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Does Financial Sector Development have an effect on Economic Growth?

A study of Sub-Saharan Africa.

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Abstract

The role of the financial sector in helping an economy grow has been the subject of debate for a long time. Recently, however, consensus has been reached, through empirical evidence, showing the importance of financial sector development in achieving economic growth (ADB, 2009).

Using the Global Financial Development Database (GFDD) model, the study done here will provide an analysis of financial sector development in Sub-Saharan Africa and its effect on economic growth, using data for 40 countries, in the years from 2000-2014. This analysis was done using a cross-sectional regression analysis of countries in Sub-Saharan Africa (SSA) with data provided from the World Bank.

The regression shows significantly positive results between economic growth and firms using banks to finance investments, bank cost to income ratio and bank credit to bank deposits, while significantly negative results are shown in financial system deposits and stock market total value traded.

However, seeing as financial sector development is diverse and dynamic, these measurements and the regression done here will not provide a comprehensive picture of the state of financial sector development in SSA.

Keywords: Financial sector development, economic growth, Sub-Saharan Africa, financial institutions, financial markets, banking sector

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1. Introduction

1.1 Background

The debate regarding the role of financial sector development in fostering economic growth¹ has not always been clear. For many years previously, economists were unsure of whether financial sector development influenced economic growth, or whether economic growth facilitated financial sector development. Indeed, the debate leaned towards the latter (ADB, 2009). Several economists, including Nobel Laureate Robert Lucas (1988) argued for the overinflated role of financial markets in affecting economic growth, whereas Schumpeter (1911) amongst others have stated that the importance of financial markets cannot be stressed enough. However, in recent years, the general consensus has changed in support of financial sector development affecting economic growth (ADB, 2009). More empirical studies have been done finding evidence of this relationship. These new findings have led to an extensive body of research, some of which will be mentioned later in this study, attempting to analyze the diverse aspects of the financial sector and their effect on economic growth.

1.2 Study Objective

The focus on Sub-Saharan Africa (SSA) derives from the relationship that financial sector development has been proven to have a more noticeable impact on economic growth in developing countries (ADB, 2009). Sub-Saharan Africa has experienced severe turmoil in the past, and is continuing to struggle with both political as well as violent instability.

Considering this, SSA is still interesting to study due to the potential financial sector development can have on the economic growth of the area.

The question thus becomes whether financial sector development can be seen to have an effect on economic growth in Sub-Saharan Africa.

1.3 Methodology and Scope of Study

The consultation and examination of previous studies in combination with literature on the subject will be used as background for this study. Empirical analysis of data will be the focus, however, as this will investigate the relationship, in an econometric fashion, between financial sector development and economic growth.

The regression will show the relation between financial sector development, measured using an application of the Global Financial Development Database's GFDD's model of financial

¹ In this study, economic growth will be considered a perfect synonym for GDP per capita growth

sector development, represented by a variable for each of the pillars supporting financial institutions and financial markets, and economic growth, measured by GDP per capita growth. Independent variables include firms using banks to finance investments, investments financed by equity or share sales, financial system deposits, bank credit to bank deposits, total value of stocks traded, stock price volatility, bank cost to income ratio and stock market turnover.

This study is restricted to countries in Sub-Saharan Africa with data from the World Bank on the years 2000 - 2014.

1.4 Thesis Structure

The structure of this study is divided into six parts, starting with the introduction where the outline and background for this study and its scope is presented. Next there will be a more thorough review of the research and the topic in question. This section will also include previous studies of this subject, and explanations of these.

The study will then continue to discuss the theory that will be used to underline the reasoning. Followed by an empirical analysis including a regression model concerning the variables related to this topic, as presented in that section.

The last part is the conclusion, where results and implications of them are discussed, as well as any final conclusions to be drawn are mentioned.

2. Background

Sub-Saharan Africa has experienced increased economic growth in previous decades. However, there is risk of this growth stagnating due to a trend of decreasing foreign development assistance, on which some of these countries have relied (SIDA, 2004). There is therefore a need for countries in this region to develop stable domestic financial institutions and markets to ease domestic capital flows.

