance, inflation declined from 16% in 2008 to 9.9% in 2009, but the WLBR rose from 20.8% to 22.6%. It was further noted that although inflation and yield rates tended to be relatively unstable, the banks' base lending rates tended to remain stable for long periods of time, suggesting that there could be other factors that dominated the banks' determination of base lending rates.

The findings further revealed that the margins charged on loans and advances were, in some cases, excessively high while operational costs which were higher than efficiency levels were explicitly included in the calculation of the base lending rate. While efficiency ratios of 60% and below were considered favorable, some banks' operational efficiency ratios were well in excess of 100%. This was coupled with consistently high returns on equity and the highest lending rates as compared to the sub-region.

While the study was semi-qualitative in nature and hence no causal relationships could be inferred, it highlighted what could potentially constitute an underlying structural concern in the Zambian financial system. This study was an eye opener and should motivate analysts and policy makers to look elsewhere for the determinants of lending interest rates in Zambia rather than the traditional "economic fundamentals". Could these findings where economic fundamentals have little or no impact on the lending interest rate be indicative of an underlying structural concern? Could competition dynamics explain this phenomenon?

6   Methods

This paper utilizes simple time series regression analysis in order to measure the impact of competition and other identified variables on the lending interest rate margins in Zambia. Specifically, the Error Correction Model (ECM) was used to measure the marginal effects of the identified variables on lending interest rate margins.

6.1   Hypothesis

It is expected that insufficient competition or higher concentration will lead to higher interest rate margins. This is in support of the S-C-P hypothesis which has been found to hold empirically in other jurisdictions especially in the developing world. The main thesis for this is that higher concentration lowers the cost of both tacit and non-tacit collusion and also promotes monopolistic conduct as competitive pressure is diminished. With regards to the other variables, it is expected that:

- Higher inflation will raise interest rate margins as commercial banks try to protect their real gains by adjusting nominal interest rates.
- Higher Treasury yield rates is expected to raise interest rate margins through the crowding out effect.
- Higher credit risk (NPL) is expected to lead to higher interest rate margins as banks try to protect their funds by adding a credit risk premium.

[24] Ho, T., Saunders, A., 1981. The determinants of bank interest margins: theory and empirical evidence. Journal of Financial and Quantitative Analyses 16, 581–600.
[25] Samuelson P., 1945. The effects of interest rate increases on the banking system. American Economic Review, March
[26] For the derivation of the optimal fees, see Ho and Saunders (1981).

6.2   Theoretical/Conceptual Framework

Because of its simplicity and applicability, this paper uses the model abstracted from Ho and Saunders (Ho, T., Saunders, A., 1981). It should however be noted that the importance of the relationship between interest-rate volatility and bank margins was recognized as early as 1945 by Samuelson (1945). This basic model assumes that the representative bank is a risk-averse agent that acts as a dealer in a market for the immediate provision of deposits and loans. In view of the liquidity preference theory, savers should be compensated for parting away with some liquidity. Thus, the major portfolio risk facing the bank emanates from interest-rate fluctuations or volatility. In other words, the model focuses on the banks' risk exposure as providers of immediacy to the rest of the economy.

The planning horizon is a single period during which bank rates, which are posted prior to observing the demand for immediacy, are held constant and a single transaction in loans or deposits occurs. Risk-averse banks facing asymmetric arrival time for the demand for loans and the supply of deposits select optimal loan and deposit rates which minimize the risk of excessive demand for loans or insufficient supply of deposits. The rates are:

$R_L = (r+b)$ and $R_D = (r-a)$, where:

R_L is the rate set on loans, and
R_D is the rate set on deposits
r is the expected risk-free interest rate
a and b are fees charged by the bank in order to provide immediacy and to bear interest rate risk.

The logic behind this model can be demonstrated as follows: Suppose a deposit arrives at a different instant in time from a new loan demand, the bank will have to temporarily invest the funds in the money market at the short-term risk-free rate. In so doing, the bank faces reinvestment risk at the end of the decision period should the short-term rate r fall. Similarly, if the demand for a new loan is met by the bank without a contemporaneous inflow of deposits, the bank would have to resort to short-term borrowing in the money market at rate r to fund the loan, thereby facing refinancing risk if the short-term interest rate goes up. As a consequence, the fees a and b have to compensate the bank for bearing this interest-rate risk. The optimal fees a and b, and thus the spread (s), are:

$s = (a+b)$

$RL - RD = [(r+b) - (r-a)] = (a+b) = s$

$s = (a+b) = \frac{a}{b} + \frac{1}{2} R s_i^2 Q$, where:

The first term $\#/_b$, measures the bank's risk neutral spread and is the ratio of the intercept a and the slope b of the symmetric deposit and loan arrival functions of the bank. A large a and a small b will result in a large $\#/_b$ ratio and, hence, large spread (s). That is, if a bank faces relatively inelastic demand and supply functions in the markets in which it operates, it may be able to exercise monopoly power (and earn a producer's rent) by demanding a greater spread than it could get if banking markets were competitive (low $^a/_{bi}$ ratio). Consequently, the ratio $^a/_{bi}$ provides some measure of the producer's surplus or monopoly rent element in bank spreads or margins.

The second term is a first-order risk-adjustment term and depends on three factors:

R, the bank management's coefficient of absolute risk aversion;
Q, the size of bank transactions; and
s_i^2, the instantaneous variance of the interest rate on deposits and loans.

It should be noted that the second term implies that, ceteris paribus, the greater the degree of risk aversion, the larger the size of transactions and the greater the variance of interest rates, the larger bank margins are. This spread equation has an important implication for the micro foundations of financial intermediation since it implies that, even if banking markets are highly competitive, as long as a bank's management is risk-averse and faces transaction uncertainty, positive bank margins will exist as the price of providing deposit–loan immediacy.

The empirical/model specification will allow us to identify the sensitivity of bank margins to bank market structure$^a/_b$ after controlling for bank specific, market and macroeconomic factors. A number of factors are controlled for in order to focus on the behavior of the "pure" interest-rate spread or margin. The first is the Consumer Price Index (CPI), Non-Performing Loans (NPL) and Government Borrowing.

The other factor likely to impact bank margins is the bank's opportunity cost of holding reserves at the central bank. The existence of non-interest-bearing reserve requirements increases the economic cost of funds over and above the published interest expense. This additional cost factor will depend on the size of reserve requirements as well as on the opportunity cost of holding reserves. Others include bank capital that banks hold to insulate themselves against both expected and unexpected credit risk. Specifically, while regulatory imposed bank capital requirements are minimum, banks often endogenously choose to hold more capital because of additional (perceived) credit-risk exposures. However, holding equity capital is relatively costly when compared to debt (because of tax and dilution of control reasons). Thus, banks that have relatively high capital ratios (high K/A) for regulatory or credit reasons can be expected to seek to cover some of this cost by imposing an extra spread (premium) in the banks' NIM over the pure spread for interest-rate risk. However, these factors have not been explicitly modeled in our framework.

In sum, at any moment in time, it is hypothesized that the actual bank margins(NIMs) will comprise a pure spread reflecting bank market structure and interest-rate risk plus markups or adjustments for implicit interest expense, the opportunity cost of required reserves, capital requirements for credit-risk exposure (K/A) and other bank specific, market and macroeconomic factors.

In compact form:

$$NIM = f\{s(^a/_b, R, Q, s), bank specific, market specicfic \ \& \ macroeconomic factors, U\}$$

From the above equation, as long as banks share similar attitudes to risk (R) and size of transactions (Q) as well as face the same market structure ($^a/_b$), interest-rate volatility (s_I^2) and the same bank specific, market and macroeconomic factors, their pure spread (s) will be the same. However, over time, as market structure and volatility change, so will the optimum pure spread (s).

6.3   Model Specification

To investigate the role of market structure (after controlling for bank-specific and macroeconomic factors) in determining interest rate margins, this paper adopts a simple model by Calixte Ahokpossi (2013). The model takes the form of a simple regression model:

$$NIM_t = a + b_0 NIM_{t-i} + b_1 HHI_t + b_2 91TB_t + b_3 CPI_t + b_4 NPL_t + e_t$$

Where NIM_t represents bank interest margins at time t; NIM_{t-i}, HHI_t, $91TB_t$, CPI and NPL_t are respectively NIM lagged by i periods, Herfindahl-Hirschman Index (proxy for market structure), 91-day Treasury bill rate (proxy for opportunity cost), Consumer price index (proxy for macroeconomic stability) and non-performing loans (proxy for credit risk), all at time t. e_t represents the residuals, also at time t.

This model has been preferred for its simple and concise way it presents the interaction of the main variables of interest. However, it is worth noting that several models have been developed depending on the relevant methodology. For instance, authors such as S. Corvoisier, R. Gropp (2002) have used a log-linearized form of Cournot model of loan pricing (Jappelli 1993) in building their econometric panel models. On the other hand, A. Saunders and L. Schumacher (2000) empirically specified their model in 2 steps: Step 1 involved estimating the pure spreads component of the NIM for all banks, i.e. the proportion of NIM not attributable to other independent variables such as implicit interest expense, the opportunity cost of required reserves and capital requirements for credit-risk exposure. The second-step regressed pure spreads obtained in step 1 on dummy variables reflecting differential market structure effects on the pure spread across countries and intermediation risk. Further, Ash Demirgiic, Kunt and Harry Huizinga (1997) used a panel regression of the linear form where NIM was regressed on a vector of individual bank characteristics, country specific characteristics and time and country dummy variables.

6.4 Measurement of Variables and Expected Signs

The variables in the model will be measured as follows:

- NIM: Lending interest rate minus deposit rate. This will be the explained variable. NIM will be used instead of just the lending rate because we want to net out the possible effect of higher deposit rates on lending interest rates.

- HHI: Market structure which is the main variable of interest is proxied by the HH Index. The HHI is computed as the summation of the squares of individual bank shares in the industry. That is:

$$HHI = \sum s_i^2, \text{ where } s_i^2, \text{ is the squared share of bank } i.$$

The HHI can be computed using assets, deposits or loans. This paper nonetheless utilized bank loans. According to the United Nations, an HHI indicator of less than 1,000 signifies a competitive market; an HHI of between 1,000 and 1,800 signifies a moderately concentrated market while an HHI of greater than 1,800 signifies a highly concentrated market.[27] Thus the higher the HHI, the higher the concentration and market power. It is therefore plausible to associate higher HHI levels to higher bank margins within the realms of the S-C-P model. Accordingly, the traditional Structure Conduct Performance (SCP) Hypothesis postulates that higher concentration is positively associated with higher bank margins. On the other hand, even if the market is highly concentrated, firms with large market share may have lower margins as a result of their aggressive business tactics aimed at beating-off the competition and gaining an even bigger market share. Thus, besides the E-S hypothesis which predicts otherwise, the relationship between the HHI and net interest margins can still be negative depending on how strong the incumbents perceive potential competition to be. This relationship however is predicated on the strength the barriers to entry whether natural, regulatory or otherwise. Further, other variables can make the relationship between the HHI and net interest margins to be negative. For instance, it is generally accepted that foreign-owned banks affect interest margins in developing countries.[28]

- NPL: Credit risk here is measured by provision for non-performing loans. The higher the provision for non-performing loans, the higher the banks' risk assessment, and banks would resort to higher margins to cover this risk.

- Inflation: Inflation constitutes a macroeconomic risk. Inflation can affect bank margins if lending and deposit rates adjust to monetary shocks at different speeds or to different extents. It will be measured by the CPI.

- Government Borrowing: Yield rates on treasury bills and government bonds constitute a risk free return on investments by the commercial banks. If yield rates are high, commercial banks will reduce lending to the private sector in favor of the government (crowding out effect). This will increase the cost of borrowing for the private sector and hence the expected sign on yield rates is positive.

7 The Data

The researcher utilized secondary data from the Bank of Zambia. It was compiled on a monthly basis from January 2005 to June 2015. However, due to challenges with model robustness, it was converted to quarterly data in a bid to smoothen the short term volatilities which impacted negatively on the model. The data source is highly reliable and credible. However, contrary to what was initially expected by the researcher, the time period was rather limited.

