Economic Determinants of Non-performing Loans (NPLs) in Ugandan Commercial Banks

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Abstract: Commercial banks are very important financial institutions in the financial system and the global economy. However, in their course of lending, commercial banks are confronted with non-performing loans (NPLs) that tend to escalate into financial crisis when left unresolved. In the view of this reality, this study examines the economic determinants of NPLs in Ugandan commercial banks. Using the entire population of 25 commercial banks in Uganda, with secondary data obtained from BOU and WB databases over the period 2000-2013, this designed experimental research attempts to establish the cause-effect relationships among the variables. A multiple linear regression model was applied to examine the effect of four economic factors: inflation rate, exchange rate, interest rate and GDP growth. The findings reveal that inflation rate, interest rate and GDP growth have a negative but statistically insignificant effect on NPLs while the effect of interest rate on NPLs is positive but insignificant. Moreover, commercial banks in Uganda are recommended to observe economic factors, in addition to bank-related factors when extending loans.

Key words: Non-performing loans, economic determinants, interest rate, exchange rate, inflation rate, GDP growth

JEL classification: C12, C31, C51, C82, E43, E44, G20, G21, Y10

1. INTRODUCTION

The importance of a strong and healthy banking sector to a country’s economic growth and development is well-established in literature (Adekunle, Salami & Adedipe Oluseyi, 2013). Efficient banking systems help countries to grow, partly by widening access to external finance and channelling resources to the benefitting sectors (Mugume, 2007). They can do so, if banks generate the necessary income to cover their operational cost they incur in due course (Ongore & Kusa, 2013). However, in their business of lending, banks are faced with default by loan borrowers that result in non-performing loans (NPLs hereafter)—a hindrance to the efficiency of bank activities (Haneef et al., 2012). NPLs create problems for the banking
sector’s balance sheet on the asset side, and have a negative impact on the income statement as a result of provisioning for loan losses (Kumar & Tripathi, 2012). In the worst scenario, a high level of NPLs in the banking system poses a systemic risk, inviting a panic run on deposits and sharply limiting financial intermediation, and subsequently, investment and growth (Istrate, Debasree & Weissburg, 2007); which could be further exacerbated if it is combined with external shocks, an unfavourable phase of the macroeconomic cycle, or inadequate political or legal support (Tiwari, 2011). Moreover, a high ratio of NPLs to total outstanding loans is in itself an indication of a banking crisis (Alhassan, Kyereboah-Coleman & Andoh, 2014). In fact, researchers have ascertained that the financial/banking crises in East Asia and Sub-Saharan African countries were preceded by high NPLs (Collins & Wanjau, 2011; Rono, Wachilonga & Simiyu, 2014; Vatansever & Hepsen, 2013; Latif, Kyereboah-Coleman & Andoh, 2014).

In Uganda, the health of the financial sector has been impaired by a long period of civil strife and economic mismanagement that produced a severe contraction of Uganda’s monetary economy, a decline in financial intermediation and a loss of financial depth (Mutebile, 2011). As a result of these troubles, the banking sector that accounts for 80% of the financial sector faced a crisis in the 1990s (Kagaari, 2014). Consequently, several commercial banks were declared insolvent, taken over by the central bank and eventually sold or liquidated (Mukokoma, 2012). All the banks that were closed were bedevilled with tremendous levels of NPLs (Odeke & Odongo, 2014). In a bid to improve financial stability and reduce NPLs, the Ugandan government in May 1987 embarked on an Economic Recovery Program (ERP), which included a range of financial sector reforms (Opolot & Kuteesa, 2006). To further reduce the incidences of high level of NPLs, the Bank of Uganda instituted a credit reference bureau on the rationale that timely and accurate information on borrowers’ debt profile and repayment history would reduce information asymmetry between borrowers and lenders (Bank of Uganda, 2005). The institution of the credit reference bureau was anticipated to enable banks to, among other things, lower the default risk or credit risk and reduce NPLs, and consequently contribute to financial deepening in the economy (Mutebile, 2008). Unfortunately, the levels of NPLs in Uganda have continued to remain high despite the financial sector reforms. For example in 2013, the level of NPLs increased to 6% from 4.2% in 2012, higher than neighbouring Kenya (Bank of Uganda, 2013).