Financial sector development is important for developing countries since it helps mobilize savings for investment, enable capital inflows from abroad, as well as facilitating domestic capital flows, and reducing transaction costs. In this way, developing financial markets can facilitate growth by increasing productivity by making investments in human and physical capital easier, as well as promote the use of capital in investment in new technologies, thus promoting technological progress which would not only increase productivity but also lead to a more efficient use of resources (DFID, 2004).

Most countries in SSA have been undergoing financial sector reform since the late 1980s and early 1990s. Progress has been made in the efficiency of monetary authorities (SIDA, 2004). Nevertheless, the rate of progress has been uneven across, and within, nations. There are several obstacles yet remaining, where the Swedish International Development Cooperation Agency (SIDA) defines ten major areas in need of attention: limited autonomy to central banks, lack of competition, nonperforming loans, absence of monetary instruments, large spreads between lending rates and deposits, the interest rate structure, regulatory framework for supervision, uncertainties regarding the political and economic situation, inefficiency of payment systems, and lack of domestic skilled labor (SIDA, 2004).

3. Previous Studies

There are several empirical studies examining the relationship between financial sector development and economic growth. Since credit cannot be given to all of these studies, the ones used for the purpose of this paper are mentioned below.

Levine (2004) specifies five important areas where financial sector development improves economic growth: (i) mobilizing and pooling savings; (ii) producing information ex ante about potential investments and capital allocation; (iii) monitoring investments and exercising corporate governance; (iv) facilitating trading, diversification, and risk management; (v) facilitating the exchange of goods and services. These five functions work through financial sector development to promote economic growth, not only by use of the private sector, but also working through the public sector by supporting investments in infrastructure and investments in human capital by households.

The encapsulation of a broader definition of the financial sector, instead of using the banking sector as a proxy, leads Martin Čihák, Aslı Demirgüç-Kunt, Erik Feyen, and Ross Levine, (2012) to conduct a 4x2 framework of financial sector development in an attempt to analyze financial systems across countries. Consisting of measurements for the depth, access, efficiency and stability of the financial sector, this model provides the most comprehensive and inclusive measurement of financial sector development, and will thus be used extensively throughout this study. The research conducted by Čihák, Demirgüç-Kunt, Feyen, and Levine (2012), is based on the five key functions of the financial sector as defined by Levine (2004). Evidence of the long-run effects also exists, concluding that financial sector development provides long-run economic growth (Demirgüç-Kunt and Levine 2008).

However, there is still debate regarding whether a more competitive and fragmented banking sector, consisting of many small banks, is better at facilitating access to financial services, as compared with a more centralized banking sector, consisting of fewer and larger banks.

Zingales (2009) argues that smaller banks would work better at transitioning a country from a pure banking system to one relying on both banks and markets, as a country develops and its needs change. Smaller banks would benefit from more localized knowledge, thus being able to support the local communities as well as having specialized information. Larger banks might stifle the banking sector by focusing on larger firms, instead of the smaller, local, ones. However, Shoar (2009) highlights the importance of economies of scale in the banking sector; where small banks will not be able to finance many of the larger and riskier projects, as well as helping small firms grow into larger ones.

Lin (2009) recognizes that economies of scale are important in making banks more diversified, and thus more stable. He argues, however, that smaller banks are stable in a different way since their exposure to financial crises is relatively limited to their area of influence. This, he suggests, should be the strategy for developing countries; to set up a banking sector consisting of smaller banks, thus matching the existence of the many smaller firms that usually make up the manufacturing, farming and service sectors in poor countries (Lin, 2009). Economic growth has been shown to be faster in countries consisting of many smaller banks coupled with many smaller firms due to an enhanced ability to finance these firms (Lin, 2009).

This debate sheds light on another central point regarding the role of the financial sector: whether a market-based or bank-based system is better at facilitating economic growth. Thus, the discussion is prevalent to whether investment funds rely on the mobilization of savings by banks or equity financing through the stock market. Zingales (2009) makes the case for institutions being designed for future use; that is, financial sector development should not immediately focus on developing the stock markets, but that this is a future goal that cannot be ignored by policymakers. Lin (2009) also points out that developing countries should not aim to develop their stock markets as top priority, but rather focus on maintaining competition in the banking sector through numerous smaller banks. Levine (2009) argues that the services of stock markets in diversifying risk aids in efficiently allocating credit. Setting up stock markets in Sub-Saharan Africa, however, have not yet had an impact as these are still relatively small (Lin, 2009). Lin (2009) also comments that microfinance institutions are more likely to play an important role in poor countries in the future, at the expense of the importance of stock markets.