8 Results

In obtaining the estimation results of the Error Correction Model (ECM), the standard pre-estimation tests were performed on the data. After obtaining the descriptive statistics, the data was tested for stationarity using the Augmented Dickey-Fuller (ADF) Test. All the data was stationary at first difference (see table A1 and A2 in annexure 1). The variables were then tested for cointegration using the 2-step Engel Granger test for cointegration. The ECM was then run to obtain the results.
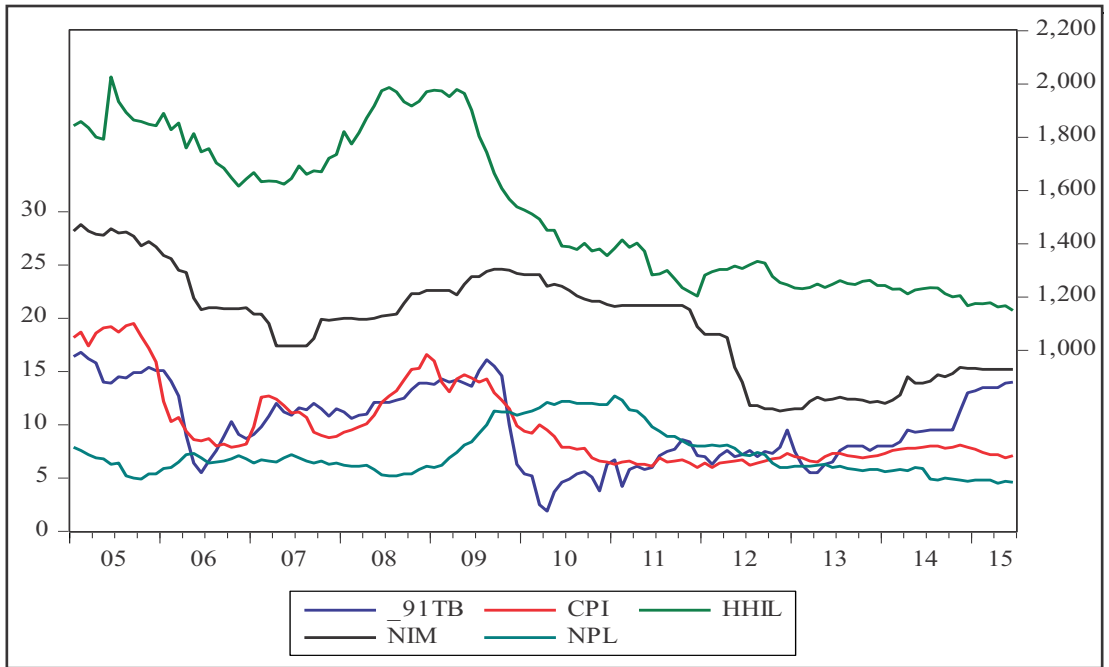
8.1 Descriptive Statistics

Graphical analysis of the variables of interest show that they generally trended downwards over the relevant time period. Chart 5 and table 3 below illustrate this.

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[27] UNITED NATIONS (New York and Geneva, 2008), United Nations Conference On Trade And Development, The effects of anti-competitive business practices on developing countries and their development prospects, HASSAN QAQAYA and GEORGE LIPIMILE (Editors).
[28] Calixte Ahokpossi, IMF, 2013

Chart 5: Trend in the Variables over Time

Source: Bank of Zambia; Authors' calculations

Table 3: Descriptive Statistics of the Variables

	NIM	_91TB	CPI	HHIL	NPL
Mean	19.54171	9.856753	104.3604	1531.159	719060.8
Median	20.56092	9.445842	106.6967	1470.706	935355.8
Maximum	28.39600	16.47447	150.5800	1967.540	1238688.
Minimum	11.40027	3.398788	62.09667	1159.603	128314.3
Std. Dev.	4.893255	3.478908	26.58323	279.0781	383299.3
Skewness	-0.122207	0.133775	0.015342	0.214504	-0.359151
Kurtosis	2.087379	1.903149	1.786976	1.475704	1.402879
Jarque-Bera	1.562077	2.230664	2.576644	4.388169	5.366821
Probability	0.457930	0.327806	0.275733	0.111461	0.068330
Sum	820.7518	413.9836	4383.137	64308.68	30200554
Sum Sq. Dev.	981.7018	496.2149	28973.39	3193268.	6.02E+12
Observations	42	42	42	42	42

Source: Authors' calculations

8.2 Cointegration Tests

Economic theory suggests that certain pairs of economic variables should be linked by a long-run economic relationship. It is possible for two or more variables to be integrated of order one I(1), and yet a certain linear combination of those variables to be integrated of order zero I(0). If that is the case, the I(1) variables are said to be cointegrated. If two or more I(1) variables are cointegrated, they must obey an equilibrium relationship in the long-run, although they may diverge substantially from that equilibrium in the short run.

The Error Correction Model (ECM) used in this paper utilizes this principle to link the long-run equilibrium relationship between variables with the short-run dynamic adjustment mechanism that describes how the series react when they move out of long-run equilibrium. The ECM measures the speed of adjustment of the dependent variable to the long-run equilibrium.

Using the Engle Granger causality methodology, testing for stationarity is firstly required before any cointegration test is conducted. The Augmented Dickey Fuller test was used in this regard. The ADF results on the variables showed that all of them were non-stationary at level but I(1). The model was then estimated using variables at level and ADF test conducted on the residuals to establish any cointegrating relationship if any among the relevant variables of interest. The results of the cointegration test indicated that the residuals were stationary. At 0.06%, the p-value was highly significant thereby rejecting the null hypothesis that there is a unit root in the residuals. This implies that there is a cointegrating relationship among the variables in question since the residuals are stationary. Table 4 below shows the results of the cointegration test.

Table 4: ADF Test Results

Unit-root tests							
The dataset is: E:\Chokwedata.xls							
The sample is: 2006(2) - 2015(2)							
residualsn: ADF tests (T=37; 5%=-1.95 1%=-2.63)							
D-lag	t-adf	beta Y_1	sigma	t-DY_lag	t-prob	AIC	F-prob
1	-2.927**	0.76556	1.272	3.792	0.0006	0.5345	0.3569
---- PcGive 13.0 session started at 20:02:22 on 18-11-2015 ----							

Source: PC Give output

8.3 Error Correction Model (ECM) Results

Having established the existence of a cointegrating relationship among the variables of interest, we then proceed to estimate the Error Correction Model (ECM). The ECM enabled us to ascertain how the Net Interest Margin adjusts to short-run dynamics in the variables of interest in order to re-establish the long-run equilibrium. Table 5 below shows the results of the OLS estimation of the ECM using the Engle Granger Causality methodology.

Table 5: OLS Results of an ECM Estimation

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
EQ(3) Modelling DNIM by OLS					
The estimation sample is: 2005(4) - 2015(2)					
DNIM_1	0.593873	0.1159	5.12	0.0000	0.4431
DLHHIL	-9.75767	4.098	-2.38	0.0232	0.1466
DLCPI_1	-21.0619	14.67	-1.44	0.1604	0.0588
D91TB	0.196237	0.07455	2.63	0.0128	0.1735
ECM_1	-0.208503	0.05333	-3.91	0.0004	0.3166
Constant	0.172890	0.3636	0.475	0.6376	0.0068

sigma	0.888024	RSS	26.0233804	
R^2	0.591432	F(5,33) =	9.554 [0.000]**	
Adj.R^2	0.529528	log-likelihood	-47.4496	
no. of observations	39	no. of parameters	6	
mean(DNIM)	-0.325847	se(DNIM)	1.29467	

AR 1-3 test: F(3,30) = 0.16657 [0.9181]

ARCH 1-3 test: F(3,33) = 0.053988 [0.9832]

Normality test: Chi^2(2) = 3.9780 [0.1368]

Hetero test: F(10,28) = 1.2599 [0.2989]

RESET23 test: F(2,31) = 0.73941 [0.4856]

Source: PC Give output

9   Analysis and discussion of results

Firstly, the model as a whole is highly significant as can be observed from the p-value of the F-statistic. In addition, an adjusted goodness of fit of 53% is a relatively good fit for studies of this nature. Further, the model has passed all the diagnostic tests, hence the coefficients can be taken as unbiased, consistent and efficient estimators of the true parameters.

9.1   Treasury Yield Rates

Consistent with orthodox economic theory, the model predicts that a rise in the treasury bill yield rates will lead to an increase in the Net Interest Margins (NIM) contemporaneously. Specifically, the model predicts that in the short run, a one percent change in the treasury bill yield rates will lead to about 20 basis points change in the NIM. This is because a rise in the treasury bill yield rates effectively represent an increase in the opportunity cost to private sector lending for the commercial banks in comparison to the return on the risk free investment. This tends to crowd out the private sector in favor of the government sector as the banking system demands a relatively higher compensation for the relatively higher inherent risk of lending to the private sector. As such, the relatively riskier private sector will face higher borrowing costs from the banking system which will give rise to a higher NIM (ceteris paribus) as predicted by the model.

In the long run however, about 20.9% of the contemporaneous effect of the change in the treasury bill yield rates on the NIM will be offset as the banking system return to its long run trend, or more appropriately the long run equilibrium level in the NIM. Thus, the model predicts that the contemporaneous effect of the change in the treasury bill yield rates will be completely offset in a year or so as the NIM returns to its long run equilibrium average.

The above observation has important implications for the fiscal authorities if they seek to expand private sector credit. This is important in developing countries and particularly Zambia where the government is actively seeking to improve both financial inclusion and accessibility to formal financial services and affordability or the cost of credit to the private sector through programmes such as the Financial Sector Development Plan (FSDP). This finding implies that policies aimed at making private sector credit affordable and enhancing financial inclusion should be consistent with prudent fiscal performance. That is, prudent fiscal management should always complement other policy measures aimed at increasing accessibility and affordability of financial services. Otherwise, good policies aimed at attaining financial inclusion may be negated by a poor fiscal position of the government sector. This is because an adverse fiscal position financed through domestic borrowing will lead to the crowding-out effect and increase the cost of borrowing which will impact negatively on both cost and accessibility as argued above. Thus, the main policy implication of this observation is that both monetary and fiscal authorities need to coordinate their policy actions if meaningful progress is to be made in deepening the financial system through innovative programmes such as the FSDP.

9.2   Effect of Lagged CPI

The Consumer Price Index (CPI) is broadly expected to have a positive effect on the nominal net interest margin as Commercial Banks try to protect their real returns by increasing nominal lending interest rates. In this particular model however, the results go against this economic intuition by suggesting that there is a negative relationship between these two variables in the short run. The possible explanation for this could be price inertia of the banking industry as costs adjust due to an inflation induced general rise in the cost of operations. Hence, as costs rise against constant lending rates, the NIM will tend to shrink in the short run.

It is however worth noting that the coefficient on CPI is not only wrongly signed but also insignificant. That is to say the CPI has no significant effect on the NIM of the banking industry in Zambia. This may not come as a surprise in the Zambian banking industry as other studies have reported that commercial Banks in Zambia infrequently take into account economic fundamentals in their determination of lending interest rates. Instead, most Commercial Banks reported considering qualitative factors as more essential than fundamentals such as the rate of inflation. This may also explain why provision for non-performing loans was rejected by the model as a determinant of NIM and fell out. This renders credence to this observation and also to the importance of competition as propounded above.

This notwithstanding, even though the contemporaneous effect of CPI on the NIM is insignificant in this model, it is broadly expected that macroeconomic instability specifically high levels of inflation has a negative effect on economic activity including in the banking industry. That is, the long run implications of macroeconomic instability is bearish or subdued economic activity which can in turn raise the risk profile of economic actors, both public and private thereby raising the NIM in nominal terms. As has been noted above, other studies have found macroeconomic instability including interest rate volatility to have a significant effect on bank NIMs. The monetary and other relevant authorities should therefore put a premium on long term macroeconomic stability.

9.3   Provision for Non-Performing Loans

As has been alluded to in 9.2 above, provision for Non-Performing Loans (NPL) was highly insignificant and hence we dropped it from the model. While this was unexpected from the perspective of conventional economic thought, it may not come as a surprise in the Zambian context in view of the findings of the Bank of Zambia survey in 2010 which revealed that NPL was not among the factors that banks considered in their determination of lending interest rates as explained above. Given that Banks may not be factoring in NPL in their interest rate setting mechanism, its effect on NIM as revealed by our model is not surprising. In-fact, it re-enforces the findings of the Bank of Zambia study in 2010.