It is hypothesised that the macroeconomic environment plays the most important role in NPLs and the stability of the economy (Janvisloo & Muhammad, 2013). The banks’ performance in an economic downturn is thus improved only if the real economy is stabilised, to which a credible macro policy can make a significant contribution. In a downturn, internal funding sources dry up as existing loans generate only small cash flows and may even cause highly restricted lending. External funding is hampered since the funding liquidity of new loans is low in a weak environment with a risky outlook (Bucher, Dieterich & Hauck, 2013). This
raised curiosity and hence the need to investigate whether the higher levels of NPLs in Uganda are due to the economic determinants. The rest of the paper is structured as follows: Section 2 reviews the literature on economic determinants and NPLs, Section 3 presents the data and methodology, Section 4 analyses the data and discusses the results, and finally, the conclusion is presented in Section 5.

2. LITERATURE REVIEW

Several studies have examined NPLs' determinants and concluded that the macroeconomic environment plays an important role in this matter. In the United States, Saba, Kouser and Azeem (2012) employed a correlation and regression model to investigate the determinants of NPLs for the period 1985 to 2010. According to the authors, real GDP per capita, inflation, and total loans have a significant impact on NPLs.

In China, Zeng (2012) used a utility function (loss function) and a model designed using optimal control theory to analyse the bank NPLs for the period 1999 to 2010. The author concluded that the bank NPLs are dependent on microeconomic factors under the circumstances of macroeconomic factors, of which the macroeconomic factors include the degree of openness to the outside world and government policy.

Studies have also been conducted on some European Union (EU) countries. For example, Klein (2013) investigated the determinants and impact of NPLs on macroeconomic performance in CESEE for the period 1998–2011 using a dynamic panel regression analysis. According to the author, the level of NPLs can be attributed to both macroeconomic conditions and the banks’ specific factors, though the latter set of factors had a relatively low explanatory power. He affirmed that NPLs respond to macroeconomic conditions, such as GDP growth, unemployment, and inflation. Relatedly, in his study to establish the determinants of NPLs in Central and Eastern European countries using reputed conditional risk model and dynamic panel regressions for the period 2003-2011, Moinescu (2012) confirmed that GDP growth is the prominent macroeconomic explanatory variable of NPLs’ development among CEE economies. Furthermore, in order to investigate the macroeconomic factors of NPLs in the commercial banks of EU countries, Mileris (2014) carried out an empirical study on the commercial banks in the EU countries. Results confirmed a tight dependency of NPLs on changes of the economic environment in the country. The author maintained that the deterioration in GDP, exports, compensation of employees, final consumption expenditures of households, unemployment rate, the number of bankrupted companies and government expenditures highly increased the percentage of NPLs in Lithuanian banks. Equally important is the study of Louzis, Vouldis and Metaxas (2012) who analysed the macroeconomic and bank-specific determinants of NPLs in Greece separately for each type of loan (consumer, business and mortgage loans) using dynamic panel data methods. Results revealed that NPLs in the Greek banking system can be explained mainly by macro fundamentals (which include GDP,
unemployment, interest rates) and management quality. The authors maintained that the quantitative impact of each factor on NPLs is different. In an effort to investigate the determinants of NPLs in the Euro zone, Makri, Tsagkanos and Bellas (2014) also applied a dynamic panel regression method on 17 countries in the eurozone for the period 2000-2008. The overall results revealed strong correlations between NPLs and various macroeconomic factors (public debt, unemployment, annual percentage growth rate of gross domestic product).

Evidently, from the literature reviewed so far, most studies focused on developed and European countries. Studies on other developing countries other than EU countries only started recently. For example, Ombaba (2013) conducted a study to assess factors contributing to NPLs in Kenyan banks for the period 2008-2012. According to the author, interest rates, inflation rate and GDP growth are the macroeconomic factors that have led to increased NPLs in Kenyan Banks. In addition, Badar & Javid (2013) compiled their findings on the basis of Johansen and Juselius multivariate cointegration model and Granger causality test covering a period of 2002-2011 so as to analyse the impact of macroeconomic forces on NPLs in Pakistan commercial banks. Results of the study revealed that inflation and exchange rate caused NPLs in commercial banks of Pakistan during that time. The authors also asserted that macroeconomic indicators are the sizeable determinants of NPLs.

