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Working Capital Management and Profitability of Banks in Zambia

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Abstract
The objective of this research was to assess how the management practices related to working capital impact the profitability of banks in Zambia. The primary research question guiding this study was: To what degree do the policies and practices regarding working capital management influence the profitability of banks in Zambia? In order to address this question, the study calculated the Return on Average Assets as a metric to measure bank profitability, which served as the dependent variable. Receivables collection period, payables payment period, and cash conversion cycle were adopted as predictor variables, while leverage, bank size, growth and credit risk were the control variables. Descriptive statistics, correlation analysis and fixed effects regression modelling using dummy variables were then used to analyse panel data for 14 commercial banks in the country for the period 2010 to 2021.Based on the findings, the study concluded that overall, effective management of working capital had a statistically significant positive impact on the profitability of banks in Zambia. With respect to individual working capital elements, it was observed that the period for collecting receivables and the duration of the cash conversion cycle had a negative and significant influence on bank profitability. Conversely, the period for making payments on payables had the opposite effect, positively impacting bank profitability.Additionally, the study discovered that when the receivables collection period and payables payment period were utilized instead of the cash conversion cycle in the regression analysis with return on average assets, there was a greater increase in R-square change and squared multiple partial R. This indicates that managing receivables and payables as distinct components of working capital is more advantageous for the banking sector in Zambia compared to employing the cash conversion cycle.
Keywords: Bank, Profitability, Return on average assets, Working capital management, Zambia
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1. Introduction

The objective of this research was to assess how the management practices related to working capital impact the profitability of banks in Zambia. The primary research question guiding this study was: *To what degree do the policies and practices regarding working capital management influence the profitability of banks in Zambia?* The importance of this study is that it provides valuable insights on the extent to which policies and practices implemented to manage working capital enhances profitability of banks in the country. As the bloodline of a business, working capital is critical in ensuring that a bank remains profitable in a manner that enables it to meet its short-term obligations as they fall due.

In order to address the research question above, the study calculated the Return on Average Assets as a metric to measure bank profitability, which served as the dependent variable. Receivables collection period, payables payment period, and cash conversion cycle were adopted as predictor variables, while leverage, bank size, growth and credit risk were the control variables.

The country's central bank, the Bank of Zambia (BoZ), provided data for this study. The BoZ provided summarized audited financial statements on a bank-by-bank basis for the years ended 31 December 2010 to 2021. The anonymized data was for all the 18 banks in the country. However, due to bank mergers and acquisitions which resulted in some banks not to have data for some years, only data for 14 banks was analysed. This sample represents 78% of the population, which gave the researcher comfort that it was large enough to reflect features of the sector.

Descriptive statistics, correlation analysis and fixed effects regression modeling using dummy variables were then used to analyse panel data for 14 of the 18 commercial banks in the country for the period 2010 to 2021. Based on the study's findings, it can be concluded that the management of working capital had a statistically significant positive impact on the profitability of banks in Zambia. When analyzing the specific components of working capital, the receivables collection period and cash conversion cycle were found to have a negative and significant effect on bank profitability, while the payables payment period had the opposite effect.

Furthermore, the study also revealed that when the return on average assets was regressed with the receivables collection period and payables payment period instead of the cash conversion cycle, there was a higher increase in the R-square change and squared multiple partial R. This suggests that managing receivables and payables as

distinct components of working capital is more effective for the Zambian banking sector than relying on the cash conversion cycle.

The remainder of the paper is organised as follows. Section 2 provides a brief review of the prior literature, while the methodology and dataset are described in Section 3. Empirical results are presented in Section 4, and Section 5 offers concluding remarks.

2. Literature Survey

The corporate financial management literature regarding the relationship between working capital management (WCM) and firm performance can be divided into two strands, namely studies of financial institutions and those for non-financial institutions. These two strands reflect the composition of working capital of firms. Compared to financial institutions such as banks, most non-financial institutions are likely to have significant inventory balances such as raw materials, work in progress and finished goods as part of their working capital. Therefore, research findings for studies of non-financial institutions may not be applicable to banks. Since this study focused on financial institutions, only literature about this sector has been included in the review.

Many published studies have been carried out in different parts of the world to understand the extent to which working capital management policies and practices affect firm performance, particularly firm profitability. The findings from these studies have mixed conclusions.

