

Financial innovation and the importance of modern risk management systems – a case of Zambia

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1. Introduction

The current banking environment in Zambia has become highly competitive as banks scramble for a share of the customer deposits on the liability side and good quality credit on the asset side of their balance sheets. In light of this and the need by banks to maintain their profitability, Zambia has witnessed considerable change in the financial landscape. The rapid rate of change in the financial sector no doubt calls for an assessment of the efficacy of risk management systems of financial institutions on one hand and devising appropriate regulatory responses to the challenges that these changes may pose, on the other. In this paper, we proposition that the time has come for the Zambian banking sector to learn from the recent global market turmoil which has demonstrated that weak and ineffective risk management systems of financial institutions and at the same time these institutions taking on greater risks contributed to their incurring of huge losses. From this perspective, it is important that all banks in Zambia fully embrace modern risk management practices. This is because it is much easier to take corrective action in times of relative financial stability, as the situation in Zambia is currently, than in stressed market conditions.

According to Greuning and Bratanovic (2009), “effective risk management, especially for larger banks and for banks operating in deregulated and competitive markets, requires a formal process. In developing economies, especially those in transition, unstable, economically volatile, and shallow market environments significantly expand the range and magnitude of exposure to financial risk. Such conditions render risk management even more complex and make the need for an effective risk management process even more acute.”

This paper is divided into four sections. The next section, which shows how the banking sector in Zambia has evolved over the years, consists of three parts; part one gives a historical overview of the banking sector in Zambia from independence to date while part two discusses the current trends in the sector and part three gives a description of the supervisory approach in place. Section 3 reviews some theoretical literature on financial innovation and risk management systems. In conclusion, Section 4 makes an analysis of the Zambian banking sector.

2. Overview of Zambia’s banking sector activities and performance

2.1 Historical overview

At the time of independence in 1964, the financial system in Zambia comprised foreign commercial banks established in the colonial era, namely, Standard Chartered Bank (1906),

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Barclays Bank(1918) and Grindlays Bank (1956, now Stanbic Bank since 1992). Following the introduction of the nationalisation policy in 1968, Government took control of a substantial segment of the financial system. At the centre of policies introduced were the creation of various state-owned financial institutions and the assumption of administrative controls over the foreign exchange market, interest rates and to a limited extent, credit allocation (Beyani, 2006). This was in line with Government's economic strategy of nationalisation and import substitution industrialisation adopted in 1968. The government envisioned a financial system that would finance its development plans in line with its economic strategy and provide long term finance for investment and funding for domestic firms.

Despite their good intentions, most of the Government policies and programmes failed to create the robust financial system Government envisioned, as the financial system remained small and undiversified. Overall, government involvement in the financial sector, coupled with deteriorating macroeconomic conditions, resulted in an inefficient system, not appropriate for financial sector development. Only a few private banks, therefore, entered the market between 1970 and 1990 as profit margins were depressed and the banking business not lucrative (Maimbo & Mavrotas, 2003).

Following the change of Government in 1991, major financial reforms were undertaken which brought about radical market-oriented economic reforms. The most significant reforms were the liberalisation of the foreign exchange markets and interest rates in 1992/3, the restructuring of and liquidation of government-owned financial institutions and the reformation of the prudential regulation and supervision system of the Bank of Zambia in 1994 (Ibid).

The liberalisation of the financial system led to a proliferation of both foreign and private domestic financial institutions in the sector. Between 1991 and 1995, nine local private banks entered the banking sector. Banking became very attractive mainly because prospects for profitability increased. Banks could earn super profits, mainly from foreign exchange dealings and investment of their funds in government paper. However, by the mid-1990s, it became increasingly difficult to maintain the high levels of profitability because inflation began to decline and stabilise (Ibid) and to maintain their earnings, banks resorted to riskier banking activities. This, coupled with failure to meet prudential requirements, resulted in the closure of ten banks between 1995 and 2000.

2.2 Current position – activities and performance

The financial system in Zambia is currently dominated by the banking sector and as at end-December 2007 accounted for 30% of GDP. There are fourteen commercial banks;³ eight are subsidiaries of foreign banks, four are private indigenous banks, one is jointly owned by the Governments of Zambia and India while another is jointly owned by the Government of Zambia and Rabo Financial Institutions Development of the Netherlands (Rabo). The banking sector is concentrated in and dominated by five large banks.