Similarly, Fofack (2005) focused on investigating the leading causes of NPLs during the economic and banking crises that affected a large number of countries in Sub-Saharan Africa in the 1990s. The empirical analysis shows a dramatic increase in NPLs and extremely high credit risk that is largely driven by macroeconomic volatility. The author highlighted a strong relationship between NPLs and economic growth, real exchange rate appreciation, the real interest rate, net interest margins and interbank loans. Likewise, Ouhibi & Hammami (2015) analysed determinants of NPLs in the Southern Mediterranean countries. The research findings highlighted external factors, namely nominal exchange rate, the consumer price index and the gross capital formation as the major determinants of non-performing loans in the Southern Mediterranean countries. Moreover, Turan & Koskija (2014) examined NPLs in Albania for the period 2003-2013 by applying Johansen multivariate co-integration test. Results of this test revealed that a relationship exists between NPLs and real GDP, unemployment, inflation, loan interest rate, and remittance. Farhan, Sattar, Chaudhry and Khalil (2012) also studied the perception of Pakistan bankers regarding the economic factors causing NPLs in the Pakistan banking industry since 2006 by using the correlation and regression model. According to the results, Pakistani bankers perceive that interest rate, energy crisis, unemployment, inflation, and exchange rate have a significant positive relationship with the NPLs of Pakistani banking sector while GDP growth has significant negative relationship.

Using a time series data multiple liner regression model, Jameel (2014) also investigated the crucial factors of NPLs with evidence from Pakistani banking
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sector for the period 2000-2010. The study highlighted GDP growth rate as one of the crucial factors affecting NPLs in Pakistan; not to mention, Masood, Bellalah, Mansour and Teulon (2010) who focused on analysing NPLs and credit managers’ role in Pakistan and Turkey by applying the ordered probit model on the primary data collected. Results of this study concluded that government intervention is a major determinant of NPLs in Turkey.

From the above literature, GDP, interest rate, inflation rate, unemployment, exchange rate, degree of openness to the outside world, government policy, and credit growth have been identified as economic variables that have a strong relationship with NPLs basing on the macro environment of Uganda. Literature establishes and explains their relationship with NPLs as discussed below.

2.1 Interest Rate

Interest rate is one of the primary economic determinants of NPLs/bad loans (Farhan et al., 2012). It is the measure of borrowed funds (Louzis et al., 2012). An increase in interest rate affects the performing assets in banks as it increases the cost of loans charged on the borrowers and reduces the borrower’s capacity to pay (Ombaba, 2013). Thus, the relationship between interest rate and NPLs is expected to be positive.

2.2 Exchange Rate

The exchange rate referred to in this study is the real exchange rate defined as the price of a nation’s currency in terms of another currency. A decrease in home currency will result in costly imported goods which put a pressure to finance letter of credits issued to traders by commercial banks, and thus increasing the risk of default, and vice versa (Badar & Javid, 2013). The impact of exchange rate on the NPL level is severe in countries with a high degree of lending in foreign currencies to unprotected borrowers (Turan & Koskija, 2014). Thus, a positive relationship between the two variables is expected.

2.3 GDP Growth

GDP is one of the indicators of the health of any country’s economy. The GDP referred to in this study is the real GDP, which is the macroeconomic measure of the value of economic output adjusted for price changes. Increasing real GDP is usually associated with decreasing levels of NPLs (Beck, Jakubik & Piloiu, 2013). This is because a strong positive growth in real GDP usually translates into more income which improves the debt servicing capacity of the borrower, which in turn contributes to lower NPLs and vice versa (Khemraj & Pasha, 2009). From this literature, a negative relationship is expected between the two variables.
2.4 Inflation Rate

Inflation refers to the sustained increase in the general prices of goods and services in an economy over time. The relationship between NPLs and inflation is ambiguous. Higher inflation can make debt servicing easier either by reducing the real value of outstanding loans, or simply because it is associated with low unemployment as the Phillips’ curve suggests. However, it can also weaken some borrowers’ ability to service debt by reducing real income when wages are sticky (Nkusu, 2011). Inflation may pass through nominal interest rates as lenders adjust rates to maintain their real returns or simply to pass on increases in policy rates resulting from monetary policy actions to combat inflation, thus reducing borrowers’ loan-servicing capacity (Skarica, 2014). Based on this literature, a positive relationship is expected between the two variables.

