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## Efficiency of commercial banks and financial sector development in Tanzania

Ramadhan K Abdulwahabi<sup>1</sup>, Dr. Masoud Rashid Mohamed<sup>2</sup>

<sup>1</sup> MSc. in Economic and Finance, Zanzibar University, Tunguu, Tanzania

<sup>2</sup> Supervisor, Zanzibar University, Tunguu, Tanzania

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### Abstract

The purpose of this study was to investigate the link between banking sector efficiency and financial development in Tanzania. The study applied the semi-non parametric Fourier flexible functional approach to estimate bank cost efficiency for the data covering 2022 to 2020 for twelve selected commercial banks. To establish the relationship between banking sector efficiency and financial development, the study made use of the Instrumental Variables (IV) 2SLS estimator

The study made very important findings and contributions to literature. Firstly, the study found that the efficiency level of banks included in the sample averaged 76% over the period, 2011- 2020. This means that there is about 24% inefficiency in terms of cost. Thus, banks in Tanzania could actually save up to almost a quarter of their cost if they were to operate efficiently. It is also found that causality runs positively in both directions between bank cost efficiency and financial development. This means that as banks become more cost efficient, financial sector develops further and credit allocation gets more distributed in the real economy.

Similarly, it is important that policy makers know that financial sector policies that deepen the financial system also result in cost efficiency in the banking sector by challenging the banking sector to be innovative and efficient in their bid to increase shareholder value. Among the other control variables, inflation is found to destabilize the financial development. Excessive government spending in the financial sector appears to destabilize banking sector efficiency. Also, a good legal environment improves financial development.

**Keywords:** instrumental variables (IV) 2sls estimator, efficiency, financial sector development

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### Introduction

The financial sector plays an important role in the economic development process.

Financial intermediaries, when they are efficient, allow mobilizing saving from diverse sources and allocate it to more productive activities which benefits not only investors and beneficiaries of the investments but also the whole economy (Gulde, Patilo and Christensen, 2006). Indeed, a banking system which efficiently channels financial resources to productive use is a powerful mechanism for economic growth (Levine, 1997). In Sub-Saharan Africa, like many other transitional economies, banks are the main financial intermediaries; therefore, restructuring policies have been implemented in order to improve efficiency (Kablan, 2007). By so doing, it is envisaged that they will efficiently allocate resources to productive areas of the economy thereby accelerating the development of the individual countries and the continent as a whole. The banking sector in Africa has also been recognized to exhibit wide variations across countries due to some historical development and also the various stages of growth in the countries of origin. For example, North African financial systems are dominated by government-owned financial institutions to a much larger extent than systems in Sub-Saharan Africa, where many systems are weighted toward foreign-owned banks. The particular legal environment also affects the extent of development in the various countries. Among the many roles of banks in the economy, they ameliorate the information problems between investors and borrowers by monitoring the latter and ensuring a proper use of the depositors' funds. Third, banks contribute to the growth of the economy and finally, they perform an important role in corporate governance. The relative importance of the different roles of banks varies substantially across countries and times but, banks are always critical to the financial system (See Allen and Carletti, 2008) [5]. Moreover, some studies suggest that bank management quality is positively related to cost efficiency, which is in turn related to asset quality (De Young, 1998). Banks play an essential role in the proper functioning of payments systems and their efficiency is directly related to improved productivity in the economy (Ikhide, 2009). Most of these studies have focused on the developed countries after major changes have been done (see Allen and Rai, 1996; Leighton and Lovell, 1998). In recent times, cross country studies on bank efficiency have been performed on WAEMU banks (Kablan, 2007), SSA Middle income countries (Chen, 2009) and 29 SSA countries (Kiyota, 2009).