The current banking environment in Zambia has become highly competitive mainly because of the stable macroeconomic conditions attained since 2002. Zambia experienced positive real GDP growth averaging 5.1% per annum from 2001 to 2007. Further, inflation continued to take a downward trend, falling to 8.9% in 2007 from 18.7% in 2001. As a result, lending rates have also taken a downward trend during this period.

Prior to 2005, the banking industry's balance sheet was significantly concentrated in Government Securities. This was because Government Securities offered highly attractive yield rates (with zero credit risk) compared to other asset types. The move by Government to

³ This was as at 31 October 2008 and one of the banks just commenced operations in August 2008.

reduce borrowing to 1.8% of GDP in order to encourage lending to the private sector led to a significant fall in Government Securities yield rates. This, coupled with stability in the foreign exchange markets, made it increasingly difficult for banks to sustain their profitability. In order to remain profitable, banks have had to become innovative and resorted to riskier banking activities, including those perceived to be conservative in their activities. This resulted in a shift in the asset structures of most banks from predominantly Government Securities holdings to an expanding loan portfolio which offered a higher return (see *Table 1* below).

Table 1
Asset types and average interest rates

Asset Type (% of Total Assets)	2002	2003	2004	2005	2006	2007
Government Securities	22.4	26.2	20.5	24.5	20.0	17.2
Net Loans and Advances	19.1	23.3	27.0	29.7	33.8	38.7
Average Interest Rates (%)						
Government Securities Weighted Yield Rates	38.5	22.1	19.4	19.6	10.9	14.1
Weighted Lending Rates	50.1	43.8	37.1	33.9	27.9	24.4

Source: Bank of Zambia.

While banks resorted to financial innovation,⁴ most of them had limited knowledge of the potential risks that were associated with the new products and services. The introduction of new services and products, particularly the expansion of the total loan book and loan-type products, brought in a myriad of new risks associated with the new lending activities. A number of banks, particularly the smaller local banks, did not have adequate risk management structures to adequately evaluate and monitor the risks and challenges associated with those products and services.⁵ Studies have shown that increasing financial innovation and deepening of financial markets brings with it challenges and risks, which if not well addressed, can threaten the health of the financial system and could cause havoc to the stability of a financial system.

As noted by Frame and White (2002), “profit-seeking enterprises and individuals are constantly seeking new and improved products, processes and organisational structures that will not only give them greater profits, but reduce their costs of production and better satisfy their customer demands”. Whereas the need for better risk management has been the main driving force behind the recent wave in innovation in more advanced markets, this has not been the case in Zambia. The drive towards financial innovation in Zambia can largely be attributed to the need to maintain profitability. However, rapid growth not commensurate with improvements in risk management systems can pose a threat to financial system stability. Financial stability depends largely on the adequacy of risk measurement and management systems of financial institutions. Lack of effective and/or failure of risk management systems by the large banks or a number of smaller ones would threaten not only the solvency of the concerned institutions but also the health of the whole system (Bernanke, 2007).

⁴ The term “financial innovation” is defined later in Section 3 of this paper.

⁵ In 2005, the Bank of Zambia conducted a Risk Management Survey to gauge the extent to which banks had in place risk management frameworks for identifying, measuring, monitoring and controlling or mitigation risk and to what extent the frameworks address risk. The survey found out that a number of the local banks did not have adequate frameworks in place.

2.3 The supervisory approach

The current prudential supervisory approach in Zambia has largely been the capital-adequacy approach (focus on minimum quantitative capital requirements) as opposed to a consistent principles-based and risk-focussed approach, which takes account of not only the benefits of financial innovation but also the accompanying risks. This assertion can be supported by the gravity of supervisory sanctions that a bank with deficient capital may be subjected to.⁶ Supervisory sanctions for failure to meet capital adequacy requirements include directives to the bank to either increase its capital or reduce its assets and off-balance sheet exposures within a period of three months. Additional sanctions include the suspension of branch network expansion and all capital expenditure, suspension of the lending privilege and the suspension of a bank's directors. However, there are no such express sanctions given in case of risk management deficiency.

According to Greuning and Bratanovic (2003), regulators should concentrate on creating an environment in which the quality and effectiveness of risk management can be optimized and should oversee the risk-management process exercised by the boards and management personnel of individual banking institutions. They have pointed out that regulation may either take a prescriptive or market-oriented approach; and that in practice, regulations in most major countries combine both approaches, leaning one way or another, depending on individual circumstances.