3. RESEARCH METHODOLOGY

The study took the form of an experimental research design that attempts to establish cause-effect relationships among the variables. It was quantitative in nature and based on secondary data. Using the entire population of 25 commercial banks in Uganda, secondary data was obtained from BOU and WB databases over the period 2000-2013. The data sources were justified given the fact that data on NPLs in all commercial banks were made available in Bank of Uganda’s financial stability reports and bank annual supervision reports.

Data collected was analysed using Microsoft Excel and the Statistical Package for Social Sciences (SPSS). In addition, correlation analysis was used to test for the hypotheses and a regression model analysis to examine the effect of each predictor variable on NPLs in commercial banks in Uganda. The regression results were then tabulated and presented, and each parameter was discussed in line with the evidence in the literature.

3.1 Model Specification

To achieve the objectives of the study, a model was developed using economic determinants as independent variables and NPL levels as the dependent variable. The basis of the econometric model is empirical literature and reviewed theory. The study adopted particularly the linear regression model explained by Carlos and Bonilla (2012). The model is presented as below:

\[ Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e \]

where;

- \( Y \) = Level of NPLs
- \( a \) = Constant term
- \( \{ \beta_i; i = 1, 2, 3, 4 \} \) = The coefficients representing the various independent variables—also referred to as predictor variables
X1 = Interest rate  
X2 = Inflation rate  
X3 = Exchange rate  
X4 = Growth domestic product growth

e = The error term which is assumed to be normally distributed with mean zero and constant variance.

4. RESULTS
Regression analysis was used to establish the effect of economic determinants on the NPL level. The four factors which include: exchange rate (EXC), inflation rate (INF), GDP growth (GDP) and interest rate (INT) were used as the predictor variables and the NPL ratio as the dependent variable for the multiple regression model. From appendix 2C, the model equation was established as follows:
\[ NPL_t = 14.829 - 0.120 \text{EXC} + 0.240 \text{INT} - 0.048 \text{INF} - 0.340 \text{GDP} + 1.68032. \]

Through the analysis of the coefficients, predictor variables EXC, INF, and GDP were shown to have a negative impact on NPLs with a coefficient of \(-0.120\), \(-0.048\) and \(-0.340\) respectively. This indicates that one unit change (increase/decrease) in EXC, INF, and GDP results in a change in the NPL’s rate by 0.120, 0.048 and 0.340 units in the opposite direction. For INT, its impact on NPLs was positive with a coefficient of 0.240, implying that one unit change in INT results in a 0.240 units change in the NPL’s rate in the same direction. These regression results were consistent with the correlation results. The table below compares the regression analysis results, correlation results and the initial hypotheses.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression Coefficient</th>
<th>Significant p-value</th>
<th>Significant/No</th>
<th>Initial hypothesis</th>
<th>Regression results</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXC</td>
<td>-0.120</td>
<td>0.172</td>
<td>No</td>
<td>Positive</td>
<td>Negative</td>
<td>Negative</td>
</tr>
<tr>
<td>INT</td>
<td>0.240</td>
<td>0.161</td>
<td>No</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>INF</td>
<td>-0.048</td>
<td>0.763</td>
<td>No</td>
<td>Positive</td>
<td>Negative</td>
<td>Negative</td>
</tr>
<tr>
<td>GDP</td>
<td>-0.340</td>
<td>0.186</td>
<td>No</td>
<td>Negative</td>
<td>Negative</td>
<td>Negative</td>
</tr>
</tbody>
</table>

4.1 Interpretation and Discussion
In order to discuss the results, previous empirical and theoretical evidences were referred to. The results are discussed in line with the study objectives.
4.1.1 Exchange rate
The first objective of the study was to investigate the effect of exchange rate on NPLs. Contrary to the hypothesised positive relationship, regression analysis results revealed a negative relationship between exchange rate and NPLs ($\beta$-value = $-0.417$, $p = 0.172$), but insignificant. These regression results are similar to the correlation results, although the relationship was significant for correlation results. Findings of a negative relationship imply that when the exchange rate increases, the level of NPLs decreases and vice versa. These findings are in agreement with the study done by Zeman & Jurca (2008) whose work asserted that exchange rate affected the level of NPLs negatively. Zeman & Jurca (2008) supported the above findings by stating that any increase in exchange rate favours domestic exporters as it makes domestic products more competitive and increases the exporters’ profits. Consequently, the financial situation of the exporters is improved which reduces the default rate. The study findings are also in line with the work of Babihuga (2007), Faward and Taqodus (2013) and Quagliariello (2003) who argued that the increase in exchange rates has a positive income effect through increase in net exports, and thereby increasing the repayment capacity of borrowers in an economy.