This short run analysis may on the other hand be erroneous in the long run. As observed above, a high NPL is symptomatic of an unfavorable economic situation in just the same way as CPI is reminiscent of macroeconomic instability. In this case, it should be expected that in the long run, a high NPL will weigh down on the banking system's profitability and generally expected to cause a rise in the lending rates and consequently the NIM.

9.4   Lagged Net Interest Margin (NIM)

According to the model, the change in NIM in the previous period (last quarter) affects the change in the current NIM in the short run. In other words, past trends in net interest rate margins tend to perpetuate themselves in the current period in the short run. That is, if past periods have been characterized by high net interest rate margins, even the current net interest rate margins will tend to be high, and vice versa. In more specific terms, a one unit change in last quarter's net interest rate margin will result in about 0.6 unit change in the current period's net interest margin. That is to say that almost 60% of the previous period's change in NIM will perpetuate itself into the current period. Similarly, low net interest rate margins in the past will tend to produce low net interest rate margins in the current period.

The long run on the other hand will correct this short run imbalance caused by the previous period's level of net interest rate margin as shown by the error correction term. In this regard, about 20.9% of the short run imbalance caused by the effect of the past level of NIM will be corrected in about a quarter. This implies that by the end of one year, all the short run imbalance perpetuated by past changes in NIM will have been eliminated.

This behavior of interest rate margins to perpetuate past trends into the current period can have implications on monetary and other policies aimed at reducing lending interest rates. If the level of interest rate margins in the economy are above the levels justified by economic fundamentals, conventional policy tools may not bring the margins to the level desired by the authorities. This is because the higher than expected levels of NIM in the past period will weigh down the contemporaneous effect of policy measures aimed at reducing current net interest rate margins. The same effect can be expected for policy measures aimed at increasing current net interest rate margins in the case where past levels were below equilibrium levels. The implications of this observation is that other regulatory actions should accompany the more conventional monetary policies in influencing the course of interest rate margins in the Zambian banking sector. Such policy alternatives may include moral suasion and prudential regulation.

9.5   The Effect of Competition

The level of competition in the banking industry is an important factor that can determine the conduct of market participants. Like in other sectors of the economy, there is no consensus on the effect of competition in the banking industry. Both theoretical and empirical works have predicted different outcomes with significant cross-country and even regional differences.

The evidence in our model suggests that there is a negative relationship between competition and net interest rate margins. The model indicates that a one percent decrease in the HH Index results in a 9.76% increase in the net interest margin and vice versa. This is counter to the propositions of the traditional S-C-P hypothesis. This observation is also consistent with findings from other jurisdictions including Europe. Federico S. Mandelman for instance did not find any evidence of the S-C-P propositions in many countries. Similarly, S. Corvoisier and R. Gropp found conflicting results based on the type of banking product. Some banking products registered a marginally statistically significant support for the S-C-P model while other banking products showed results which supported the E-S model. For instance,

comparing Belgium and the Netherlands with moderately and highly concentrated baking markets respectively, it was found that for loans and demand deposits, increasing concentration had increased banks' margins by 100–200 basis points whereas for savings and time deposits, it was found that higher concentration resulted in margins which are 100–200 basis points lower in more concentrated markets. Contrary to the S-C-P hypothesis, the evidence in the model tends to support the E-S model which suggests that efficiencies from economies of scale as a result of market consolidation can lead to lower interest rate margins as commercial banks pass on the efficiency gains to the final consumers, the borrowers.

Theoretically, there are two plausible explanations for this observation. One is the efficiency argument as suggested by the E-S model and as explained above. The alternative view is the argument of contestability of markets as proposed by Federico S. Mandelman. This argument suggests that contestable markets (free entry and exit) leads to threat of potential competition which leads to entry-deterring pricing by incumbent firms. Thus, the relationship between the HHI and net interest margins can still be negative depending on how strong the incumbents perceive potential competition to be. He also asserted that including the entry of foreign banks variables exerted a significant negative effect on the margins as foreign competition is also considered in strategic decisions.

In the Zambian situation, the most plausible argument is the contestability proposition. This is because corroborative evidence from other studies has suggested that the Zambian banking industry is relatively inefficient thereby ruling out the E-S argument. Thus, for the Zambian market, the contestability argument is the most reasonable explanation for the observed relationship between competition and net interest margins. Entry or threat of entry induces incumbent banks to charge entry deterring interest rates in order to safeguard or even grow their market shares.

The recent entry of several commercial banks in the Zambian market has entrenched the perception by commercial banks of monetary authorities as pro-competition. As such, even if the entrants have not been significant or vigorous enough to compete away some market shares from the incumbents, overall lending interest rates have generally tended to decline which reduced the NIM especially around the time of heightened entry between 2006 and 2012 when 6 new commercial banks entered the market. The other point to note is that foreign competition also matters as it is also considered in strategic decisions. This is evidently relevant in the Zambian situation since all the six entrants between 2006 and 2012 were subsidiaries of foreign banks. In this regard, it is not only the perception of market contestability that matters but also the perception of foreign competition or foreign interest in the local banking sector. This argument holds whether entry actually materializes or not since what matters is simply the market participants' perception of the monetary authorities' stance on market entry.

Despite this rather rapid entry of new market participants between 2006 and 2012, the effect on the market shares was not significant especially for the largest four banks as was shown under chapter 2. Despite the market shares remaining more or less unaltered, the lending interest rates and more importantly the NIM narrowed down to reflect more competitive pricing by the banking industry as a whole. Accordingly, it is clearly evident that the net interest margin reduced on account of actual and perceived contestability of the local market as perceived by incumbent banks despite insignificant changes in the market structure. In this regard, market contestability can exert competitive pressure on market participants despite an uncompetitive market environment. Since actual and potential contestability has not been separately accounted for in the model, it is collectively shown as a negative relationship between the HH index and NIM.

This result is important in the short run as incumbents try to protect their market shares by trying to price out potential competition out of the market. In the long run however, a concentrated banking industry is generally expected to impact positively on the NIM in support of the SCP hypothesis. This is partly explained by the error correction term in our model which predicts that about 21% of the short run deviations from the long run equilibrium relationship is corrected in a quarter. This implies that within a year, all the short run gains from the transient threats of competitive rivalry will have been eliminated. Coincidentally, this finding is consistent with the findings of Federico S. Mandelman who postulated that the pro-competitive effect of entry in the local banking system in the United States was found to be short-lived and vanished after one year.[29] This is evident in the Zambian case where the NIM started registering a

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[29] Supra note 7

gradual rise starting from 2012. In other words, once the incumbents are sufficiently comfortable with the new competition on the market, the NIM is expected to return to its long term equilibrium consistent with oligopolistic pricing and high NIMSs as predicted by the SCP hypothesis.

In view of the above, under concentrated market conditions, competitive NIMs can only be sustained if incumbents consistently perceive the market to be highly contestable. In this regard, how the market participants perceive to be the regulators' long term policy stance on market contestability becomes hugely significant. Sustaining this perception may require periodic actual entry into the market.

This finding has huge implications for policy makers in the banking industry. Firstly, it shows that monetary authorities should be concerned with contestability of the banking industry in just the same manner as they should be concerned with actual competition. Once market participants believe and expect regulators to maintain a liberal attitude with regard to market contestability, it will anchor their expectations of market contestability in the long run thereby imposing a competitive restraint in the midst of high market shares. Since contestability of markets has implications on bank NIMs, monetary authorities may find it important to actively pursue this policy stance if they are interested in aligning bank NIMs to market fundamentals. This may require explicit statements by monetary authorities in support of market contestability.

This policy stance has been ably elucidated in Federico Mandelman of the federal reserve of Atlanta who argued that contestable markets force incumbents to charge markups well below short-run profit maximizing levels to avoid entry. Further, Bain (1956), argues that pricing decisions strongly influence firms contemplating entry and justify limit-pricing strategies which counter short run profit maximization. Consequently, in as much as the competitive pressure of entry is short-lived and only affects markups by triggering limit pricing strategies among incumbents rather than by transforming an existent monopolistic market structure, they can be the only alternative to ensuring competitive pricing and consequently market efficiency in a monopolistic market structure.

In addition, the conduct of limit pricing by incumbents can also explain the observed cyclicality of the markups in the business cycle; i.e. credit is more expensive during recessions when very few firms are expected to enter the market due to the challenging macro-economic situation as firms and households postpone investment and work decisions as compared to boom periods when economic agents are expected to enter the market. This behavior makes the recessions deeper and booms to overshoot long term equilibrium levels. During recessions, the incumbents have no threat of entry and therefore can increase NIMs since firms and households postpone investment decisions. This cyclicality can be dampened if incumbents perceive the monetary authorities' policy stance to be that of market contestability in the long term. This is possible since their sense of security in the market during periods of economic downturn will be dampened by the authorities' liberal stance. This will serve as a check on their pricing conduct.

Finally, it should be noted that this analysis complements rather than substitutes the standard version of the credit channel theory that relies on an external finance problem that induces banks to charge a premium to cover the increasing expected default and bankruptcy costs during recessions. While the standard credit channel theory is driven by fundamentals, the market contestability theory is solely the result of imperfect competition in the banking system. This is why it is particularly relevant in developing countries like Zambia where banking industries are relatively more concentrated and bank credit remains the primary source of funds for entrepreneurs.

10   Conclusion and policy recommendations

10.1   Summary of Main Findings

In summary, the model shows that net interest margins depend on the net interest margins in the previous period (past quarter), government securities yield rates and contestability conditions of the market. Since the explanatory power of the model is limited to about 53%, it is reasonable to conclude that other variables not explicitly introduced into the model (such as operational efficiency, liquidity risk, opportunity cost of reserves, payment of implicit interest and quality of management, etc) also affect NIMs.

This notwithstanding, the study contributes to the existing literature in various directions. Firstly, it introduces into the modelling of net interest margins the direct measures of market power; secondly, the paper introduces the influence of contestability of markets; thirdly, unlike other studies, it analyses the determinants of the interest rate margins of Zambian banks using a time series econometric model.

The results obtained show that the variables of interest are in general significant and of the predicted signs except CPI and NPL. The results obtained can be summarized as follows:

(I) Despite the liberal measures taken by the government in the 1990s and the liberal stance of the monetary authorities, the banking sector remains largely concentrated and hence no appreciable increase in the competitive rivalry among banks can be appreciated.

(ii) While our model rejects the S-C-P model in favor of the E-S model, potential competition through the contestability of markets argument appears to be the most credible explanation of the practical observations in the Zambian banking industry.

(iii) The level of net interest margins in the previous period has a lagged effect on current interest rate margins.

(iv) One of the most significant variables in the explanation of net interest margin is yield rates on government securities. High yield rates increases the opportunity cost of credit to the private sector for the baking industry thereby increasing the risk premium.

10.2   Policy Recommendations

In view of the evidence obtained in this paper, the following policy measures can be recommended:

(I) Monetary authorities should actively cultivate and maintain a culture of market contestability as a long term policy stance. In other words, monetary authorities should not only be concerned with actual competition (e.g. greater penetration by new entrant banks, new branches or the development of alternative distribution channels for banking services such as internet banking), but also actively inculcating a perception of market contestability. Negating on this important aspect may make other conventional policy measures less effective at aligning NIMs to the fundamentals and in turn, make the process of financial intermediation more costly for society as a whole. This will negate financial inclusion efforts of monetary authorities.

(ii) Monetary authorities should work together with fiscal authorities to coordinate their policy interventions in the market. This will avoid policy inconsistency and hence the desired effect on the market will be enhanced.

(iii) It is imperative that in addition to conventional policies, monetary authorities use other forms of regulation such as moral suasion and prudential regulation to influence their preferred outcome on the market. This may be necessary to align current net interest margins to fundamentals since past net interest margins have been found to affect the current NIMs.