A prescriptive approach usually limits the scope of activities of financial institutions and often results in attempts to promulgate regulations for all risks known to the regulators. The danger of such an approach is that regulations quickly become outdated and cannot address the risks stemming from financial innovation. In contrast, a market-oriented regulatory approach is premised on the belief that markets, by definition, function effectively and are capable of managing financial risks and should therefore be allowed to operate as freely as possible. The role of the regulator should be focused on the improvement of risk management. In Zambia, because of the stage of market development which is still in its infancy, the approach taken leans more towards a prescriptive (prudential) approach.

The role of a bank's supervisory authority is moving away from the monitoring of compliance with banking laws and old-style prudential regulations. In this regard, a more appropriate mission statement for supervisory authorities today would be: *"To create a regulatory and legal environment in which the quality and effectiveness of bank risk management can be optimized in order to contribute to a sound and reliable banking system."* (Ibid)

3. Literature analysis on financial innovation and risk management

According to Mathews and Thompson (2008), the term "financial innovation" is an over-used term meant to describe any change in the scale, scope and delivery of financial services. Akhtar (1983) has defined financial innovation as to include new or altered financial instruments as well as issues of securities in money and capital markets and also changes in the market structure and institutions; and goes on to list five broad categories of financial changes which seem to reflect the major long-term trends in the financial systems of industrial countries. These categories are: (1) the increasing use of interest-sensitive funds by banks and other financial institutions; (2) the variable rate lending or borrowing and maturity shortening; (3) the growth of financial markets and of marketable financial instrument; (4) the changing shape of retail banking; and (5) the diversification of sources of financial services.

⁶ Statutory Instrument No. 184 (Capital Adequacy) which can be accessed from: www.boz.zm.

As pointed out by Frame and White (2002), innovation is clearly an important phenomenon of any sector of a modern economy. Successful financial innovation must reduce costs and risks or provide improved services to users. This notwithstanding, certain aspects of financial innovation may pose significant risks which should not be taken lightly. According to Mathews and Thompson (2008), by opening their doors to new products and activities, banks also let in a myriad of new risks associated with this activity. The rapid rate of innovation in the financial sector no doubt calls for an assessment of the efficacy of risk management systems of financial institutions on one hand and devising appropriate regulatory responses to the challenges that financial innovation may pose, on the other. It is important that risk management systems should keep pace with the financial innovations that take place. According to Greuning and Bratanovic (2003), risk rises exponentially with the pace of change, but bankers are slow to adjust their perception of risk. In practical terms, this implies that the market's ability to innovate is in most circumstances greater than its ability to understand and properly accommodate the accompanying risk. (ibid)

Dowd (2005) attributes the emergence of financial risk management as a discipline to the following factors: (1) phenomenal growth in trading activity (2) massive increases in the range of instruments traded and trading volumes over the past two or three decades; (3) the huge growth of financial derivatives activity, and (4) the rapid advance in the state of information technology.

Financial risks are risks mainly relating to the management of a banks' balance sheet; and these have broadly been categorised as credit risk, liquidity risk and interest rate risk. As a result of the introduction of sophisticated products such as derivatives and structured products, banks have also become increasingly exposed to other equally important risks such as market risk and operational risk. In response, risk management systems have also been evolving and as a result of, the current trend has been the integration of the management of the various financial risks. According to Gallati (2003), the concept of total risk management is "the development and implementation of an enterprise-wide risk management system that spans markets, products and processes and requires the successful integration of analytics, management and technology."

Moles (2004) suggest that risk management follows a logical process. At its simplest it involves three steps: an *awareness* of the risks being taken by the firm; *measurement* of the risks to determine their impact and materiality; and *risk adjustment* through the adoption of policies or a course of action to manage or reduce the risks. A major challenge however to any risk management framework is the measurement of risk. As financial products and institutions evolve, the measurement of risk has also become more sophisticated. Accurate measurement of risk is the essential first step for effective risk management (Allen et al, 2004).

Risk measurement has been the subject of many academic studies and a number of models have been advanced. By mid-1990s, Value at Risk (VaR) had already established itself as the dominant measure of financial risk and has been the widely adopted model. The model was extended to cover more types of instruments and the methodology itself was extended to deal with other types of risks such as credit risk, liquidity risk and operational risk (Dowd, 2005).

The benefits of financial risk management cannot be underestimated. This has been highlighted by observations made by Dowd (2005) that: (1) risk management helps to increase the value of the firm in the presence of bankruptcy costs, because it makes bankruptcy less likely; (2) the presence of informational asymmetries means that external finance is more costly than internal finance, and good investment opportunities can be lost. Risk management helps alleviate these problems by reducing the variability of the corporate cash flow; and (3) risk management helps investors achieve a better allocation of risks because the firm would typically have better access to capital markets.