4.1.2 Inflation rate
The second study objective was to investigate the effect of inflation rate on the level of NPLs. Results from the regression analysis established a negative but insignificant relationship between the two variables ($\beta$-value = $-0.107$, $p$-value = 0.763). These regression results were similar to the correlation results. The negative relationship between the two variables implies that when inflation increases, the level of NPLs decreases and vice versa. These findings are in line with the work of Lleshanaku (2015), Fofack (2005), Bofondi and Ropele (2011), Valabzaghard et al. (2012), Khemraj and Pasha (2009), and Quagliarello (2007) whose work concluded that the relationship between inflation rate and NPLs rate is insignificant. Carlos and Bonilla (2012); Constant and Ngomsi (2012), Shingjergji and Shingjergji (2013) also supported the findings of this study by arguing that the inflation variable is statistically insignificant in explaining NPLs.

However, these findings are in contrast with the study hypothesis that hypothesised a positive relationship between inflation rate and level of NPLs as concluded by authors like Adebola, Yusoff and Dahalan (2011) and Richard (2011). This contrast is not surprising as the relationship between inflation rate and level of NPLs is ambiguous based on literature. According to Nkusu (2011), higher inflation can affect the level of NPLs negatively or positively. Theoretically, high inflation should reduce the real value of debt and hence make debt servicing easier. However, high inflation may pass through to nominal interest rates and weaken some borrowers’ ability to service debt by reducing real income when wages are sticky (Skarica, 2014).
4.1.3 Interest rate

The third objective of the study was to investigate the effect of interest rate on the level of NPLs.

Similar to the study hypothesis, regression analysis between the two variables established a positive relationship ($\beta$-value = 0.420) but insignificant at 0.161. These regression results were similar to the correlation results although correlation results established a significant relationship. This implies that increase in interest rate increases the level of NPLs. Similarly, this finding is supported by Kaplin et al. (2009), Patnaik and Shah (2004), Clementina and Isu (2014) whose work concluded a weaker or insignificant relationship between interest rate and the level of NPLs. In line with the findings, Swamy (2012) also argued that interest rates are insignificant in affecting the NPLs. Thus, the NPL level does not necessarily depend on the level of central bank prime rate as per this study.

Withal, these findings are in contrast with the general perception of a significant positive relationship between interest rate and level of NPLs. As per international evidence, increase in the central bank rate (central bank rate) should increase the cost charged on loans which should consequently weaken the borrower’s debt servicing capacity, more so if the rates are variable (Ombaba, 2013). The insignificance of the study findings may have resulted from the use of a small sample for the research. Perhaps future studies using a larger sample may provide a significant positive relationship rather than an insignificant relationship between interest rate and the level of NPLs.

4.1.4 GDP growth

The last objective of the study was to investigate the effect of GDP growth on the level of NPLs. Regression results established a negative but insignificant relationship between the two variables ($\beta$-value = -0.337, p-value= 0.186). These results were similar to the correlation results in direction, but the difference in the level of significance as correlation established the relationship between GDP growth and level of NPLs to be significant. This implies that an increase in GDP growth results in a decrease in the levels of NPLs and vice versa. These findings are in line with the work done by Tomak (2013) and Alexandria & Santoso (2015) who concluded that GDP growth has insignificant negative relationship with the NPLs.

Nevertheless, the study findings are contrary to the initial hypothesis predicting a significant negative relationship between GDP growth and level of NPLs. The group of authors behind this conclusion (for example, Khemraj & Pasha 2009; Clementina & Isu (2014)) argued that in theory, an improvement in the real economy should see an instantaneous reduction in the NPLs. Generally, a growing economy increases borrowers’ income and ability to repay debts and subsequently, increases overall financial stability. Thus all subjects in one economy when getting higher incomes will ideally be more capable of repaying their debts and this will be translated into lower
NPLs ratios (Shingjergji, 2013). The insignificance of the study findings may have resulted from using a small sample size for the research. Using a larger sample for future studies may provide significant rather than insignificant negative relationships between the variables.