The function of the commercial banks has been enhanced in Tanzania to sustain the increasing need of agriculture, industrial and services sectors economy in general after the financial reforms contemplated in the country. According to these principals, the government implemented central control by directly investing in all sectors of economy. In the early 1990s, The Tanzania government implemented reform designed to decrease its

influence in the financial sectors. In 1991, the government passed the banking and financial institution act, which allowed for the formation of privately held banks. In addition, the Bank of Tanzania was given certain oversight control to ensure the development prudent banking activities. In 1996, Tanzania's cooperative and rural Development Bank (CRDB) became the first state owned bank to be privatized. Currently, a number of banks have been established in Tanzania and now hold a significance amount of a total market share. The top ten banks in term of market share are National Microfinance Bank (NMB) with 23%, National Bank of Commerce (NBC) with 13.3%, CRDB Bank 12.8%, Barclay Bank Tanzania 6%, Exim Bank 4.3%, Stanbic Bank 3.6%, Tanzania Postal Bank 3.5%, Akiba Commercial Bank 3.2%, Standard Chartered Bank 3%, and FBME Bank 2.7%. NMB, NBC and CRDB are the private commercial banks among top six commercial banks which have domestic shareholding either via the government, aid agencies or the Tanzania private sector. According to Bank of Tanzania financial stability report 2013 and 2014 the banking sector continues to expand, the number of banking institutions increased from 49 in March 2012 to 51 in March 2013, while that of branches rose from 521 to 559 during the same period. Tanzania banking sector has very limited exposure to the world financial markets. In spite of significance role played by the banking sector it fail to cater the need of industry, agriculture, service sector, high interest rate, high interest spread, low return on capital employed are some challenges faced by the banking sectors in Tanzania, (Srinivas, 2013). Tanzania's banking sector is one of the most vibrant in the region, with its number of commercial banks higher than that of bigger economies in the continent. In fact, the evolution of the banking industry in the last 60 years gives a more visible picture of how the Tanzanian economy has performed and the mileage ahead the country still has to cover to attain its sustainable economic targets. The informal economy is traditionally out of the reach of the banking industry, which means that despite the fact that Tanzania had a number of private banks at independence the millions of Tanzanians could not access services in these banks. As of August 2021, there are 48 licensed banks in Tanzania: 35 commercial banks, 5 community banks, 4 microfinance banks, 2 mortgage banks, and 2 development banks. The study also investigates the role of commercial banking sector efficiency on the overall financial development in Tanzania.

## Literature Review

### 1. Theoretical Literature Review

#### Law and Finance Theory

According to Eryigit (2010), legal systems are institutions that regulate social and commercial relationships and reduce uncertainty. In recent years, since the pioneer study of La Porta *et al* (1997), the effects of different legal systems on financial development have been intensely investigated. The legal systems of many countries originate from those of England or France. Legal systems based on the laws of England are typically described as belonging to the common law tradition, while those based on the laws of France are described as belonging to the civil or Roman law tradition. Structurally, the two legal systems operate in very different ways: civil law relies on professional judges, legal codes, and written records, while common law relies on judges, broader legal principles, and oral arguments (Glaeser and Shleifer, 2002). The civil law tradition itself is divided into French, German and Scandinavian systems. The civil and common legal traditions have spread around the world through a combination of conquest, imperialism, outright borrowing, and imitation.

According to the law and finance theory of La Porta *et al* (1997), the differences in the legal protections of investors and creditors and the quality of enforcement of laws can explain why levels of financial development differ among countries. With regard to this, they found that: a) shareholders and creditors are protected most in common law countries and in French civil law countries the least, with German and Scandinavian civil law countries falling somewhere in the middle in terms of these protections; b) the quality of law enforcement is highest in Scandinavian and German civil law countries, next highest in common law countries and again the lowest in French civil law countries.