In the more advanced economies, Bourke (1989) studied the internal and external determinants of profitability of twelve banks in Australia, Europe, and North America. The study found that the liquidity ratio as measured by liquid assets to total assets was positively related to return on assets (ROA). In the UK commercial banking industry, Kosmidou, Tanna and Pasiouras (2005) investigated the impact of banks' characteristics, macroeconomic conditions and financial market structure on their return on average assets and net interest margin over the period 1995–2002. They found a positive relationship between working capital (as measured by the ratio of liquid assets to customer and short-term funding) and return on average assets (ROAA), but a negative relationship to net interest margin (NIM). Mazreku, Morina and Zeqaj (2020) affirmed these findings in respect of the effect of WCM on profitability of banks in Kosovo.

A study conducted on a sample of 80 OECD countries, developing countries, and economies in transition during the period of 1988 to 1995 demonstrated that liquidity risk, measured by the ratio of loans to total assets, exhibited a negative correlation with return on assets and a positive correlation with net interest margins (Demirgüç-Kunt & Huizinga, 1999). Another study by Barth *et al*. (2003) investigated the link between the structure, scope, and independence of bank supervision and bank profitability in 2,300 banks across 55 countries. The findings indicated that liquidity risk, measured by the ratio of liquid assets to total assets, was negatively associated with ROA.

In the context of emerging economies, an analysis conducted by Chen *et al*. (2001) focusing on the banking industry in Taiwan from 1993 to 1999 revealed a negative relationship between the ratio of liquid assets to deposits and net interest margins. On the other hand, a study of 98 commercial banks in India revealed that working capital had significant positive effect on profitability of banks (Senan *et al.*, 2021). Furthermore, Rosida and Aisyah (2021) found no significant effect of working capital management policies and practices on profitability in their study of state owned Sharia banks in Indonesia.

In the Middle East, AL-Zararee, Almasria and Alawaqleh (2022) found a statistically significant relationship between working capital management and profitability of banks. They concluded that while there was a positive relationship between receivables collection period, turnover ratio and company size and profitability, the relationship between inventory turnover period and payables payment period and profitability was negative.

In Sub-Saharan Africa, results of similar studies are inconclusive. For example, although a study of the two largest banks in Nigeria concluded that working capital did not significantly affect their profitability (Ogodor and Mukolu, 2015), other researchers who studied deposit banks found the exact opposite (2018). Even more surprising, Umoren and Udo (2015) concluded that while some components of working capital such as the cash conversion cycle had a significant negative relationship with profitability, others such as payables payment period and receivables collection period had no significant relationship. These differences in findings of studies in the same environment could have arisen because the researchers studied different types of banks.

In another Sub-Saharan African country, Ghana, a study by Peprah and Riziki (2019) found that there was a small but significant negative relationship between working capital management and profitability, while Yeboah and Yeboah (2014) concluded that although some components of working capital management such as cash conversion cycle and payables payment period had a statistically significant relationship with profitability, the receivables collection period did not. Similarly, although the cash operating cycle and receivables collection period had a significantly positive relationship with bank profitability, the payables payment period exhibited a significantly opposite relationship with profitability (Agyei and Yeboah, 2011).

The conflicting results regarding the effect of working capital management policies and practices on profitability of banks revealed in the literature suggest that findings of studies carried out in one jurisdiction cannot

be relied on in other economic environments. The current study is therefore justified as the Zambian economic environment is unique and results of studies carried out even in other Sub-Saharan African countries cannot be relied on as a basis for managing working capital of banks in the country.

3. Data and Methodology

A description of the data, data sources, and the empirical model used in the study is provided in this section.

3.1 Data and Data Sources

Data for the study was obtained from the Bank of Zambia (BoZ), the central bank of the country. The dataset consisted of audited financial statements for individual banks covering the period from 2010 to 2021. These financial records were instrumental in calculating the dependent variable, Return on Average Assets (ROAA), which served as a measure of profitability. Additionally, several independent variables were considered, including receivables collection period, payables payment period, cash conversion cycle, bank size, growth, leverage, and credit risk.

The BoZ provided anonymized data for all 18 banks operating in the country. However, due to bank mergers and acquisitions, only data from 14 banks was included in the analysis. This sample encompassed 78% of the total population, which was considered sufficient to capture the characteristics of the banking sector.

3.2 Data Analysis Model

To enhance our understanding of the data utilized in the study, we employed descriptive statistics to summarize the information. Additionally, we conducted variance inflation factor (VIF) and correlation analyses to examine whether there were any issues of multicollinearity among the variables.

The dataset employed in this study comprised both time-series and cross-sectional elements, allowing us to utilize panel data methodology for our analysis. Panel data methodology offers advantages as it permits the inclusion of cross-sectional observations across multiple time periods and helps control for individual heterogeneity caused by hidden factors. This approach assists in reducing biased results.