10.3   Limitations and Areas of Future Research

The obvious limitation of the study is the lack of a longer time series data. This had the potential to negatively affect the robustness of the model but enough statistical safeguard measures were undertaken to mitigate the effect. With a longer time series data, more degrees of freedom could have be acquired to include more explanatory variables in the model. Related to the first limitation is the exclusion of what could be important explanatory variables such as operational efficiency, liquidity risk, payment of implicit interest, effect of stock market development and opportunity cost of reserves. The other limitation was lack of disaggregated data to isolate the effects of the explanatory variables in specific product market segments. Finally, it could have been interesting to compare the results for countries in the sub-region and beyond but data challenges made this impossible. These challenges present opportunities for improving on the study going forward.

References

2015 Zambian Budget Address by Hon. Alexander B. Chikwanda M.P, Minister of Finance, Delivered to the National Assembly on Friday 10th October, 2014.

Angbazo L.; "Commercial bank net interest margins, default risk, interest rate risk and off-balance sheet banking". No. 21, Journal of Banking and Finance, P. 55–87 (1996).

Ash Demirgiic, Kunt and Harry Huizinga; "Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence". Vol 13, No. 2, The World Bank Economic Review, P. 379-408 (1999).

Berger, A., Hannan, T.; "The price-concentration relationship in banking". No. 71, The Review of Economics and Statistics, P. 291–299 (1989).

Berger, A.; "The Relationship between Capital and Earnings in Banking". No. 27, Journal of Money, Credit and Banking, P. 432–456 (1995).

Calixte Ahokpossi; "Determinants of Bank Interest Margins in Sub-Saharan Africa". IMF - African Department, Working Paper (WP/13/34), IMF (2013).

Commercial bank circular number 25/2012, Bank of Zambia.

Corvoisier, S., Gropp, R.; "Bank Concentration and Retail Interest Rates". No. 26, Journal of Banking & Finance, P. 2155–2189 (2002).

Federico S. Mandelman; "Business Cycles: A Role for Imperfect Competition in the Banking System". Federal Reserve Bank of Atlanta Working Paper Series, Working Paper No.2006-21 (2006).

FinMark Trust; "Measuring Financial Access in Zambia, Summary of Topline Findings". FinScope™ Zambia (2006).

Francis Z.Mbao, Chungu K, Owen M, Tobias R, and Joe S; "Determinants of Bank Lending Rates in Zambia: A Balance Sheet Approach". Bank of Zambia Working Paper No. WP/02/2014 (2014).

Hansen, G.; "Indivisible Labor and the Business Cycle". No. 16, Journal of Monetary Economics, P. 309-327 (1985).

Ho, T., Saunders, A.; "The determinants of bank interest margins: theory and empirical evidence". No. 16, Journal of Financial and Quantitative Analyses, P. 581–600 (1981).

Jappelli, T.; "Banking competition in southern Italy: A review of recent literature". No. 49, Studi Economici, P. 47–60 (1993).

Jeffrey M. Herbener et al; "The Pure Time-Preference Theory of Interest". Ludwig von Mises Institute, Alabama (2011)

Kothari, C.R.; "Research Methodology, Methods and Techniques" (Second Revised Edition), New Age International Publishers (2004).

Madura, J.; "Financial Markets and Institutions". Seventh Edition, South-Western, Thomson Learning (2006).

Maudos, J., Fernandez J. de Guevara; "Factors explaining the interest margin in the banking sectors of the European Union". No.28, Journal of Banking & Finance P. 2259–2281 (2004).

Mishkin, F. S. and J. Simon; "An Empirical Examination of the Fisher Effect in Australia". NBER Working Paper No. 5080. Cambridge, MA (1997).

Noah Mutoti, Peter Zgambo, Francis Z. Mbao, Chungu Kapembwa, Emmanuel Chokwe and Nomsa Kachingwe; "Survey on How Commercial Banks Determine Lending Interest Rates in Zambia". BoZ,

Economics Department (2010).

Rose, P.; "Money and Capital Markets: Financial Institutions and Instruments in a Global Marketplace". Eighth Edition, McGraw-Hill (2003).

Porter, M.E.; "Competitive strategy: techniques for analyzing industries and competitors". New York; London: Free Press (2004).

Porter, M.E.; "Competitive advantage: creating and sustaining superior performance". New York; London: Free Press (1998).

Rajesh Kumar Shastri (2009); "Micro finance and poverty reduction in India (A comparative study with Asian Countries)". African Journal of Business Management Vol.3, No. 4, P. 136-140

Saunders A., Schumacher L,; "The determinants of bank interest rate margins: an international study". No. 19, Journal of International Money and Finance P. 813–832 (2000).

Samuelson, P.; "Foundations of Economic Analysis". Cambridge, MA: Harvard University Press (1947).

Samuelson, P.; "Proof that properly anticipated prices fluctuate randomly". No. 6, Industrial Management Review P. 41–9 (1965).

Simpasa, Anthony Musonda, Competition and market structure in the Zambian banking sector, Working Paper Series No. 168 African Development Bank, Tunis, Tunisia (2013).

Smith, C.I.; "Theories of fluctuations in the monetary economy: A study of the concepts of money, capital, and investment in the theories of Wicksell, Hayek and Keynes". Michigan: University Microfilms International (1984).

World Bank Policy Research Report, Finance for Growth Policy Choices in a Volatile World, (2001).

IX. Appendix

Table A1: Unit root tests at levels

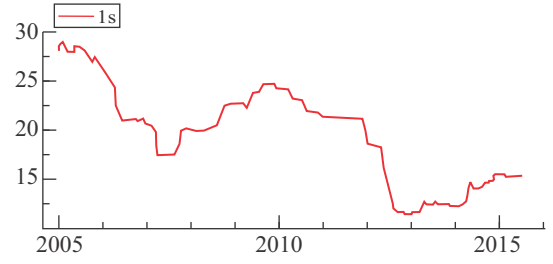| Variable	ADF	Order of Integration
NIM	0.3432	1
_91tb	0.4075	1
LCPI	0.7425	1
LNPL	0.9422	1
LHHIL	0.3345	1

Source: PC Give output

Table A2: Unit root tests at first difference

Variable	ADF	Order of Integration
NIM	0.0147	1
_91tb	0.0003	1
LCPI	0.0000	1
LNPL	0.0054	1
LHHIL	0.0068	1

Source: PC Give output

Figure A1: The Model
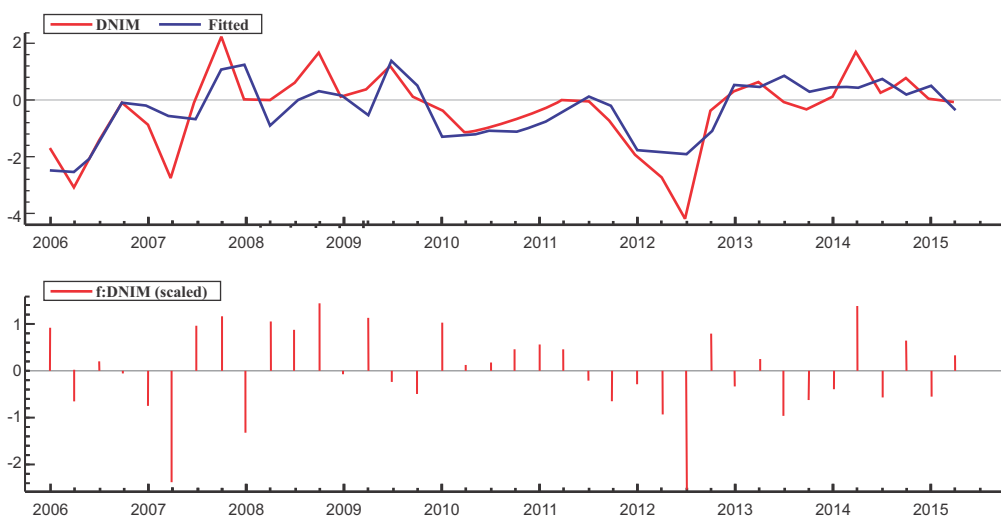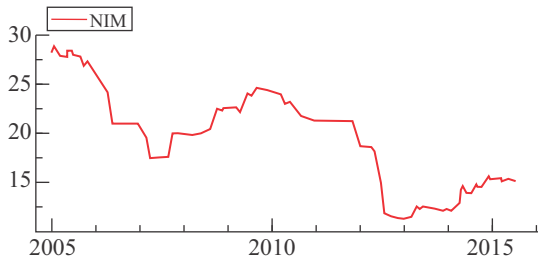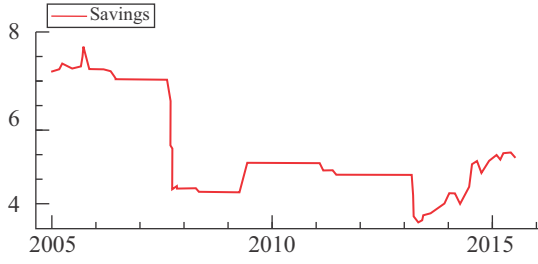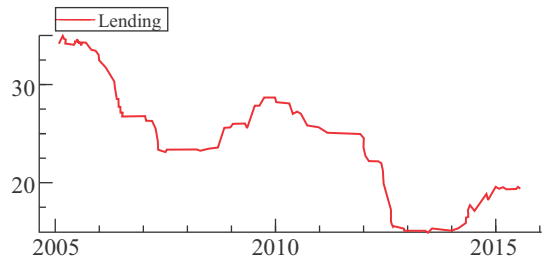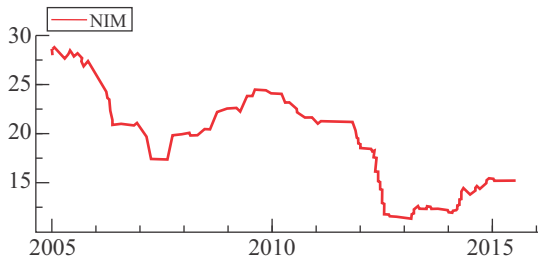
Source: PC Give output

ROLE OF CENTRAL BANKS IN MANAGING A COUNTRY'S NATURAL RESOURCES REVENUE: INTERNATIONAL EXPERIENCE AND INSTITUTIONAL CONSIDERATIONS FOR MEFMI COUNTRIES

By **Ekaterina Gratcheva** *with substantial contributions of Patrick Saner and Florent Antoine**

1. INTRODUCTION

Key decision makers across the African continent have been discussing the most effective ways of deploying the newly discovered and current revenues to advance the economic development and improve the lives of its citizens. Originally, such a debate focused predominately on macroeconomic stabilization and intergenerational equity transfer policies that lead to the accumulation of financial assets invested in external markets. As the new frontier of countries interested in developing such polices have significant development challenges, this debate has been shifting to focus more on the deployment of the resources to achieve domestic economic diversification and financial stability, and to generate wealth.

The idea for this note originated at the MEFMI Region Central Banks Governors' Forum "Leveraging Sovereign Wealth Funds as a Tool for Economic Stabilization" at BIS in Basel, Switzerland, on June 27, 2015. The objective of the note is to contribute to the ongoing policy discussion among MEFMI members and broader African community on the issue of optimal management of current and future natural resource revenues and to draw on existing practices and relevant country examples to apply to Africa specific context. While this event's discussion was anchored around the role that sovereign wealth funds (SWFs) play in transforming natural resources into national wealth in the broad sense of the word, the event fully recognized that the establishment of a SWF in itself will not help the country achieve its stated objectives unless its creation is the result of sustainable and credible rules based fiscal policy and is complemented by a range of other policies and institutions. Not least important in this discussion is the policy decision on how much of natural resource revenue should be directed toward domestic investment and how much should be accumulated in foreign assets to serve a specific objective, and what should be the optimal mechanisms and institutional arrangements to achieve both of these goals.