4. Theory

The theory used and applied in this study is based on the Global Financial Development Database's (GFDD) model of financial sector development as displayed by a 4x2 grid showing financial institutions and financial markets and their criteria of development (Čihák, Demirgüç-Kunt, Feyen, and Levine, 2012). The model defines financial sector development for financial institutions and financial markets as having four criteria: access, depth, efficiency and stability. These four pillars of development all contribute to the development of the financial sector in different and unique ways. In the regression done later in this study, one variable for each of these pillars, one for each of the financial institutions and financial markets, has been used. Displayed in the table below is the version of the matrix that has been used for the purpose of this study. Modelling financial sector development is difficult since there are many variables affecting it; the financial sector is vibrant and always evolving due to the actions it facilitates. For the purpose of this study, the GFDD's model, and using one variable for each section, is enough to establish an initial picture of the relationship between financial sector development and economic growth.

The four criteria used in the model, and their relevance to financial sector development, will be explained briefly. Access is important to financial sector development because it indicates the spread and availability of financial institutions and financial markets to the private sector. The depth of the financial sector shows what and how much it contains; the volume of trade it facilitates. An efficient financial sector fosters its development through the ability to allocate resources in manner that is not hindered by unnecessary government regulations, or complicated bureaucracy. The stability criterion represents the ability of the financial sector to stay functioning; it shows how responsive the financial sector is to economic shocks.

Table 4.1: The 4x2 matrix model of financial sector development

	Financial Institutions	Financial Markets
Depth	Financial system deposits	Stock market total value traded
Access	Firms using banks to finance investments	Investments financed by equity or stock sales
Efficiency	Bank cost to income ratio	Stock market turnover ratio
Stability	Bank credit to bank deposits	Stock price volatility

The GFDDs model is based on the five criteria of financial sector development defined by Levine (2004). Mobilization and pooling of savings is important for a developed financial sector since it helps increase savings, taking advantage of economies of scale, and accumulating capital, as well as improving resource allocation (Levine 2004). In order for the pooling of savings to become effective, there are several obstacles to overcome first, including the often-high transaction costs of collecting savings from individuals and the asymmetries of information existing when individuals make their saving decision. Producing information about investments by reducing high information costs through the use of financial intermediaries improves capital and resource allocation (Boyd and Prescott, 1986). The capital flow within firms has an impact on resource and capital allocation, as well as economic growth (Levine, 2004). Thus, exerting sound corporate governance is a key factor in developing a country's financial sector. Information asymmetries existing between shareholders and managers impede the allocation of capital to its most efficient use (Levine, 2004). Financial intermediaries can relieve this problem by improving corporate governance and capital accumulation (Bencivenga and Smith, 1993) and, in the presence of informational asymmetries, intermediaries may ease the flow of savings from savers to investors (Harrison, Sussman, and Zeira, 1999). Another important role of financial intermediaries, as defined by Levine (2004), is their role in risk diversification, and risk pooling. Levine (2004) argues that the existence of stock markets is due to information costs, and that costs to trade highlight the importance of liquid stock markets, which can be improved through financial intermediaries' ability to reduce liquidity risk. The fifth pillar of financial sector development, as defined by Levine (2004), regards the lowering of transaction costs that ease the exchange of goods and services. These financial arrangements may increase technological innovation and growth through increased specialization (Levine 2004). Levine (2004) also comments that financial innovation may contribute to the continued fall transaction and information costs.

Although there is general consensus that a dynamic view of financial sector development is needed, there is still debate regarding the efficiency of bank-based vs. market-based financial systems. This debate highlights the effect of the composition of the financial sector. Arguments for a bank-based system rely on the assumption of markets being inadequate as a reliable source of information about firms, and thus inherently having a problem of asymmetric information, potentially resulting in a free-rider problem (Stiglitz 1985). Another argument for a bank-based system regards the oversight needed of how and where the investment funds are spent, and since banks do not have the same fundamental flaws as markets, they will provide the information and oversight needed (Levine 2004). Proponents

for a market-based system argue that banks may become too powerful to have an unbiased opinion of firms, resulting in inefficient allocation of resources in the market (Levine 2004). Bank-based systems may also be slower to adapt to shocks in the economy, thus implementing structural changes too late, to which markets are faster to adjust (Levine 2004). Demirguc-Kunt and Levine (2001) find that, as countries become richer, their financial sectors tend to be more market-based, showing that the development of banks, stock markets, and financial intermediaries affect the composition of the financial sector. Yet, Levine (2004) argues that the actual structure of the financial sector is irrelevant as long as there are legal institutions and frameworks facilitating financial sector development across countries. Levine (2004) also points out that developments in the banking sector may affect financial markets, and vice versa.