The literature emphasizes that legal systems influence financial development through two channels: the political and the adaptability channels. The political channel, which is the—static view of law and finance, stresses that legal traditions differ in terms of the priority that they give to private property rights, which form the basis of financial development, versus the rights of state. For instance, the civil law tradition gives priority to state power. Civil law has evolved to eliminate increasing corruption in and mistrust of courts. To establish and strengthen trust in courts, legislature tried to be clear and precise in wording laws. By so doing it was believed that any need for interpreting laws by judges would be avoided. With this codification, the judiciary has produced legal traditions that concentrate on the power of the state rather than the rights of individual investors. This situation has relegated judges to a relatively minor bureaucratic role while enhancing the power of the state (Eryigit, 2010; Mahoney, 2001; Meryman, 1985; Beck, et. al., 2001, 2003). On the other hand, common law evolved to protect private property owners against the crown. English common law developed as it did because landed aristocrats and merchants wanted a system of law that would provide strong protections for property and contract rights and limit the crown's ability to interfere in markets. The crown attempted to reassert feudal prerogatives and sell monopolies to raise revenues (Mahoney, 2001). Parliament, which was composed mostly of landowners and wealthy merchants, along with the courts, took the side of the property owners against the crown (Beck and

Levine, 2003b) <sup>[15]</sup>. Thus, English legal origin tends to place great emphasis on the rights of individuals than the rights of the state. Hayek expressed that common law is superior to civil law, not because of substantive differences in legal rules, but because of differing assumptions about the roles of the individual and the state. In general, Hayek believed that common law was associated with fewer government restrictions on economic and other liberties (Mahoney, 2001).

## 2. Empirical Literature Review

Empirical evidence on the effect of banking sector efficiency and financial development is scanty. Kablan (2010) was among the first to investigate the relationship between financial development and bank efficiency. Using the generalized methods of moments systems, the study assessed the factors affecting the financial development for some SSA countries. The result shows a negative relationship between bank cost efficiency and financial development even though this was not statistically significant. However, it is generally agreed that financial markets variables are endogenous. To deal with the potential issue of endogeneity, this study will make use of the Baltagi EC Two Stage Least Squares (2SLS) estimator with the Baltagi-Chang estimation of the variance components. This approach is adopted because the study hypothesized a bi-causal relationship between financial development and banking sector efficiency. The instrumental variable (IV) approach also enables us to deal with potential measurement errors and omitted variable bias. The IV approach further enables us to consistently estimate the coefficients of the potentially endogenous variables whether caused by measurement error, omitted variables or simultaneous causality bias.

In analyzing the change in the productivity of Australian banks during the period of 1995 to 1999, Sathye (2002) finds that technical efficiency of banks in the panel has declined by 3.1% and the Total Factor Productivity (TFP) declined by 3.5%. The data of the study consists of annual observations of outputs, i.e. net interest income and non-interest income and inputs such as interest expenses and non-interest expenses. By using the intermediation approach, the study concludes that although the mean technical change efficiency change and the mean of TFP remain positive, the decline in productivity is still a cause for concern. Efficiency of Commercial Banks in Malaysia For the Malaysian banking system, Abd. Karim (2001), Abd. Majid, Md. Nor, and Said (2003), Amir (2004) and Suhaimi (2005) employ the parametric approach to measure the efficiency of both conventional and Islamic banks. Abd. Karim (2001) investigates efficiencies of banks in selected ASEAN countries and the overall results suggest that ASEAN banks enjoy increasing returns to scale and larger banks tend to have higher cost efficiency than smaller banks.

Abd. Majid *et al.* (2003) finds that there is no empirical evidence that foreign banks are more efficient than local banks. Consistent with Abd. Majid *et al.* (2003), Suhaimi (2005) provides empirical evidence that there are no significant differences in terms of cost and profit efficiency between local and foreign banks. In addition, the local bank appear to reach its optimum profit efficiency at the asset size of RM40 billion, whereas the foreign bank reach its highest profit efficiency at a smaller asset size of RM15 billion. This could be partly due to the fact that local bank is more susceptible to macroeconomic shocks than foreign banks. However, over the medium term foreign banks are only marginally superior to local banks. During the 1997 financial crisis, it seems that the local banks were more exposed to the risks than foreign banks operating in Malaysia. It is also possible that during the said period, the local banks have higher levels of non-performing loans and loan losses as compared to the foreign banks. Finally, unlike foreign banks, the local banks were less capitalized and most of the banks were operating with higher expenses