This note contributes to the overall discussion by examining a narrow set of questions related to the *implementation* aspects of these issues when a country has made a decision to accumulate foreign assets as a part of its overall economic and development policy. As such, this note does not discuss whether a country rich with natural resources should or should not establish a sovereign wealth fund (SWF), nor does it delve into a country's macro and fiscal policies related to the design of a SWF or how to invest domestically and whether to do it through the country budget, a separate entity of both. This paper presumes that the government's decision to accumulate foreign assets is the direct result of sustainable fiscal policy. As such, this paper focuses on implementation aspects of such a fund if and when a country determines that establishment of a SWF investing in foreign assets supports the country's long-term objectives and strategy in managing its resource revenues and has put in place measures that will ensure that accumulated funds will be used for the intended purpose and will be insulated from unrelated claims. More specifically, the note focuses on the role of the country's central bank in managing the country's sovereign assets and on a broader question on whether a new independent agency should be established for that purpose. The note does not attempt to provide policy prescriptions in deciding between a central bank and a new institution as we acknowledge significant impact of country specific circumstances on the choice of decision makers. Still, the note seeks to assist the policy makers by offering important

considerations that typically influence the selection of an appropriate asset management institution with regards to the operational management of the country's sovereign assets and outlines pros and cons with regards to using the country's central bank versus establishing a new independent entity. The note's analysis and examples draw on extensive hands-on experience of World Bank Treasury Reserves and Advisory Management Program's practitioners that have been providing technical and capacity building services to central banks and SWFs over the last two decades.

The note is organized as follows. Section II summarizes the note's findings in an executive summary. Section III provides a brief retrospective of the history and evolution of SWF phenomenon[1], presents the universe of funds relative to all countries' level of development and evaluates the existing funds' contribution to the quality of national governance. Section IV discusses the key principles of individual fund governance and institutional arrangements for managing public funds, offers a framework for an appropriate institutional design given the country-specific circumstances and presents key considerations in the choice between the country's central bank and the creation of an independent entity as the agent for the operational management of the sovereign assets. Section V analyzes the international practices of institutional design across countries with different level of economic development and national governance, and section VI presents several case studies that illustrate country-specific nuances in institutional arrangements. Section VII concludes with key take-aways for policy-makers that are considering establishing new SWFs and are evaluating available institutional alternatives.

2.   Executive summary

By 2015 a significant number of countries have established various forms of institutions that manage the country's sovereign assets ranging from more traditional stabilization funds and funds for future generation to funds focusing on economic development within the country or within the neighboring region. More recently funds have been established that integrate several of these objectives. The interesting feature of existing and functioning funds is that they have been established in countries across all levels of economic development and quality of national governance, and that there are examples of successful implementation of SWFs across countries of all income levels. Furthermore, countries in which these funds have been established score more favorably on several important aspects of national governance, such as government effectiveness, regulatory quality, rule of law and control of corruption.

Existing SWFs span a broad spectrum of country circumstances based on the country's economic development, as well as the quality of national governance. Respectively, the institutional set-ups of SWFs are varied due to the differences in overall objectives in managing sovereign assets, as well as due to differences in political and executive institutions. In designing the SWF's governance system the fundamental concern would be to ensure that the decisions taken in the management of the fund reflect the best interests of the people as ultimate owners of its assets, at the same time as the implementation of these decisions should be based on relevant levels of expertise. Consequently, the governance system should be built to balance two complementing demands: first, informed policy making and the ownership of the risk/return profile of the portfolio to meet its strategic objectives at the highest level of sponsorship; and second, the delegation of authority and accountability of implementation to a specialized financial entity best suited to achieve the stated objectives.

Central banks have often been an institution of choice to serve as an agent for operational management of sovereign assets. Establishing a new independent agency, on the other hand, is highly complex and resource consuming. While in some cases the overall institutional design is significantly affected by the country's specific circumstances, the selection of an appropriate institution as an agent to manage the country's sovereign assets is typically driven by some common considerations that influence the choice between a central bank and a specialized agency. Based on the World Bank Treasury's extensive institutional and technical capacity building experience with central banks and other public asset management institutions the following considerations are among the most important: (1) the nature of the sovereign fund and its policy objectives, (2) operational capacity of a potential institution, (3) political and operational independence of an institution from the government, (4) an institution's ability to attract and retain qualified staff, and (5) legal issues.

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[1] For the purposes of this report, we will use the following definition of a SWF: a long-term investment fund owned by a sovereign nation, distinct from investments by national pension funds with explicit pension liabilities, state-owned-enterprises, development banks and development funds, and distinct from central bank management of official foreign exchange reserves. *In this report we are analyzing SWFs that are funded from commodity (natural resource) revenues, currency intervention or fiscal savings that invest in foreign assets. As the note is focusing on the role of central banks in the management of the country's sovereign assets, we explicitly exclude funds with domestic investment objectives from the analysis and discussion while acknowledging that the issue of institutional arrangements for effective management of domestic investments is of paramount importance to MEFMI member countries.* For more details on various definition of SWF by different institutions please refer to the World Bank's 2011 report on ASEAN Financial Markets Integration.

While there is no single model that spans a variety of structures to manage a long-term public fund, the most important criteria for success are: (1) compatibility of the model with the overall government structure of each country; and (2) ensuring key stakeholder ownership of the fund's performance, while providing managerial flexibility for the implementation. For the funds that are funded from commodity related revenue, there is an equal split between the number of funds managed by the country's central bank and by an independent entity. In the countries with high level of income nearly twice as many countries have set up an independent entity to manage the sovereign assets as used their central banks for that purpose. In low and middle income countries, twice as many central banks manage the country's SWFs investing in foreign asset as do independent agencies. In comparison to their peers in high income countries managing SWF assets, central banks of low and middle income countries manage the sovereign assets more conservatively and often limit eligible asset classes to fixed income universe. In fact, the management of these funds is more closely aligned with the management of foreign exchange reserves.

## 3.   Evolution of SWFs and Their Impact on National Governance

Since 1950 countries with structural sovereign asset balances, whether due to fiscal or foreign exchange surpluses, have started to develop and implement policies and institutions to accumulate and manage sovereign balances over the long run. The first countries that established sovereign funds in 1952 were Saudi Arabia and Kuwait to manage fiscal surpluses due to significant oil-related revenues. By mid-50s two small Pacific island-states, Kiribati and Nauru, which are among the world's smallest countries, established their funds that were capitalized by phosphate royalties. By 2015, Kiribati's fund of about AUD 700 million is nearly 390% of the country's GDP. It is currently the largest sovereign fund as compared to the size of the country's economy and has been providing substantial contribution to the country's budget, particularly since the phosphate deposits were exhausted in 1979. Nauru's fund, on the other hand, was fully depleted due to mismanagement and corruption by 2001, as the fund invested in risky investments domestically and abroad. The fund's assets were also pledged for government and other commercial debt. These two countries' experiences with managing their natural resources is highly instructive: while in both countries natural resources were depleted, the two countries' financial outcomes are starkly different. Kiribati has accumulated a portfolio of financial assets and investment income from these assets currently contributes about 45% to the country's national budget. Nauru on the other hand, experienced the boom and bust cycle due to poor management of the country's natural resource riches as both the resources and financial assets have been depleted.

The 1990s saw the second big wave of the establishment of such funds, when in particular Norway (1990) and Botswana (1993) funds were established with more funds in the 2000s, such as Azerbaijan (2000), Chile (2006), Russia (2008), Timor-Leste (2005), Trinidad and Tobago (2007) among others. Until the early 2000s, most SWFs were set up with the stabilization and intergenerational equity transfer objectives and were designed to invest all or almost all of their assets abroad. SWFs avoided significant domestic investments, primarily in order to avoid the "Dutch disease" and increased inflationary pressure on the domestic currency. Many SWFs still continue to invest only overseas. An increasing number of funds, especially those created in the past decade in developing countries, however, are eager to invest domestically in order to galvanize local economies and help finance domestic infrastructure. Going forward, and with particular emphasis on African countries that are experiencing significant natural resource discoveries, a recent study has called for rethinking the conventional policy advice on this matter, suggesting that for "Resource-Rich Developing Countries" the optimal allocation is likely to have a significant domestic investment component.[2]

By 2015 a significant number of countries have established various forms of institutions that manage the country's sovereign assets ranging from more traditional stabilization funds and funds for future generation to funds focusing on economic development within the country or within the neighboring region. More recently funds have been established that integrate several of these objectives. The interesting feature of existing and functioning funds is that they have been established in countries across all levels of economic development, as illustrated in blue in Figure 1 below. The effectiveness of various aspects of these funds is being debated by the academic and international community but there are examples of well-run and effective institutions *across countries of all income levels*.

[2] IMF (2012).

Figure 1: Countries with Established SWFs across Countries of All Income Level
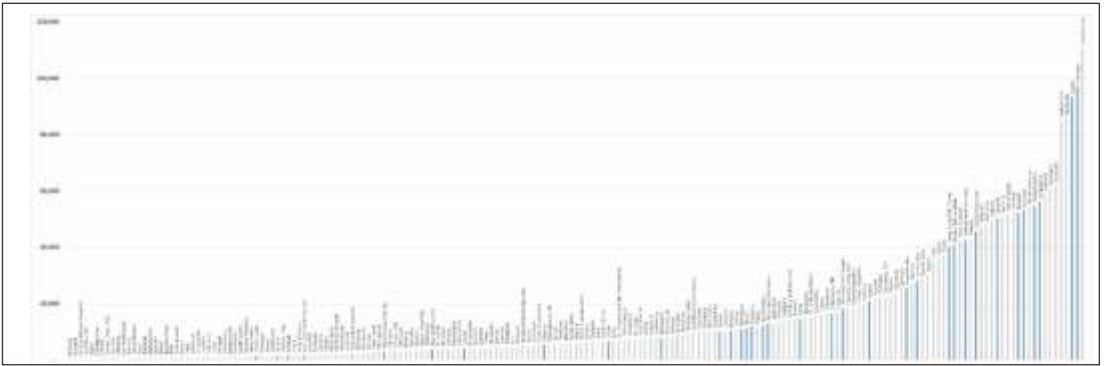
Another notable feature of these funds is that the countries in which these funds have been established score more favorably on several important aspects of the national governance based on the World Wide Governance Indicators[3], particularly on the following aspects:[4]

1.1. <u>Government effectiveness,</u> which measures the quality of public policies and services, independence from political pressures, and the credibility of the government commitment to these policies;

1.2. <u>Regulatory quality,</u> which measures the government's ability to formulate and implement sound policies that promote private sector development;

1.3. <u>Rule of law,</u> which measures the extent to which agents have confidence in and abide by the rules of society, including the quality of contract enforcement, the police, and the courts, as well as likelihood of crime and violence; and

1.4. <u>Control of corruption</u>, which measures the extent to which the government limits corruption and rent seeking by elites and private interests.

As Figure 2 below demonstrates, the national governance scores for African and developing countries are lower than the same scores for the developed countries and reflect a challenging overall environment to develop and implement effective policies and institutions. The good news, however, is that if we compare these governance indications for different countries within the three country groupings that include only African countries, developing countries and developed countries,[5] on average the countries with established SWFs demonstrate better governance scores across these four measures than the countries in their peer group without such a fund. The causality of this relationship is difficult to ascertain from this particular analysis, and the relationship could go in either direction. For example, it could be the case that better governed countries are more likely to establish policies and institutions to manage SWFs or that the establishment and functioning of these institution have positive externalities for the country's overall governance. Based on our own experience in helping countries set-up their SWFs, well governed and successful SWFs could become a potential catalyst for positive change not only in achieving financial return on the country's revenue, but also for its contribution to improving the overall national governance.

3 Aizenman and Glick (2008)
4 The Worldwide Governance Indicators (WGI) report aggregate and individual governance indicators for 215 economies over the period 1996-2013. These aggregate indicators combine the views of a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. They are based on 32 individual data sources produced by a variety of survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms.
  Source: www.govindicators.org.
5 We acknowledge the difficulty in categorizing countries as developing and developed in the current environment and there are multiple methodologies used by different organizations and for various objectives. We use OECD and non-OECD countries as proxies for developed and developing countries for the purpose of this analysis.