Another view of financial sector development implements a broader perspective, including essential prerequisites for financial systems: good governance, macroeconomic stability, financial market safety nets, and a competitive environment. In this view, a competitive environment relates to the overall financial system, including banks and markets. SIDA (2004) argues that liberalization of the financial sector, removing barriers to entry and allowing foreign capital to move freely and compete domestically, will enhance financial development. Yet, they caution against financial crises, providing evidence that monitoring of the financial sector is still necessary (SIDA, 2004). Good governance encapsulates the ability to provide underlying rules of law creating judicial stability, transparency in the public sector, and anti-corruption measures (SIDA, 2004). These concepts provide a challenge in their empirical measurement, as they are not easily quantifiable. Another issue arises in cross-country analyses, as good governance may vary greatly across nations. Considering macroeconomic stability, the financial sector's ability to diversify and share risks may lead to greater stability through enhancing an economy's ability to absorb economic shocks (ADB, 2009). However, the financial sector may open up for the existence of speculation and bubbles thus impeding the stability of the economy (Easterly, Islam, and Stiglitz 2000). Financial market safety nets exist in most developed countries, and refer to the ability of the financial system to restore consumer confidence after economic shocks (SIDA, 2004). In developing countries, these safety nets are not as prevalent yet. Fostering competition through the liberalization of the banking sector is another of SIDA's prerequisites of financial sector development, coupled with supervision to prevent instability (SIDA, 2004). The Asian Development Bank (2009) defines developing a financial sector that promotes economic growth in a stable financial environment as the issue to solve. Their review of the

literature surrounding previous banking crises suggest that institutional weaknesses, weak corporate governance, and excessive deposit insurance lead to increased risk taking by bank managers (ADB, 2009). Thus, macroeconomic stability, bank regulation and reforming the financial system to decrease structural weaknesses are important (ADB, 2009). The Asian Development Bank (2009) also concludes that evidence from empirical studies suggests that: i) developing countries benefit more from financial sector development compared with developed countries, ii) the composition of industries matter, where ones consisting of smaller firms experience faster growth with a financial sector that is more developed, iii) a developed financial sector is better equipped to handle and avoid currency crises. According to Lin (2009), developing countries' manufacturing, service and agricultural sectors consist mostly of small firms, making a developed financial sector needed for increased growth in these areas. For a financial sector to better absorb currency and other financial crises, it needs to be stable, where financial intermediaries can absorb these shocks. For developing countries, Lin (2009) argues for the existence of small and simple financial institutions to aid in the recovery from financial crises, helping banks to promote private-sector-led growth. An important aspect regarding the inflow of foreign capital to a developing country, is the existence of a stable and reliable banking system, that is also technologically sound. As a requirement, countries who cannot meet this standard limit themselves to the amount of foreign capital willing to invest. Thus, developing a banking system that meets technological standards, in terms of tracking and ease-of-use, may facilitate foreign capital and ease foreign direct investment. Having a digital system for banking services also allows for the detection of corruption, as oversight is provided, thus allowing for a more efficient allocation of resources. As an example of this, mobile money services exist in many countries in Sub-Saharan Africa, including Kenya's M-PESA service, through which salaries and bills can be paid, thus reducing the amount of informal saving as well as the prevalence of an informal market (The Economist, 2014).

5. Empirical Analysis

The empirical model used in this study is presented below, as well as an explanation of the data and variables used, and the results of the regression model.

5.1 Regression Model

In this study, a stacked time-series model has been used. The regression is based on the model of financial sector development used by the World Bank's Global Financial Development Database (GFDD).