For the panel data analysis, we employed fixed effects (panel) regression using the Least Squares Dummy Variable approach in SPSS. We chose this approach due to its capability to handle unbalanced and correlated data (SPSS Inc., 2005). In the dataset used, there were missing data for a few banks in the years 2020 and 2021, which influenced our decision to select the fixed effect model over General Linear Models (GLM). The fixed effects model was preferred because it is asymptotically efficient, regardless of whether the data is balanced or not. Furthermore, prior research conducted by Yeboah and Yeboah (2014), who conducted a similar study, demonstrated that fixed effects regression analysis produced superior results compared to ordinary least squares modeling.

To account for all potential differences between cases or banks in measured and unmeasured predictors, we included dummy variables in the model. Consequently, the fixed effect regression model is represented as follows:

$$y_{ij} = \alpha_0 + \beta_1 x_{1ij} + \beta_2 x_{2ij} \ldots \beta_n x_{nij} + \varepsilon_{ij} \quad (1)$$

In the given equation/model, y_{ij} represents the value of the dependent variable for a specific case ij. α0 denotes the constant term, while β1 to βn represent the coefficients of the fixed effect variables (predictors). The variables x_{1ij} through x_{nij} correspond to the fixed effect variables for observation j in group i, and ε_{ij} represents the error term for case j in group i.

The regression models used in this research are as shown below. Table 1 provides definitions of the variables.

$$ROAA_{ij} = \alpha_0 + \beta_{1CCC1ij} + \beta_{2TDAij} + \beta_{3SIZEij} + \beta_{4NPLij} + \beta_{5GROij} + \varepsilon_{ij} \quad (2)$$

$$ROAA_{ij} = \alpha_0 + \beta_{1PPP1ij} + \beta_{2RCPij} + \beta_{3TDAij} + \beta_{4SIZEij} + \beta_{5NPLij} + \beta_{6GROij} + \varepsilon_{ij} \quad (3)$$

4. Empirical Results

4.1 Descriptive Statistics

The descriptive statistics of the variables used in the study are as depicted in Table 2 below. An inspection of the data identified three data points that were considered outliers for payables payment period (PPP). These data points were therefore deleted.

In terms of profitability, bank performance remained low with return on average assets (ROAA) averaging 0.91% (minimum -19% and maximum 8%). This confirms the fact that bank return on average assets (ROAA) is generally low in Zambia and is below the four percent target set by the central bank (Bank of Zambia, 2022). The World Bank Group (2023) aggregate ROA for the banking sector in the country which ranged between 0.8 to 3.1 per cent from 2012 to 2021 is further confirmation of this. The average (standard deviation) receivables collection period (RCP) of the sampled banks was 1,584 days (763), while similar statistics for PPP were 11,299 (8,638) respectively. The average (standard deviation) cash conversion cycle (CCC) of banks was -9,715 days (8,464). Compared to other sectors, banks have much higher RCP, PPP and CCC due to the nature of their business. Additionally, these statistics lend support to the generally accepted view that most banks are highly geared. As a

result, it is no surprise that total debt to total assets ratio (TDA) averaged 7.7% (minimum 0.15% and maximum 71.79%).

Table 1 Definitions of variables

Variable	Type	Definition	Expected relationship between predictor and outcome factors
Profitability (ROAA)	Dependent	Return on Average Assets measured as profit or loss after tax over average assets.	
Cash Conversion Cycle (CCC)	Independent	The difference between receivables collection period and payables payment period.	Negative
Payables Payment Period (PPP)	Independent	The ratio of bank short-term debt to interest expense x 365 days. Short-term debt includes all current deposits from customers and other banks, income tax, provisions and other liabilities.	Positive
Receivables Collection Period (RCP)	Independent	The ratio of receivables to interest income x 365 days.	Negative
Leverage (TDA)	Independent (control variable)	Ratio of total debt divided by total net assets.	Positive
Bank Size (SIZE)	Independent (control variable)	The log of total assets	Positive
Credit Risk (NPL)	Independent (control variable)	Non-performing loans to total loans	Negative
Growth (GRO)	Independent (control variable)	Interest income in year one minus interest income in year zero divided by interest income in year zero	Positive

The log of bank assets had a mean (standard deviation) of 14.62 (1.218), whereas bank growth averaged at about 45%. In terms of credit risk, the average non-performing loan ratio (NPL) of 7.2% was not far off from the World Bank Group (2023) range for the country of 4.8 to 14.8% between 2010 and 2021.