Figure 2: Comparison of Governance Performance for Different Country Groups With and Without SWFs (1996-2013)
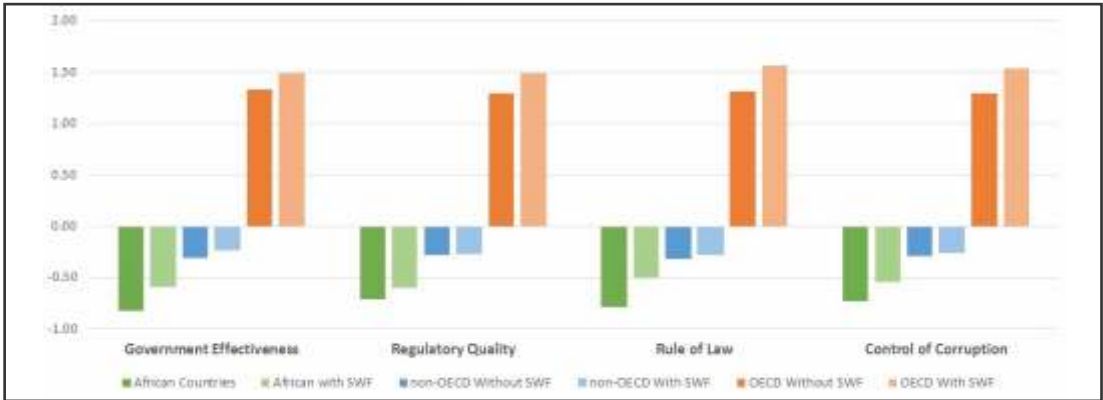
Source: WB Treasury analysis based on publicly available WGI indicators data

4.   Individual Fund Governance and Institutional Arrangements for Managing Public Funds: Key Principles

Existing SWFs span a broad spectrum of country circumstances based on the country's economic development, as well as the quality of the national governance. Respectively, the institutional set-ups of SWFs are varied due to the differences in overall objectives in managing sovereign assets, as well as due to differences in political and executive institutions. This section will present common principles that should be considered essential in setting up well-governed long-term public funds even allowing for different governance models due to differences in country specific circumstances. The next section will analyze existing institutional arrangements globally focusing on distinctive features of various set-ups and present several country examples.

The nature of natural resource revenue is quite distinct from other sources of government revenue as it is generated from the exploitation of (exhaustible) natural resources that belong to the public, arguably to both current citizens and to the future generations. As a result of the fundamental nature of these resources, the key starting point in establishing the governance system to manage these resources is to recognize that the bodies established to manage the assets of the fund are essentially the trustees of the people. Thus, the fundamental concern would be to ensure that the decisions taken in the management of the fund reflect the best interests of the people as ultimate owners of its assets, at the same time as the implementation of these decisions should be based on relevant levels of specialized expertise. Consequently, the governance system should be built to balance two complementary demands: first, informed policy making and the ownership of the risk/return profile of the portfolio to meet its strategic objectives at the highest level of sponsorship; and secondly, the delegation of authority and accountability of implementation to a specialized financial entity best suited to achieve the stated objectives. The lack of an appropriate framework to segregate policy decision from implementation can lead to imposing inefficient constraints on investment parameters that would be inconsistent with the fund's mandated objectives and in turn would lead to inferior financial results over time.

The governance system to manage sovereign assets should be thought of as a system of delegated asset management where the authority to invest is delegated from the top of the governance system, through the various governing bodies, down to the individual (internal and/or external) asset managers. The parliament would adopt the laws that govern the management of the fund and in most cases the full government (i.e. the cabinet or the council of ministers) or the finance minister will be carrying out the functions of the owner of the fund. In the case of SWFs, typically the Ministry of Finance is entrusted with the function of the formal ownership of the sovereign assets. The finance ministry, in turn, delegates asset management responsibility to an asset management organization: either the country's central bank, a specialized investment management entity or a combination of both. In this respect the finance ministry can be regarded as principal with the management organization being the agent in the operational asset management.[6] Figure 3 schematically depicts the governance arrangements from the highest level of

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[6] Al-Hassan, Papaioannou, Skanke, Sung (2013)

governance representing the ownership function to the operational asset management function and individual specialized asset managers.

Figure 3: Governance Diagram for Management of Sovereign Assets
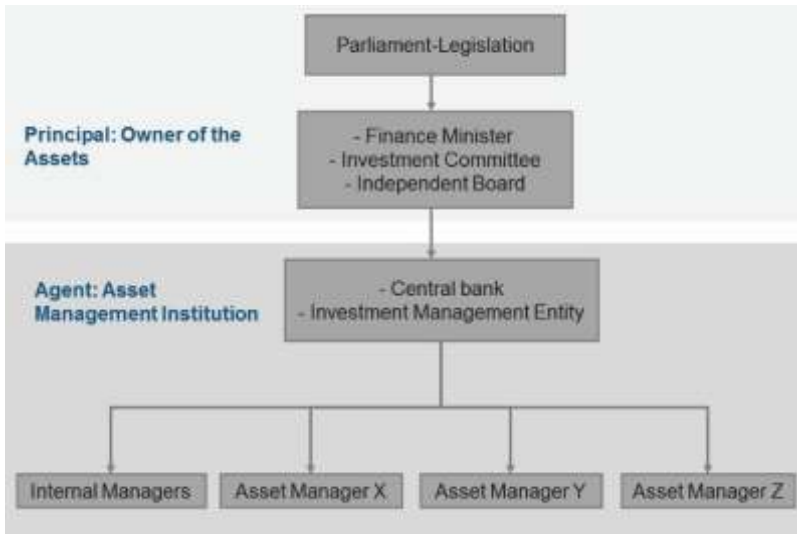
Central banks are typically among the countries' oldest specialized institutions that have a track record in managing the country's foreign exchange reserves and, thus, have often been the institutions of choice to serve as agents for operational management of sovereign assets. Establishing a new independent agency, on the other hand, is highly complex and resource consuming. While in some cases the overall institutional design is significantly affected by the country's specific circumstances, as will be shown in the subsequent section, the selection of an appropriate institution as an agent to manage the country's sovereign assets is typically driven by some common considerations that influence the choice between using an existing institution, such as a central bank, and creating a dedicated specialized agency. As we will discuss later in the section, in some country circumstances particular considerations could become predominant in the choice of an institution. Based on the World Bank Treasury's experience with central banks and other public asset management institutions across all geographies, we can articulate several critical considerations that typically influence the choice between the central bank and a separate investment management entity. These considerations are as follows: (1) the nature of the sovereign fund and its policy objectives, (2) operational capacity of a potential institution, (3) political and operational independence of an institution from the government, (4) an institution's ability to attract and retain qualified staff, and (5) legal issues that could influence the choice of the institution. We discuss these issues in greater details bellow.

Objectives of the fund. The funds investing in foreign assets, which are the focus of this note, can typically be categorized as stabilization and savings funds. The purpose of a stabilization fund is to stabilize a country's budgetary and fiscal policies by isolating them from volatile government revenue linked to commodity price changes. As a potential source of budget revenue in the short to medium term, stabilization funds have a relatively short investment horizon and require investment capabilities similar to that of managing the country's foreign exchange reserves. Consequently, central banks are typically entrusted with the management of these funds. In contrast, the purpose of savings funds is to transfer resource wealth across generations, and, by design, their assets are not expected to be used for government needs in the short to immediate term. The objective of the funds for future generation is to maximize the real value of its assets in the long run and to accomplish this objective these funds should invest with a much longer investment horizon, as well as demonstrate greater risk bearing capacity and tolerance for inter-temporal income volatility. In practice this would imply institutional ability to manage portfolios that could exhibit significant investment losses over annual reporting cycles and investment in assets with greater risk/returns characteristics. Both of these considerations raise significant reputational risk concerns to most central banks, and in such scenarios, the establishment of a separate specialized organization could be warranted. Still, there are country examples, in which centrals banks have been selected as agent for the management of the country's *long term savings funds*. These countries' central

banks were able to expand their existing capacity, investment infrastructure and even human resource management policies to include riskier asset classes outside of the fixed income universe in the management of their sovereign wealth portfolios. In the management of Norway's SWF, for example, Norges bank built separate asset management from core central bank responsibilities under non-civil service regime and manages the country's long-term portfolio invested in high grade and emerging market fixed income, public equity and real estate. In cases of Botswana, Chile and Trinidad and Tobago, the central banks manage the funds that combine stabilization and savings objectives and the funds are invested in fixed income and public equity through the use of specialized external managers for asset classes outside of the central banks' internal investment management capacity.

Operational capacity. Closely related consideration when selecting an appropriate institution is the institution's operational capacity, including *inter alia* technical expertise and investment management infrastructure. Central banks are already responsible for the management of the country's foreign exchange reserves. In that role central banks have established market presence, operational capacity and infrastructure to manage portfolios in various currencies. Consequently, central banks have established their names in the international markets and have entered into key contractual and partnership relationships with relevant financial and peer institutions to execute transactions in the markets. These considerations make the choice of a central bank quite appealing as a starting point to manage the country's sovereign assets, and, in particular, stabilization funds. Still, in many countries the core mandate of central banks is to manage liquidity portfolios and, based on our experience, some central banks could face significant (internal) constraints to expanding its existing practices to accommodate investment portfolios requiring different specifications. Establishing a new institution with no legacy constraints could potentially offer an opportunity to implement more advanced investment management operations based on current best industry practices. It is, on the other hand, quite complex, and resource and time consuming and would require building and enabling institutional development over time consistent with best practices.

Political and operational independence. Independence from political interference is critical for the long-term success of the fund and potential for political interference is even more pronounced in countries with lower level of national governance. Central banks *tend to be* among more independent technical institutions from the government in many countries and could become an institution of choice in countries with a low level of national governance. In countries with poor governance practices and/or high level of corruption, independent agencies could potentially be even more vulnerable to poor governance. We were involved in cases when direct interference in the governance of the institution led to substantial investment losses due to politically motivated investment decisions. We have also seen that in some countries with insufficient control of corruption, creation of an independent institution could be perceived by the public as an instrument to avoid public scrutiny on the management of public assets. While in practice this institutional set-up will still be subject to controls and oversight to ensure that the assets are managed properly, such public perception could be an indication of the lack of public support for the country's approach of managing its sovereign assets that will affect its legitimacy over time.

Institutional ability to attract and retain qualified staff. Asset management is highly skill-intensive, and proper delegation to professional staff is required for the successful implementation of the SWFs investment strategies. One of the key issues to consider is the availability and institutional ability to hire and retain appropriate technical skills in order the carry out strategic policy and day-to day operational responsibilities. In developing countries, with underdeveloped financial sector in particular, central banks tend to attract the most qualified staff, especially for analytical and entry level positions. However, competition with financial industry is fierce for skilled staff. In many countries public sector regulation and HR policies are seen as a significant constraint to retaining talent in central banks bound by these policies, which presents a particular challenge to attracting advanced asset management skills required for more sophisticated investment portfolios. As already discussed, Norway's central bank, the Norges Bank, set-up asset management operations for the management of the country's sovereign assets outside of the public sector regime. In most other countries, such a significant change to central banks organization is deemed untenable. Hence, an institution that is not bound by the public sector HR requirements is often the reason for setting up an independent asset management entity, especially in countries with developed financial industry and sophisticated private financial institutions.

Legal issues. The institutional set-up should be carefully evaluated on its implications on legal issues, in particular on issues such as immunity of assets. Specialized legal professionals should be involved in the design and the implementation of the fund. While examination of legal considerations is outside of the scope of this note, based on Treasury's experience, legal concerns with regards to the risk of attachment of

sovereign assets was predominant in some countries' effort in setting up a long-term savings fund and countries chose to use arrangements with the central banks in such a way that it minimized the risk of attachment. Correspondingly, when considering establishment of an independent entity, legal matters, in particular related to immunity and taxation, should be assessed carefully as the asset management institution would be subject to international and domestic regulation.

5. International Practices

While there is no single model that spans a variety of structures to manage a long-term public fund, the most important criteria for success are: (1) compatibility of the model with the overall government structure of each country; and (2) ensuring key stakeholder ownership of the fund's performance, while providing managerial flexibility for the implementation.

We have analyzed 28 existing institutional arrangements of SWFs. We focus on the subset of existing SWFs that satisfy the following criteria: (1) we include the funds that invest in foreign assets based on commercial investment objective and exclude the funds with domestic investment and/or development objective; (2) the funds have been active and operational for at least two years,[7] (3) we have been directly or indirectly involved with these funds or the funds have a high level of transparency. Table 1 below summarizes institutional arrangements for the sovereign funds based on the source of their revenues.