Model:

$$\text{GDPg} = \alpha + \beta_1\text{GFDDAI} + \beta_2\text{GFDDAM} + \beta_3\text{GFDDDI} + \beta_4\text{GFDDDM} + \beta_5\text{GFDDEI} + \beta_6\text{GFDDEM} + \beta_7\text{GFDDSI} + \beta_8\text{GFDDSM} + \varepsilon$$

Explanation of variables:

GDPg = Average GDP per capita growth over 2000 – 2014

α = constant

β_x = coefficient of variable x

GFDDAI = Firms using banks to finance investments

GFDDAM = Investments financed by equity or stock sales

GFDDDI = Financial system deposits

GFDDDM = Stock market total value traded

GFDDEI = Bank cost to income ratio

GFDDEM = Stock market turnover ratio

GFDDSI = Bank credit to bank deposits

GFDDSM = Stock price volatility

ε = Error term

5.2 Data and Specification for chosen variables

GDP per capita growth

The dependent variable used is GDP per capita growth. This is defined as the growth rate of GDP per capita as an annual percentage. In this study, GDP per capita is an average of the years 2000 – 2014, using data from the World Bank (2016). The reason GDP per capita growth is used as the dependent variable is to study the effect of financial sector development on economic growth, using GDP per capita as a measurement. Previous studies on financial sector development have used real GDP per capita growth as a measurement of economic growth (King and Levine (1993), Demirguc-Kunt and Maksimovic (1998), Beck and Levine (2004)). Real GDP per capita was not used here due to lack of data.

Firms using banks to finance investments

Firms using banks to finance investments measures the “percentage of firms using banks to finance purchases of fixed assets.” (World Bank, 2014). This measure has been included since, according to the GFDD model, it provides an indication of how accessible the financial market is to the private sector. An increase in this measure is thus expected to have a positive impact on GDP per capita.

Investments financed by equity or stock sales

Investments financed by equity or stock sales is an indication of the purchases of fixed assets financed through equity (e.g., contribution of the firm’s owners) or the issuing of new shares, measured using estimates of the proportion of assets financed by either option. The impact of this measure on GDP per capita is thus ambiguous, as equity financed fixed asset purchases would not be a measure of financial sector development whereas issuing new shares would suggest an accessible financial market. This variable has been included in the regression model because of this ambiguity; how firms finance their investments show how accessible the financial market is, whether they prefer to finance their projects internally or use the stock market.

Financial system deposits

Financial system deposits show the percentage of savings deposits in banks and other financial institutions as a share of GDP. The expected effect of this variable is negative

seeing as an increased proportion of GDP tied up in savings accounts leads to less money in circulation through spending, and thus to a lower GDP per capita growth. In the GFDD model, financial system deposits show the depth of financial institutions as more savings in official financial institutions means less informal saving (i.e., under a mattress).

Stock market total value traded

The total value of traded stocks in the stock market measures the total value of all traded stocks as a percentage of GDP. It provides an indication of the volume of the financial market, and is thus expected to have a positive impact on economic growth. According to the GFDD model, this measure shows the depth of the financial market, as more stocks traded means more volume of trade being done through financial markets.

Bank cost to income ratio

Bank cost to income ratio measures the operating expenses of a bank to their net-interest revenue and other operating income (World Bank, 2014). This variable is expected to have a negative impact on GDP per capita growth as higher bank costs hinders their ability to find investments; by having to raise their interest rate, fewer firms would be willing to accept the loan. In the GFDD model, bank cost to income ratio is an efficiency measure as it shows how well banks manage their costs to their net-interest revenue.

Stock market turnover ratio

The stock market turnover ratio is the total value of shares traded divided by average market capitalization (World Bank, 2014). Market capitalization is defined as the value of traded shares excluding the top 10 companies divided by the total value of shares traded (World Bank, 2014). This measure is used to indicate the efficiency of the financial sector, as more stocks traded means a growing financial market. Turnover, measured in this way, was also used by Demirguc-Kunt and Maksimovic (1998) in their review of the effect of financial sector development on the excess growth of firms, showing that the composition of financing done by firms matter for their relative growth rate. This variable was also used by Beck and Levine (2004) when they considered the effect of stock markets and the banking sector and their influence on economic growth.