5. CONCLUSION

The study attempted to investigate the economic determinants of NPLs in commercial banks in Uganda using secondary data and a regression model similar to Carlos & Bonilla (2012). Contrary to most of the international evidence, findings of this study do not support the view that economic factors specifically interest rate, real effective exchange rate, and real GDP growth and inflation rate impact significantly on the level of NPLs. In particular, the study found a significant negative relationship between GDP growth and NPLs with correlation analysis, but insignificant with regression analysis. Similarly, exchange rate portrayed a negative relationship with the level of NPLs which was significant when performed with the correlation analysis, and insignificant with the regression analysis.

The study also found evidence of a negative relationship between inflation rate and level of NPLs that was insignificant with both the correlation analysis and the regression analysis. On the other hand, the relationship between interest rate and level of NPLs was found to be positive and insignificant with both the correlation and regression analysis. Overall, the relationship between all the independent variables selected for this study and NPLs ratio was insignificant. Thus, as per this study, exchange rate, inflation rate, interest rate and GDP growth are not important factors in explaining the variation in the level of NPLs ratio in Ugandan commercial banks for the period 2000-2013.

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References


Appendix 1. Correlation analysis results between dependent and independent variable

<table>
<thead>
<tr>
<th></th>
<th>Non-performing loans</th>
<th>Exchange rate</th>
<th>Inflation rate</th>
<th>Interest rate</th>
<th>Gross domestic product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-performing loans</td>
<td>Pearson Correlation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig (2-tailed)</td>
<td>1</td>
<td>-.565*</td>
<td>-.268</td>
<td>.424</td>
<td>-.617*</td>
</tr>
<tr>
<td>N</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Exchange rate</td>
<td>Pearson Correlation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig (2-tailed)</td>
<td>0.035</td>
<td>.011</td>
<td>.790</td>
<td>.250</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>Pearson Correlation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig (2-tailed)</td>
<td>.355</td>
<td>.072</td>
<td>.324</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Interest rate</td>
<td>Pearson Correlation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig (2-tailed)</td>
<td>.424</td>
<td>.078</td>
<td>.495</td>
<td>1</td>
<td>-.267</td>
</tr>
<tr>
<td>N</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Gross domestic product</td>
<td>Pearson Correlation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig (2-tailed)</td>
<td>-.617°</td>
<td>.329</td>
<td>.285</td>
<td>-.267</td>
<td>1</td>
</tr>
<tr>
<td>N</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
Appendix 2. Multiple regression results

Appendix 2A. Model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.806(^a)</td>
<td>.650</td>
<td>.495</td>
<td>1.68032</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Gross Domestic Product (GDP), interest rate, exchange rate, inflation rate
b. Dependent variable: Non-performing loans
Appendix 2B. ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Regression</td>
<td>47.249</td>
<td>4</td>
<td>11.812</td>
<td>4.184</td>
<td>.035</td>
</tr>
<tr>
<td>Residual</td>
<td>25.411</td>
<td>9</td>
<td>2.823</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>72.660</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent variable: Non-performing loans
b. Predictors: (Constant), Gross Domestic Product (GDP), interest rate, exchange rate, inflation rate

Appendix 2C. Coefficients for the regression analysis

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Tolerance</td>
</tr>
<tr>
<td>(Constant)</td>
<td>14.829</td>
<td>8.457</td>
<td>1.756</td>
<td>.113</td>
<td></td>
</tr>
<tr>
<td>Exchange rate</td>
<td>-.120</td>
<td>.081</td>
<td>-.417</td>
<td>-.1485</td>
<td>.172</td>
</tr>
<tr>
<td>Interest rate</td>
<td>.240</td>
<td>.157</td>
<td>.420</td>
<td>1.528</td>
<td>.161</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>-.048</td>
<td>.155</td>
<td>-.107</td>
<td>-.311</td>
<td>.763</td>
</tr>
<tr>
<td>Gross Domestic product</td>
<td>-.340</td>
<td>.238</td>
<td>-.337</td>
<td>-.1430</td>
<td>.186</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Non-performing loans