Table 1: Summary of Various Institutional Arrangements for Different Types of Funds

Source of Funds	Central Bank	Independent Agency	CB and Independent Agency	Ministry of Finance	Grand Total
Commodities	10	10	1	2	23
Fiscal Surpluses		1			1
FX Reserves Surpluses		3			3
Other		1			1
Grand Total	10	15	1	2	28

Source: WB Treasury analysis based on publicly available SWF data

<u>Funds Funded by Commodity Revenues.</u> On our analysis we find that for the funds that are funded from commodity related revenue, there is an equal split between the number of funds managed by the country's central bank and by an independent entity, with 10 cases for each set-up. Apart from these set-ups, which are discussed in details later in the section, there are notable examples of quite distinct institutional arrangements due to countries' circumstances. In the case of Libya, for example, the country's sovereign assets are managed by two institutions as the Libyan central bank has the responsibility for managing the country's stabilization funds and the Libyan Investment Authority (LIA) is responsible for the management of the fund for future generations. The Libyan example offers an insight into how different institutions within the same country can have a vastly different track record in the management of the country's sovereign assets. While the management of the stabilization fund by the Libyan central bank has been prudent, the LIA's track record has been quite turbulent. The lack of in house technical expertise and deficient auditing and compliance checking procedures was seen by the market participants to be inconsistent with the complexity of the investments undertaken by the LIA. Furthermore, allegations of corruption and mismanagement are currently at the forefront of two separate legal claims in the UK courts against two investment banks for the total of $3.3 billion filed by the LIA in 2014.[8] This example illustrates the challenges in implementing the institutional blueprint to manage the country's sovereign assets: domestic realities should be seriously taken into account as they could provide significant hurdles against effective implementation of the institutional design and best practice. In another example, Kiribati's institutional arrangements reflect an institutional design highly affected by country's circumstances. Kiribati is one of the least developed countries, its financial system is highly undeveloped and there is no central bank in the country, as the country uses Australian dollar as its currency. In the management of Kiribati's SWF, currently the size of about 400% of the country's GDP, the ministry of finance is responsible for the operational management of the sovereign assets. Thus, the finance minister is responsible for the implementation of the investment policy decisions that are carried out at the higher level of authority, namely the Cabinet of Ministers chaired by the country's president. The ministry of finance contracts global specialized asset managers to execute specific investment strategies based on the overall investment strategy.

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[7] That would imply that countries with "stabilization" or "future generation" accounts placed with the government or with the central bank without active investment and governance practices are excluded.

[8] Public news sources, such as Financial Times and Economist Intelligence Unit among others. For example:
   http://www.eiu.com/industry/article/42386588/libya-investment-authority-and-goldman-sachs-meet-in-court/2014-10-15
   http://www.ft.com/intl/cms/s/0/a4a16ece-da11-11e4-ab32-00144feab7de.html#axzz3aWCHIyyN

FX Reserves Surpluses. It is not surprising that the countries with a surplus of foreign exchange reserves and with the objective to enhance the long-term value of foreign exchange reserves, have set-up independent entities: China Investment Corporation (CIC), Korea Investment Corporation (KIC) and Government of Singapore Investment Corporation (GIC). These corporations are investing in globally diversified portfolios across various assets classes with investments in public and private markets. Their mandates are for foreign assets only and they are not allowed to invest in domestic companies or financial instruments. The decision for the creation of these corporations was a direct result of the government's objective to diversify investment practices of the countries' central banks. The direct consequence has been that the funds managed by these corporations are invested with much greater risk bearing capacity than the foreign exchange reserves and over time are expected to deliver higher returns than investment portfolios of the central banks.

Fiscal Surpluses and Other Revenue. The two other examples that were included in the analysis are the New Zealand Superannuation fund that manages the country's fiscal surpluses and Panama's Fondo de Ahorro de Panama (FAP) to manage surplus revenue from the Panama Canal post its expansion. In both of these examples the governments had set-up independent institutions to manage these long term portfolios but based on different considerations. In New Zealand, one of the key considerations was additional flexibility to invest assets with longer-term returns characteristics and to achieve "double-arm's length" independence from the government as will be discussed in the last section. In Panama, the decision was primarily driven by the fact that the country does not have a central bank as it uses USD as its local currency. In Panama, in addition to the Ministry of Finance's role as an asset owner and FAP's role as a fund manager, the largest state owned bank, Banco Nacional de Panama, has been entrusted with the role of the trustee for the fund's assets. Each institution's role, responsibilities and accountability mechanisms are set out in the relevant legislation.

Table 2 below presents a more granular portrayal of the 20 countries with commodity funded sovereign funds that chose to use a central bank or an independent agency based on the country's level of development.[9] In the high income countries nearly twice as many countries have set up an independent entity to manage the sovereign assets as used their central banks for that purpose. Chile, Norway, Russia, Trinidad and Tobago use their central banks as the operational manager of the sovereign assets and with the exception of Russia, these countries have been able to expand their central banks' operational capacity to invest in additional asset classes that were eligible for foreign exchange reserve management, such as corporates, public equity and even real estate in the case of Norway. Other high income countries (Australia, Bahrain, Brunei, Canada, Kuwait, Qatar, and UAE) set up independent entities to manage their SWFs.

Table 2: Summary of Institutional Arrangements for Different Levels of Countries Development

Countries by Income Level	Central Bank	Independent Agency	Grand Total
High income	4	7	11
Low and middle income	6	3	9
Grand Total	10	10	20

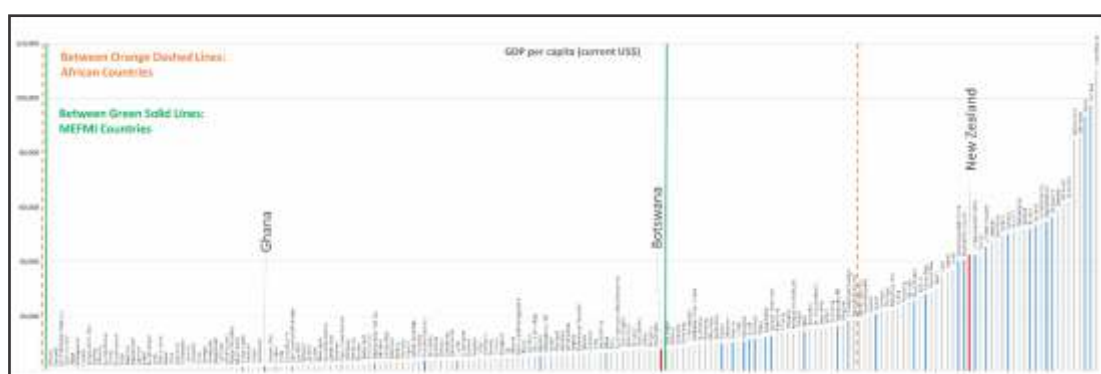*Source: WB Treasury analysis based on publicly available SWF data*

In low and middle income countries, twice as many central banks manage the country's SWFs investing in foreign asset as do independent agencies. In Algeria, Botswana, Colombia, Ghana, Kazakhstan and Peru, their central banks manage the countries' SWFs or the funds' components that invest in foreign assets. In comparison to their peers in high income countries managing SWF assets, apart from Botswana, central banks of low and middle income countries manage the sovereign assets more conservatively and limit eligible asset classes to fixed income universe. In fact, the management of these funds are more closely aligned with the management of the foreign exchange reserves. The three countries that have set up independent entities are Angola, Azerbaijan and Nigeria. In Azerbaijan an independent entity is managing the country's SWF and, while investing in a broad spectrum of asset classes, nearly 80% of its portfolio is in fixed income. In Angola and Nigeria new agencies have been set up recently and are currently in the process of developing their operations.

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[9] Country classification for this analysis was based on the World Bank country classification indicators.

6.   Select County Examples

To illustrate a range of institutional set-ups we present three examples that offer relevant perspective to MEFMI member countries. We present two African examples: Botswana's Pula fund and Ghana's Petroleum Fund(s) representing the oldest and one of the newer African SWFs respectively. The common feature of the two funds is that both countries use their central bank as the fund manager, although with different arrangements within the banks. Besides this specific operational aspect, the two countries' management of the resource revenues are rather dissimilar, particularly with regards to the legal framework, explicitly defined institutional mandate and investment parameters, decision making authority of various stakeholders and its delegation to the central banks. To illustrate an example of an independent investment agency that manages one of the more sophisticated long-term SWF we present the case of New Zealand's Superannuation fund. While New Zealand's level of development is higher than that of African countries and even more so of MEFMI member countries, as illustrated on Figure 4 below, we feel that the institutional design of its Superannuation fund presents one of the most successful examples of an independent entity managing sovereign assets from two particular aspects: overall institutional design in the management of long-term portfolios and actual practice of independence from political interference in the investment decision making by the fund.

Figure 4: Ghana's, Botswana's and New Zealand's SWFs in Relation to SWF Universe

*Source: WB Treasury analysis based on publicly available WB and SWF data*
In grey: all countries
In blue: countries with SWFs
In red: presented country examples

Botswana

Botswana's Pula fund was established in 1993 by the 1975 Bank of Botswana (BoB) Act. In 1996 the Act was updated to reflect the establishment and the management of long-term investment funds and to provide greater flexibility for the management of the BoB assets. Effectively, the Pula fund represents the country's surplus reserves rather than a separate legal entity for the management of the sovereign assets. BoB evaluates the appropriate level of reserves and surpluses get allocated to the Pula fund. Consequently, Botswana's sovereign assets and BoB assets are physically commingled. Consequently, assets in the Pula fund are owned by BoB rather than by the central government. BoB retains decision making authority for the operational management of the fund, as well as responsible for its implementation. The investment mandate for the Pula fund is not explicitly defined and its investment objectives are interpreted by BoB to combine both stabilization and savings objective. The Pula fund's assets are invested in a mix of fixed income and public equity assets and combines internal management with the use of external asset managers for specialized mandates. Figure 5 below presents the diagram of Botswana's financial flows from the mineral revenue and the treatment of the Pula fund on BoB's balance sheet.

**Figure 5: Botswana's Pula Fund: Mineral Revenue Flows and BoB Balance Sheet**
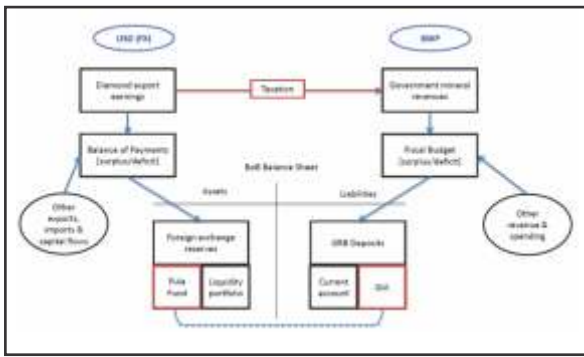
Source: WB International Conference on SWF Management, March 2013

Ghana

Ghana is among the newer established SWFs. In 2010 the government approved the Petroleum Revenue Management Act establishing Ghana's Petroleum Funds (GPFs), comprising stabilization fund and fund for future generations and since 2011 the oil revenue started to be accumulated in the stabilization fund. The institutional framework described clear separation of complementary roles between Ghana's parliament, its finance ministry, Bank of Ghana, Ghana Revenue Authority, National Oil Industry and Auditor General. Parliament through the finance ministry assumes the asset owner function, while the asset management role is delegated to the central bank, the Bank of Ghana (BoG). Ghana Petroleum Funds Investment Mandate defines the investment parameters for the management of the sovereign assets and Operations Management Agreement defines operational relationship between the Finance Ministry and BoG. To extend the BoG's tax exempt status to the sovereign assets and to mitigate the risk of possible attachment, the funds' assets are maintained in the name of the BoG. As a reflection of different ownership of the GPFs from that of the central bank's own assets, the assets of the sovereign wealth funds are segregated from the foreign exchange reserves and are managed separately. To avoid any potential conflict of interest, technical staff managing sovereign wealth funds are separated from BoG staff responsible for the management of the bank's foreign exchange reserves. BoG has the authority to contract external asset managers for asset classes outside of its expertise. Currently, the funds are invested similarly to the country's foreign exchange reserves and are limited to investing in fixed income only. In the future, it is envisioned that BoG will develop its capacity to manage more complex investment portfolios when GPFs starts accumulating revenue in the long-term fund. Figure 6 below presents key operational management principles for the management of GPFs.