## Methodology

### 1. Model Specification

To examine the impact of credit risk on financial performance of the selected commercial banks in Tanzania, the empirical model based on panel data approach can be specified as follows as applied by majority of past empirical studies:

$$(1) Y_i = x_i\beta + (V_i - U_i) \quad ,i=1,\dots,N,$$

Where  $Y_i$  is the production (or the logarithm of the production) of the  $i$ -th firm;

$x_i$  is a  $k \times 1$  vector of (transformations of the) input quantities of the  $i$ -th firm;  $l$

$\beta$  is an vector of unknown parameters;

the  $V_i$  are random variables which are assumed to be iid.  $N(0, \sigma_v^2)$ , and

independent of the  $U_i$  which are non-negative random variables which are assumed to account for technical inefficiency in production and are often assumed to be iid.  $|N(0, \sigma_u^2)|$ .

### 2. Estimation Techniques

The descriptive study used panel data covering the period of twenty years from the year 2000 to 2020 were used to examine the efficiency of commercial banks and financial development in Tanzania.

### 3. Data Envelopment Analysis (DEA) and Ordinary Least Squares (OLS)

This study applied panel data econometric approach (fixed and random effect models) while non-parametric approach will employ the data envelop analysis (DEA) to estimate the efficiency scores of commercial banks in Tanzania.

To avoid spurious results, normality tests conducted like Unit Root test, this tested using Augmented Dickey-Fuller to test stationarity since the data are panel. Multicollinearity test to test whether there is high correlation between predictor variables. Applying Unit Root test, the null hypothesis rejected when p-value is less than a significance level of 5%.

## Findings and Discussions

### 1. Descriptive Statistics

Usually, before estimating any regression model, it has to check whether the series of variables used has followed the normal distribution curve. Therefore, the traditional way to confirm the normality is to conduct the descriptive analysis for variables used. The Table 4.1 provides the estimation of mean, median, skewness, kurtosis and probability values. The mean over median ratio for each series is seen to be approximately one, which represents normality of distribution, which agreed the series had the feature of normal distribution. Addition to that, the Jarque-Bera test statistics fails to reject the null hypothesis of normal distribution of each variable ( $P > 0.05$ ), which confirms that the series are normally distributed. Also, the numeric of kurtosis for each variable is found to be close to 3, which indicates the normality of distribution. Therefore, the study has been confirmed the normality of distribution.

**Table 1:** Descriptive Statistics of the Financial Development and Control Variables

Variable	Observation	Mean	Std. Dev	Min	Max
<u>predbofgdp</u>	120	0.237	0.292	0.011	1.624
<u>Bdgdg</u>	120	0.259	0.193	0.030	0.915
<u>M2gdp (%)</u>	120	0.317	0.210	0.070	1.028
<u>concentration</u>	120	0.716	0.195	0.387	1.000
<u>Inflation (%)</u>	120	10.810	24.910	-9.620	325.000
<u>enfo (days)</u>	120	633.710	182.880	310.000	1070.000
<u>rule of law</u>	120	-0.681	0.641	-2.071	0.940
<u>creditor right index</u>	120	2.110	1.540	0.000	4.000
<u>Settler mortality</u>	120	574.050	714.080	15.500	2004.000
<u>kaopen</u>	120	-0.521	1.064	-1.831	2.500
<u>trade openness</u>	120	0.741	0.298	0.235	2.094
<u>gov't spend (% of GDP)</u>	120	25.940	7.760	8.420	58.560
<u>Ruden (%)</u>	120	61.360	15.130	14.960	91.920
<u>Corr</u>	120	-0.630	0.587	-1.546	1.071
<u>hef (%)</u>	120	51.590	0.160	0.000	0.726
<u>regu</u>	120	-0.469	0.534	-1.861	0.954
<u>poli</u>	120	-0.727	0.195	0.387	1.000
<u>govteffec</u>	120	-0.563	0.570	-1.737	0.951