Table 2 Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Return on Average Assets	160	-.19	.08	.0091	.03971
Receivables Collection Period	159	400	4598	1584.17	763.032
Payables Payment Period	159	2350	61134	11298.81	8638.077
Cash Conversion Cycle	159	-57473	-726	-9714.62	8464.482
Bank Size	160	12	17	14.62	1.218
Bank Growth	160	-94	1981	44.67	160.322
Bank Leverage	160	.15	71.79	7.7271	7.00670
Credit Risk	160	.00	.43	.0722	.06930
Valid N (listwise)	159				

4.2 Correlation Analysis

Variance inflation factor (VIF) and correlation analyses were used to test the presence or absence of multicollinearity among the variables. The correlation results reported in Table 3 below show that apart from CCC and PPP which had a correlation coefficient of -.996 and therefore, very highly correlated, all the correlations between the other predictor variables had either medium (and only NPL and CCC, and NPL and TDA, for that matter) or low strength of association. According to Cohen (1988, pp.79-81), the effect size of a correlation is considered small if below 0.3, medium/moderate if between 0.3 and 0.5 and large/strong if above 0.5. This also

applies to negative associations.

To address the multicollinearity between CCC and PPP, we used the stepwise regression method to the working capital variables. Accordingly, two models namely, Model A which excluded RCP and PPP and only used CCC, and Model B which excluded CCC (the difference between RCP and PPP) emerged.

The VIF of the two models were estimated as shown in Table 4 below. The very low VIF means of Model A and B of 1.16 and 1.12 respectively, suggest the absence of multicollinearity among predictor variables in both models. As Pallant (2020, pp.246-247) asserts, tolerance values larger than 0.10 and VIF values lower than 10 suggest tolerable multicollinearity amongst the predictor variables.

Table 3 Correlations Analysis

Correlations								
	ROAA	RCP	PPP	CCC	SIZE	GRO	TDA	NPL
ROAA	1							
RCP	-.230	1						
PPP	.216	.269	1					
CCC	-.241	-.185	-.996	1				
SIZE	.433	-.155	.109	-.125	1			
GRO	-.001	.005	.018	-.018	.047	1		
TDA	-.251	-.078	-.010	.004	.040	.001	1	
NPL	-.240	.084	-.298	.312	.065	-.041	.414	1

4.3 Fixed effects regression model

The results for the fixed effects regression using dummy variables are presented in Table 5 below.

Table 4 Collinearity Statistics

Collinearity Statistics				
	Model A		**Model B**	
	Tolerance	**VIF**	**Tolerance**	**VIF**
CCC	0.863	1.16		
SIZE	0.97	1.03	0.929	1.08
GRO	0.995	1.01	0.995	1.01
TDA	0.811	1.23	0.788	1.27
NPL	0.723	1.38	0.684	1.46
RCP			0.828	1.21
PPP			0.766	1.31
Mean VIF		**1.16**		**1.22**

Table 5 Fived Effects Regression Results for Model A and B

Variables	**Model A**			**Model B**		
	Coefficients	**t-values**	**Significance**	**Coefficients**	**t-values**	**Significance**
Constant	.012	1.252	.212	.012	1.252	.212
Bank Size	.025	7.925	.000	.025	8.243	.000
Bank Growth	3.676E-6	.245	.807	6.081E-7	.043	.966
Bank Leverage	.000	-1.070	.286	-.001	-1.566	.119
Credit Risk	-.114	.750	.007	-.065	-1.580	.116
Cash Conversion Cycle	-8.350E-7	-2.192	.030			
Receivables Collection Period				-1.901E-5	-4.510	.000
Payables Payment Period				1.262E-6	3.378	.001
	R square	.499		R square	.555	
	Adj R square	.438		Adj R square	.498	
	R square change	.233		R square change	.290	
	F change	13.876		F change	16.061	
	Sig.	.000		Sig.	.000	
	Multiple $R^2_{partial}$	.317		Multiple $R^2_{partial}$	.394	

The R-square change for Model A of 0.233, (Model B: 0.290), are significantly greater than zero [F(5,149) = 13.876, p<.000], {Model B: [F(6,148) = 16.061, p<.000]}. This R-square change suggests that the additional time-varying regressors enhance the percentage of total variation accounted for in bank profit by 23.3% (Model B: 29%) after accounting for between bank differences. The squared multiple partial R (calculated using the formula below) shows that the time-varying predictors account for 31.7% of the unexplained variation in profitability after residualizing for the dummy variables for Model A (Model B: 39.4%).

$$Multiple\ R^2_{partial} = \frac{R^2_{model2} - R^2_{model1}}{1 - R^2_{model1}} = \frac{\Delta R^2}{1 - R^2_{model1}} \quad (4)$$

The statistical results from both models indicate that the management of working capital has a statistically significant impact on the profitability of banks in Zambia. This finding aligns with the conclusions of numerous researchers in different jurisdictions, such as Kosmidou, Tanna, and Pasiouras (2005), Osuma *et al*. (2018), and AL-Zararee, Almasria, and Alawaqleh (2022).