**Figure 6: Ghana Petroleum Funds: Operational Management Principles**
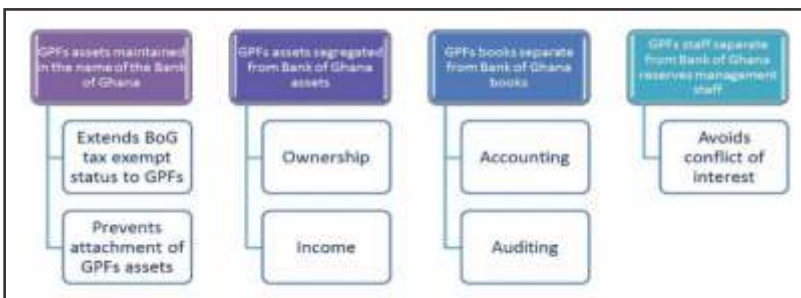
Source: Nana Aba Ashun, Head of GPFs Secretariat, Bank of Ghana, December 2012

New Zealand

In the management of its fiscal surpluses in its Superannuation Fund (the Super Fund), New Zealand created a specialized independent agency to manage the pool of sovereign assets that are owned by the government. The governing legislation was passed in 2001, the inaugural board was appointed in September 2002 and the Super Fund started investing in 2003. The Fund obtained sovereign tax status,

benefiting from the preferential taxation treatment. Legislation that created the fund also established its investment independence from the Government. The investment mandate for the Fund specifies that the fund should be invested on a purely commercial basis and the government may only express their expectation of the Super Fund's overall risk and return. The fund's investment structure is explicitly designed to exist over many decades reflecting the fund's long investment horizon: the fund is given significant flexibility to invest in assets with longer-term returns characteristic as presented in Figure 7 and a greater tolerance to market volatility for the overall fund. The Super Fund is allowed to invest across all asset classes, including New Zealand's assets, as long as the investments are consistent with the commercial nature of the fund and are within the fund's risk tolerance parameters.

Figure 7: New Zealand Superannuation Fund: Complex Investment Portfolio as of 2014
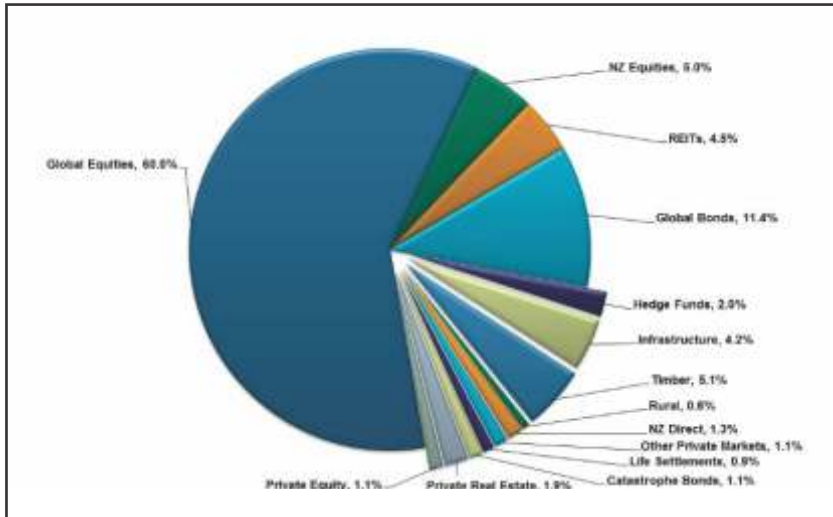
Source: World Bank Treasury

The "double-arms" autonomy from the government in the organizational structure is achieved as follows. The "first arm" of independence is that Government does not decide on the pool of Board candidates that would comprise the Board governing the Super Fund. The second arm of independence is that investment decision are made exclusively by the Board and the management of the Super Fund.[10] This independence was tested following the 2008 financial crisis when on May 14, 2009 the then Finance Minister sent a request to the Super Fund to increase the fund's investment in New Zealand's domestic assets as the "Government believes that it is in the national interest".[11] On June 9, 2009 the Board responded that, while acknowledging the Government's interest, investment of the Super Fund is to invest on a prudent, commercial basis without undue risk to the Super Fund and indiscriminate increase to domestic assets would not be consistent with the mandate. The Board continuously communicates with the ministry of finance on its investment decisions and practices, through which it developed and continue to deepen a relationship based on operational independence and trust.[12]

7.   Conclusions and take-aways

Our analysis and extensive technical assistance experience with central banks and SWFs globally have led us to the unsurprising conclusion that there is no single right model for the institutional set-up to manage a country's SWF. Even less surprising is the undeniable fact that the country specific context has significant implication on the institutional design optimal for a given country. Possible institutional arrangements for the operational management include using the country's central bank, setting up a new independent entity or using a combination of specialized institutions depending on specific objectives and investment parameters.

Central banks have quite often been the institution of choice as an agent to the government for operational management of sovereign assets. Central banks are typically among the countries' oldest specialized institutions that have a track record in the international markets in managing the country's foreign

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[10] "How we invest", https://www.nzsuperfund.co.nz/how-we-invest.
[11] The two letters are now publicly disclosed and are available on the Super Fund website: https://www.nzsuperfund.co.nz/publications.
[12] Ibid.

exchange reserves and, thus, could be a natural choice as an agent for operational management of SWFs, stabilization funds in particular. Establishing a new independent agency, on the other hand, is complex and resource consuming. While in some cases the overall institutional design is significantly affected by the country's specific circumstances, the selection of an appropriate institution as an agent to manage the country's sovereign assets is typically driven by some common considerations that influence the choice between using an existing institution, such as a central bank, and creating a dedicated specialized agency. Based on the World Bank Treasury's experience with central banks and other public asset management institutions across all geographies, we offer several critical considerations that typically influence the choice between the central bank and a separate investment management entity: (1) the nature of the sovereign fund and its policy objectives, (2) operational capacity of a potential institution, (3) political and operational independence of an institution from the government, (4) an institution's ability to attract and retain qualified staff, and (5) legal issues.

Regardless of specific institutional arrangements, the governance arrangements to manage SWFs should balance two complementing demands. First, policy makers should make informed policy decisions and have full ownership of the risk/return profile of the portfolio to meet its strategic objectives at the highest level of sponsorship. The stakeholders should clearly articulate and disclose to the public the strategic criteria governing the management of the funds. Secondly, the authority and accountability of implementation of the operational management should be delegated to a specialized financial entity best suited to achieve the stated objectives. The institutional arrangements for managing the funds should be dedicated, specialized and shielded from political interference to facilitate a stable stewardship over the management of the funds. Independent, knowledgeable and effective oversight mechanisms should be in place to review the activities of the SWF and follow prudential standards of care. The lack of an appropriate framework to segregate policy decision from implementation can lead to imposing inefficient constraints on investment parameters that would be inconsistent with the fund's mandated objectives and in turn would lead to inferior results over time.

Our final thought is coming from New Zealand's experience in building a world class organization to manage a complex investment portfolio. Their message is that growth is evolutionary. The decision makers should avoid jumping to a complex solution. Successful examples demonstrate that starting simple and allowing the investment program complexity to evolve with organization and governance capacity is the path to long-term sustainability and prosperous outcomes.

List of Figures and Tables

8. References

Al-Hassan, Abdullah, Michael Papaioannou, Martin Skancke and Cheng Chih Sung, 2013, *Sovereign Wealth Funds: Aspects of Governance Structures and Investment Management.* IMF Working Paper 13/231 (Washington: International Monetary Fund).

Aizenman, Joshua and Reuven Glick, 2008, *Sovereign Wealth Funds: Stylized Facts about their Determinants and Governance*. Federal Reserve Bank of San Francisco Working Paper 2008-33. Available at http://www.frbsf.org/economic-research/files/wp08-33bk.pdf

Bagnall, Allie E. and Edwin M. Truman, 2013, *Progress on Sovereign Wealth Fund Transparency and Accountability: An Updated SWF Scoreboard.* Peterson Institute Policy Brief 13-19 (Washington: Peterson Institute for International Economics).

International Monetary Fund, 2012, *Macroeconomic Policy Frameworks for Resource-Rich Developing Countries*. Available at https://www.imf.org/external/np/pp/eng/2012/082412.pdf

Oritani, Yoshiharu, 2010, *Public governance of central banks: an approach from new institutional economics*. BIS Working Papers, No 299 (Basel: Bank for International Settlements).

World Bank, 2011, *ASEAN Financial Markets Integration*. Report No 89564-EAP (Washington: The World Bank).
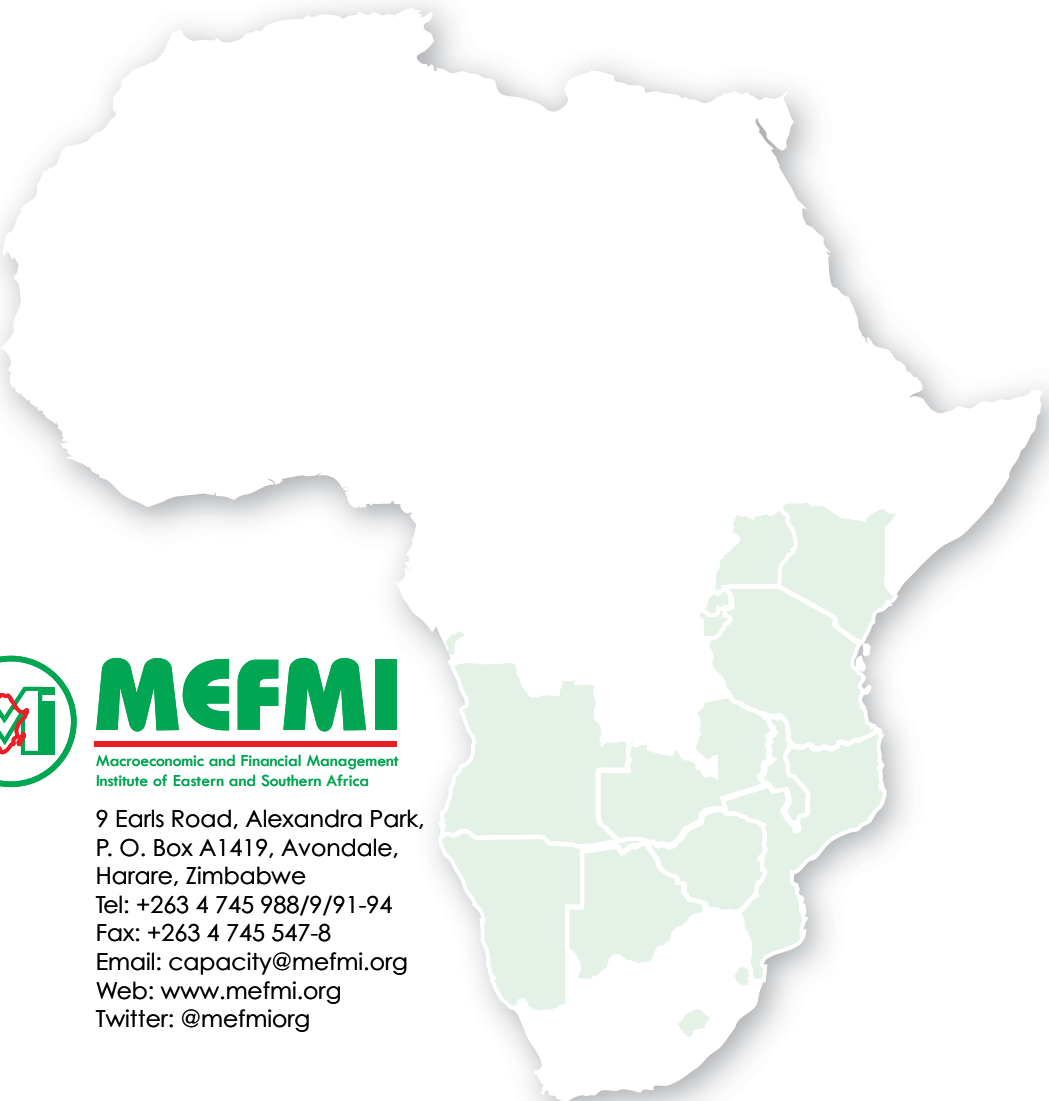
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