The major attractions for VaR-based risk measurement approaches over traditional risk measurement approaches such as gap analysis, duration-convexity analysis, probability of default and credit expert systems for example are mainly that: (1) VaR provides a common measure of risk across different positions and risk factors (for instance, risk associated with a fixed-income position can be compared to risk associated with an equity position); (2) VaR

can aggregate the risks of sub-positions into an overall measure of portfolio risk and in so doing, take account of the ways in which different risk factors correlate with each other; (3) VaR is holistic in that it takes full account of all driving risk factors whereas many traditional approaches either only look at risk factors one at a time and also focuses assessment on a complete portfolio, often at the firm-wide level; (4) VaR is probabilistic and gives a risk manager useful information on the probabilities associated with specified loss amounts; and (5) VaR is expressed in the simplest and most easily understood unit of measure namely, “lost money” (Ibid).

Despite being a popular risk measurement tool, the VaR has also been heavily criticised, mainly on grounds of the validity of the statistical and other assumptions underlying its use. The most questionable assumption is that of normality (Allen et al, 2004). The normal distribution ignores the fat tail phenomenon of distribution of returns (known as kurtosis risk) which has empirically been proven to exist. Historical analysis of markets shows that returns have fat tails where extreme market movements occur far more frequently than the normal distribution would suggest (Gallati, 2003).

In order to overcome some of the weaknesses of the model, the common practice to any VaR risk measurement model is to combine it with stress testing, as this gives a more comprehensive picture of risk (Ibid). Stress testing is used as a tool by risk managers to understand the firm’s risk profile and to conduct contingent planning in times of market stress and allocation of capital. Stress testing analyses the effect of extreme price movements and tests the capacity of the bank to withstand the impact of plausible but unusual market conditions. Stress tests at the portfolio level are designed, in part, to examine potential vulnerabilities faced by the firm that may not be revealed by quantitative risk management models (Mathews & Thompson, 2008). Stress testing is also a requirement under the Basel Committee’s “Amendment to the Capital Accord to incorporate Market Risks” which was introduced in 1996 and updated in November 2005. Banks that seek to have their capital requirements based on their internal models are required to have in place a rigorous and comprehensive stress testing programme. The stress-testing-based analysis typically proceeds in one of two ways: (1) it examines a series of historical stress events (historical scenarios) and (2) it analyses a list of predetermined stress scenarios (hypothetical scenarios) (Allen et al, 2004).

4. Financial innovation and risk management – a case of the Zambian banking sector

As already pointed out, the current prudential supervisory approach in Zambia has largely been the capital-adequacy approach. Without downplaying the important role that capital plays in fostering financial stability, it is important to note that over-reliance on the quantitative measure of capital has some shortcomings. High levels of regulatory capital cannot be a substitute for proper risk management, but rather adequate capital and effective risk management should complement one another.

The above assertion can be supported by a study undertaken by the Senior Supervisors Group (2008) to assess risk management practices during the recent market distress and turmoil which began in the second half of 2007. The study which involved major financial services organisations noted that the sample organisations and firms entered the turmoil in relatively sound financial conditions and with capital well above regulatory requirements. The study observed that despite having capital well above regulatory requirements which was able to absorb significant losses, the prolonged disruption in market liquidity stressed their liquidity and capital. It also revealed that institutions without proper and adequate risk management systems were not able to recognise on time and mitigate emerging and future risks which could lead to huge losses, thereby threaten their capital reserves and solvency. According to the study, institutions with more comprehensive systems were able to deal more successfully with the turmoil (Ibid). They were able to use developed information

systems to adjust their business strategies, risk management practices and exposures promptly and proactively in response to changing market conditions. In contrast, those institutions that had not established rigorous systems faced significant challenges. It must be understood and appreciated that the issue is not just about having a risk management system in place; but more importantly, that the system in place must be comprehensive, adequate and ideal for the risk profile of the institution. Experience has shown that despite having in place extensive risk management frameworks, the recent market strains can be attributed to gaps in the design or implementation by major institutions. In other cases, overly aggressive risk-taking decisions appear to have been made despite having sound risk-management inputs (Institute of International Finance, 2008)

In making decisions about the amount of capital that they need to hold, banks must be aware of the benefits and costs of doing so. The benefit of holding higher capital is that it reduces the likelihood of bankruptcy, hence secures the investment of the owners of the bank. Holding high capital reserves, however, has a number of limitations or weaknesses. It is costly to maintain higher levels of capital because the higher the level of capital, the lower will be the return on equity for a given return on assets (Mishkin, 2007). According to Allen et al (2004), among other short comings of the BIS capital requirements was the neglect of diversification benefits in measuring a bank's risk exposure. Thus, regulatory capital requirements tended to be higher than economically necessary, thereby undermining commercial bank's competitive position vis-à-vis largely unregulated investment banks. This is true for the Zambian banking sector where some banks, especially those with ineffective risk management frameworks, have very high capital adequacy ratios.