Furthermore, the study revealed that Model B, which incorporated the variables of receivables collection period (RCP) and payables payment period (PPP), provided a better fit for the data compared to Model A, which utilized the cash conversion cycle (CCC). This was evident from the higher values of R-square change and squared multiple partial R in Model B. Therefore, the findings suggest that in Zambia, it is more effective to manage receivables and payables separately than to focus solely on the cash conversion cycle.

4.4 Working capital management (WCM) and profitability

With respect to the effect of the WCM independent variables, the RCP had a negative statistically significant relationship with bank profit, while PPP had a positive statistically significant relationship. The CCC had a negative statistically significant association with ROAA, which is expected given the relationship RCP and PPP had with ROAA. These relationships are as expected because with respect to RCP, profitability is more likely to decline when customers take longer to repay their loans due to increased level of default. On the other hand, banks can earn more interest by investing funds if they take longer to settle their debts. Regarding CCC, the expectation is that a shorter cash conversion cycle should enhance bank profitability because readily available liquid funds can be invested to earn income.

However, many researchers have found contrary results to this study's findings in terms of the relationship between RCP and PPP, and bank profitability (Agyei and Yeboah, 2011; AL-Zararee, Almasria and Alawaqleh, 2022). With respect to CCC, Senan *et al.* (2021) did not find any significant effect of this variable on profitability.

4.5 Bank size, growth, leverage and credit risk, and profitability

As shown in Table 5 above, the results indicate a positive statistically significant correlation between bank size and profitability in both models. In particular, the study suggests that a one unit increase in bank size, enhances ROAA by 2.5%. The concepts of economies of scale and high bargaining power which are associated with large scale operations could be used to explain this finding. This finding is also supported by most previous empirical studies carried out in different parts of the world (Agyei and Yeboah, 2011; Umoren and Udo, 2015; Piabuo, 2016; AL-Zararee, Almasria and Alawaqleh, 2022). However, a few studies have found contrary results to this study's findings regarding the association between bank size and profitability. Yeboah and Yeboah (2014), for example, found that bank size had a marginally negative relationship with bank profitability. They attributed this to diseconomies of scale that could arise from managerial inefficiency due to expansion. They also posited that bank expansion ultimately meant opening more branches in unattractive locations, which increased operational costs.

Bank growth, leverage and credit risk had no statistically significant association with bank profitability in Model A. Of these three predictor variables, only credit risk had a negative statistically significant association with ROAA in Model B. Similar empirical studies have revealed no significant relationship between bank growth and profitability (Agyei and Yeboah, 2011; Yeboah and Yeboah, 2014), leverage and profitability (Senan *et al*., 2021), and credit risk and profitability (Yeboah & Yeboah, 2014).

However, other researchers have found these variables to have positive or negative significant effect on bank profitability. These include the effect of leverage (Agyei and Yeboah, 2011; Yeboah and Yeboah, 2014; Umoren and Udo, 2015) and credit risk (Agyei and Yeboah, 2011) on profitability. For example, in their study of banks in Kosovo, Mazreku, Morina and Zeqaj (2020) found a significant inverse relationship between leverage and return on assets. They attributed this to the fact that if banks continuously increased their debt financing, then the resultant increase in interest rates on deposits would trigger higher financing cost, which directly reduces profitability.

5. Conclusion

This study aimed to assess the impact of working capital management policies and practices on the profitability of banks in Zambia. The findings of the study indicated that effective working capital management significantly enhanced profitability of banks in the country. When examining the specific components of working capital, receivable days and cash conversion cycle were found to have a negative and significant effect on bank profit,

meanwhile, payable days had the opposite effect.

Additionally, the study determined that Model B, which utilized the receivables collection period (RCP) and payables payment period (PPP) as working capital variables, provided a better fit for the data compared to Model A, which used the cash conversion cycle (CCC) instead. This conclusion was supported by the higher values of R-square change and squared multiple partial R observed in Model B. Therefore, the findings suggest that in Zambia, it is more effective to manage receivables and payables separately than to focus solely on the cash conversion cycle.

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