### 2.1 Results of the Effect of Bank Efficiency on Financial Development

In this section, the study uses the cost efficiency scores obtained in the previous chapter to investigate the link between bank efficiency and financial development. The correlation matrix of the variables included in the regression equations are shown at Appendix 2. The table fairly shows that there is no risk of multi-collinearity among the independent variables. To examine the bi-causality between financial development and commercial banking sector efficiency the study makes use of Instrumental variable (2SLS) approach. The use of the IV approach helps to consistently estimate the coefficients of the potentially endogenous variables whether caused by measurement error, omitted variables or simultaneous causality bias. To fully operationalize IV in empirical research one needs to carefully select instruments to use in the estimation of the model. A good instrument is one that is not correlated with the error term and has an association with the instrumented. The regression results are shown in tables 4.5 and 4.6.

Three governance variables, government effectiveness, regulatory effectiveness and control of corruption were used as instruments. These variables were chosen because it is envisaged that the governance environment should impact positively on the commercial banking sector efficiency in a particular country. The cost efficiency variable, *costeff* indicates the cost efficiency scores generated in the previous section. It enters the three regression equations with positive and significant coefficients. It did have the expected sign as projected in the study. An efficient banking sector in an economy helps in allocation of financial resources to the productive

areas of the economy thereby enhancing the financial development. The result is in line with the findings of Ghannouchi and Radic (2010) and means that banking sector productivity is crucial for financial development. As noted by Kablan (2010), in many of these African countries the stock market is either not in existence or is not well developed, hence the banking sector is the main source of finance for development. Thus, the reforms which were started in the late 80s and early 90s were in the right direction and it should serve as a catalyst to propel development in the financial sector which is expected to translate to accelerated growth.

**Table 2:** Effect of Bank Efficiency on Financial Development

Variables	Private Credit/GDP	M2/GDP
	0.2361	0.1822
Costeff	(0.026)** 0.0009	(000)***
		-0.0001
Creditor Right	(0.933)	(0.979)
	0.0264	0.0204
Rule of law	(0.000)***	(0.001)***
Settler Mortality	-0.0190	-0.0088
Capital account openness	(0.040)**	(0.000)***
Inflation	0.0135	0.0460
Rural population	(0.040)**	(0.000)***
Concentration	-0.0383	-0.0295
Constant	(0.000)***	(0.007)***
	-0.4323	-0.3308
	(0.000)***	(0.000)***
	0.0271	0.0930
	(0.000)***	(0.000)***
	0.3856	0.3461
	(0.000)***	(0.000)***
	207.07	336.67
Wald Chi (13)	(0.000)***	(0.000)***
Observations	120	120

*p-values are in parenthesis*

\*\*\*, \*\* and \* indicate significant at 1, 5, and 10% respectively

Turning to the other determinants of financial development, the legal variable rule of law was found to be positive and significant in all the regressions. This means country has strong rule of law should that's why has an improved level of financial development as confirmed by the regression results. These findings are in line with that of Laporta *et al* (1997) and confirm the theory of law and finance.

With regards to capital account openness, the study finds a positive and significant relationship with financial development in all the regressions. This finding is in line with Baltagi *et al* (2008) and Rajan and Zingales (2003). The finding shows the opening up on a country's capital markets could lead to improved levels of financial development.