During the 1990s, Zambia experienced a number of bank failures mainly due to weak corporate governance and risk management structures. For example in 1995 alone, the Zambian banking sector experienced a turbulent period with three commercial banks failing. This included the biggest failure in the history of Zambian banking. None of these failures was attributable to capital deficiency. According to the Financial System Supervision 1995 Annual Report, the major causes of the bank failures were attributed to three factors namely; (1) insider abuse by the shareholders and related parties, (2) incompetent management coupled by ineffective Board of Directors; and (3) foreign exchange exposure risk.

The importance of risk management can also be seen from a macro perspective in terms of the overall financial system stability. Financial stability has largely been defined in terms of preconditions and one such definition is that financial stability is said to exist when all financial risks are adequately identified, allocated, priced and managed (Orr, 2006).

The analysis below, based on a case of a Zambian bank, further illustrates that institutions without proper and adequate risk management systems are not able to recognise on time and mitigate emerging and future risks which could lead to huge losses, thereby threatening their capital reserves and solvency. The adequacy of a bank's regulatory capital should therefore, be premised on a sound risk management framework.

Illustration: scenario from the Zambian banking sector

According to published financial statements of one bank in Zambia, its overall financial performance and condition has been marginal over the last three years, in particular its earnings performance and profitability. Its profitability has been fluctuating between losses and marginal profits during this period. The poor performance has been attributed mainly to lack of a robust risk control and management framework. During the period 2005–2007, the bank invested in lending structures that were more risky than anticipated. The bank, whose balance sheet had been dominated by investments in government securities, grew its loan book without having in place an effective credit monitoring and appraisal system to assist in monitoring and evaluating its credit risk. This resulted in a large non-performing loan portfolio, warranting for high loan loss provisions which impacted negatively on the profitability of the bank.

Further, the bank's balance sheet has not been well managed, especially the liabilities side. Consequently, the bank relies heavily on expensive deposit liabilities and borrowings from

the inter-bank market to meet its liquidity needs. This has resulted in high interest expenses which have affected the bank's profitability. Despite these weaknesses, the bank maintains high capital reserves. For instance, as at 30 June 2008, the bank had US\$10,181 million in excess of its minimum capital requirement of US\$4,975 million. The bank's capital adequacy ratios were 21.3% for primary capital and 30.5% for total regulatory. Both ratios were way above the prudential regulatory requirement of 5% and 10%, respectively.

This example is consistent with the study findings of the Senior Supervisors Group that institutions that had weaker controls over their potential balance sheet growth and liquidity tended to have greater problems during times of turmoil.

Empirical Study done

The Bank of Zambia risk management survey which was conducted in August 2005 as a precursor to the issuance of the Risk Management Guidelines in 2007 revealed that a number of banks did not have a comprehensive approach to risk management. Further, these banks did not have adequate risk management policies and procedures and lacked the requisite expertise to develop and implement the desired risk management practices. This is a clear indication that risk management systems have not kept pace with the financial innovations that have taken place.

For purposes of this paper, the thirteen banks⁷ in the industry surveyed have been grouped into two categories; Category 1 banks and Category 2 banks. Category 1 banks comprises four banks with superior risk management systems while Category 2 banks is the remainder of the nine banks with weak or poor risk management systems.

Table 1 below summarizes responses to some of the key areas of the questionnaire, while Table 2 gives a summary of the variability in the annualized monthly return on assets and capital adequacy ratios for the Category 1 and Category 2 banks, for the thirty six months period from January 2005 to December 2007.

Table 1 reveals that out of the 13 banks, only four were using an advanced risk measurement tool, the Value at Risk model and three of these banks were also using the Earnings at Risk model. These four banks belonged to Category 1.