Concerning the macroeconomic variable, inflation has the expected sign in all the models. It enters all the regression models negative and significant. This confirms the findings of Kablan (2010) and Detragiache *et al* (2005) and suggests that macroeconomic stability is essential for financial development. The finding of the study is also in line with the findings of Huybens and Smith (1998, 1999) who finds that inflation may aggravate asymmetries of information in credit markets, reducing the real rate of return and the volume of credit. Also, inflation reduces the real returns depositors receive on their deposit and thus discourage savings which eventually tighten credit to the private sector because of lower deposit base. Besides this, inflation also slows the intermediation function of financial banks. High inflation means higher interest rates on loans with its attendance increases in non-performing loans which eventually reduces the desire of banks to expand credit to the private sector. The finding also echoes that of Boyd *et al* (2001) who find a negative association between inflation and banking sector development.

Concentration as measured by the ratio of three top banks in the country divided by the total banking sector enters all the models as positive and significant. This finding deviates from that of Kablan (2010) and suggest a concentrated banking sector is better for the financial sector as a whole.

## 2.2 Results on the Effect of Financial Development on Banking Sector Efficiency

The next stage of the analysis is to investigate the reverse causality. Here we try to answer the question; to what extent does financial development influence banking sector efficiency? Table 4.7 below shows the results of this. Two models were run using both the private credit to GDP and M2/GDP. The first model makes use of private credit to GDP as independent variable and the second makes use of M2/GDP as one of the independent variables. Inflation was used as instrument for the measures of financial development in both models. Literature

has strongly established the link between financial development and inflation. Macroeconomic stability is key if a country's financial sector is to operate efficiently. From Table 4.7, our measure of financial development, private credit to GDP and M2/GDP are positive and significant in all the regression models. This means that as credit to the private sector expands it affects the efficiency with which it is distributed. Thus, a developed financial sector enhances the efficiency with which the banking sector operates in terms of its cost as abnormal profits are reduced and the only source of profits enhancements become the extent to which managers are able to reduce cost inefficiencies. Thus, causality between banking sector efficiency and financial development runs positively in both directions.

Among the other control variables which affect the banking sector efficiency government spending stands out. Government spending enters all the regression equations as negative and significant. This means increase in government expenditure in the financial sector destabilizes the banking sector as it has the potential of crowding out credit to the private sector and increase interest rates.

**Table 3:** Effect of Financial Development on Bank Efficiency

Variables	model 1	model 2
private credit/GDP	0.3414	
	(0.069)*	
M2/GDP		0.4278
	(0.001)***	
Settler mortality	0.0028	0.0018
	(0.557)	(0.572)
capital account	-0.0335	-0.0382
openness	(0.002)***	(0.000)***
Trade openness	0.1446***	0.0938***
	(0.000)	(0.003)
Govt spending	-0.2898***	-0.2939***
	(0.000)	(0.000)
rural population	0.3896***	0.2757***
	(0.000)	(0.000)
Concentration	0.0045	0.0022
	(0.884)	(0.944)
Constant	0.4889***	0.5440***
	(0.000)	(0.000)
Wald Chi2 (13)	65.03***	56.58***
	(0.000)	(0.000)
Observations	120	120

(P-values are in parenthesis)

\*\*\*, \*\*and \* indicate significant at 1,5 and 10% respectively

Furthermore, the found evidence suggests that opening up of the country to trade affects positively the efficiency in the banking sector. This is because; the banking sector gets the opportunity to increase its portfolio lines by funding other international businesses. By so doing, they are able to leverage on income from these activities and reduce cost of banking in the local market. However, the same cannot be said of the capital account openness. It appears the proxy for the financial liberalization affects banking sector negatively. This is in line with studies that have found negative association of the share of foreign ownership in the banking sector to bank efficiency.

### Conclusion and Recommendations

The study adopted the semi non parametric Fourier flexible approach in estimating banking sector efficiency which has been found to envelope banking data better. Using the intermediation approach to studying banks, it concluded that the efficiency level of the sample included in the study average 0.76 over the period, 2011-2020. This means that there is about 24% inefficiency in terms of cost for the sampled banks. Thus, banks in Tanzania could actually save up to almost a quarter of their cost if they were to operate efficiently.

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