Table 2
Summary responses of the risk management survey

Questions	Responses		Total
	Yes	No	
1. Does your institution have a comprehensive risk management framework (RMF)?	7	6	13
2. Does your institution have an independent Risk Review Function?	11	2	13
3. What tools do you use to assess the significance of your identified risks?			
(a) Value at Risk	4	9	13
(b) Earnings at Risk	3	10	13
(c) Basic measures	3	10	13
(d) No metric currently used	6	7	13

⁷ This was at the time of the study in 2005.

Table 2 (cont)

Summary responses of the risk management survey

Questions	Responses		Total
	Yes	No	
4. What are your potential barriers to implementing your RMF activities for maximum benefit?			
(a) Lack of appropriate technology	12	1	13
(b) Lack of tools	6	7	13
(b) Cost	5	8	13

Source: Bank of Zambia Risk Management Survey 2007.

The subsidiaries of some foreign banks have benefited from their parent networks in terms of superior risk measurement and management systems. Although the indigenous banks, comprised of small-to-medium sized banks, have also been expanding rapidly both in terms of asset size and product offering, their risk management systems have remained embryonic. As has been pointed out in various studies, rapid growth not commensurate with improvements in risk management systems can pose a threat not only to the solvency of these institutions but also to financial system stability. The combined size of these small-to-medium sized banks is significant and therefore poses systemic risk. This is despite the fact that overall, this category of banks has high levels of excess regulatory capital compared to the Category 1 banks.

From *Table 2* below, we note that the average return on assets (ROA) for Category 1 banks was slightly higher than that of Category 2 banks. Further, the variability⁸ in the ROA was slightly lower for Category 1 banks than that for Category 2 banks. In terms of the capital adequacy ratio (CAR) however, Category 2 banks, on average, had a higher CAR and the variability in the CAR was twice as high as that for Category 1 banks.

The results indicate that Category 1 banks with more superior risk management systems, on average, earned a higher return on assets and were better able to manage the variability in the ROA and CAR.

Table 3

Empirical Study Results

Statistic	Return on Assets		Capital Adequacy Ratios	
	Category 1 Banks	Category 2 Banks	Category 1 Banks	Category 2 Banks
Mean	4.3	4.1	20.0	28.5
Median	4.0	3.3	19.5	28.5
Std. Deviation	2.4	2.6	2.9	6.2
Minimum	0.8	-0.1	16.4	19.7
Maximum	12.0	10.2	25.7	41.2

Source: Bank of Zambia/Own Computations.

⁸ Variability is the standard deviation measure of risk. All other things being equal, the higher the deviation, the higher the risk.

Conclusion

The paper concludes that the Zambian banking sector should draw lessons from the recent global market turmoil which has demonstrated that weak and ineffective risk management systems of financial institutions contributed to their incurring of huge losses. From this perspective, it is therefore, important that all banks in Zambia fully embrace modern risk measurement and management systems.

Banks must also formulate forward looking risk measurement systems and sound practices for managing risks, particularly in times of rapid growth in new products or markets. This is because as pressure mounts up on banks to increase their market share, combined with unrealistic expectations about growth and performance prospects, they fail to adhere even to the basic risk management principles. It is obvious that bankers themselves will be unfamiliar with a new product and therefore will have less or no experience in evaluating the risks that come with it. As new products and transactions emerge or take on new characteristics, different or heightened levels of risk also emerge over time.

Consequently, if not well recognised in advance, possible risks may remain hidden during the normal times and may only manifest during times of stress and may result in devastating effects on the financial condition of the institution.

Further, as pointed out in the paper, capital requirements and adequate risk management systems should not be treated separately, but rather as complimentary. High levels of regulatory capital cannot be a substitute for proper risk management, but rather adequate capital and effective risk management must be complementary. Banks must therefore, establish a good link between their risk exposures and capital.

The challenges that financial innovation poses for public policy and the regulatory framework in ensuring financial stability are enormous and cannot be over-looked. The supervisory approach must therefore, take account of the benefits as well as the risks that accompany financial innovation and the appropriateness of regulatory responses. From a central banker's point of view, the objective of ensuring financial stability remains critical. In light of the evolving financial landscape, financial stability can be said to be dependent on the adequacy of risk management and control systems by market participants, on one hand, and appropriate supervisory responses by the regulator, on the other hand. It is therefore imperative for the Bank of Zambia that as regulator to take a more proactive role, using a combination of both the prescriptive and market-oriented approach, in laying a strong foundation in the proper practice of risk management systems by banks in Zambia. The Bank of Zambia must be seen to be taking a continuous and leading role in providing leadership in research on the latest developments in the field of financial innovation and risk management.

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