Bank credit to bank deposits

Bank credit to bank deposits show the amount of credit provided to the private sector by domestic banks as a share of total deposits (World Bank 2014). According to the GFDD model, this is a measure of the stability of financial institutions; having a high ratio of bank credit to bank deposits indicates a smaller likelihood of banks going bankrupt, provided no major crises occur. This is expected to have a positive effect on GDP per capita since more credit available to the private sector leads to more spending and investments. Beck and Levine (2004) used this variable in their analysis, and found a significantly positive result, as also found below.

Stock price volatility

Stock price volatility is an “average of the 360-day volatility of the national stock market index” (World Bank, 2014). This indicates the stability of financial markets in an inverse relationship to GDP per capita growth.

Table 5.2.1: Variables and their expected sign

Variable	Description	Source	Expected Sign
GDPg	GDP per capita growth 2000 – 2014	World Bank	Dependent variable
GFDDAI	Firms using banks to finance investments	World Bank	+
GFDDAM	Investments financed by equity or stock sales	World Bank	±
GFDDDI	Financial system deposits	World Bank	-
GFDDDM	Stock market total value traded	World Bank	+
GFDDEI	Bank cost to income ratio	World Bank	-

GFDDDEM	Stock market turnover ratio	World Bank	+
GFDDSI	Bank credit to bank deposits	World Bank	+
GFDDSM	Stock price volatility	World Bank	-

Selection of variables

The variables used in this regression model were chosen for their relevance to the GFDDs model of financial sector development. There are variables not used in this regression that would likely have an effect on GDP per capita growth, however, they were not included due to restrictions on the number of variables; that is, there are already quite a few variables included in this regression model. Taking more time to do a full, more inclusive, regression is outside the scope of this study, but would likely shed more light on the relationship between financial sector development and economic growth. Thus, the model and results presented here may suffer from omitted variable bias.

5.3 Regression Analysis

Table 5.3.1: Regression results

Dependent variable: GDP per capita growth

Model	1	2	3	4
Variable	Estimated coefficient	Estimated coefficient	Estimated coefficient	Estimated coefficient
Constant	1.97373 (0.396807) <i>0.00015 ***</i>	2.01598 (3.22144) <i>0.27275</i>	-6.45257 (5.14686) <i>0.12265</i>	-23.6963 (10.3665) <i>0.03115 **</i>
Firms using banks to finance investments	0.0210840 (0.0373933) <i>0.2916</i>	0.0113626 (0.0500296) <i>0.41245</i>	0.0175484 (0.0455260) <i>0.35495</i>	0.130953 (0.0832720) <i>0.08345 *</i>
Investments financed by equity or stock sales	-0.0331095 (0.164621) <i>0.422</i>	0.0397464 (0.201799) <i>0.4239</i>	0.132566 (0.190734) <i>0.25335</i>	-0.445404 (0.403706) <i>0.1561</i>
Financial system deposits		0.0206267 (0.107574) <i>0.4259</i>	-0.0394521 (0.107488) <i>0.36155</i>	-0.234566 (0.145655) <i>0.0792 *</i>
Stock market total value traded		-0.0898452 (0.127082) <i>0.24785</i>	-0.207113 (0.129083) <i>0.07365 *</i>	-0.142412 (0.125264) <i>0.14945</i>
Bank cost to income ratio			0.199544 (0.0977638) <i>0.03775 **</i>	0.199598 (0.0896639) <i>0.0338 **</i>
Stock market turnover ratio			-0.00365786 (0.0152059) <i>0.40795</i>	-0.00721863 (0.0171647) <i>0.34435</i>
Bank credit to bank deposits				0.337360 (0.178477) <i>0.0538 *</i>
Stock price volatility				-0.243506 (0.171627)

				<i>0.10285</i>
R-squared	0.030890	0.081329	0.396025	0.628470
Adjusted R-squared	-0.130628	-0.286140	-0.056956	0.133096
F-value	0.191247	0.221321	0.874265	1.268678
P-value	0.828397	0.920417	0.552561	0.396813

N = 40

Standard error in parentheses and p-values in cursive.

*** = significance level at 0.01

** = significance level at 0.05

* = significance level at 0.10

The regression analysis displayed above has been done in four steps, shown as models one through four. Adding both variables for financial institutions and financial markets for each aspect of the financial system, step by step through all models, shows how all of these aspects and measures need to be included in order to achieve a more comprehensive picture of the financial sector development for this region. The purpose of this method is to point out that financial systems are complex, and that an inclusive view, pertaining the four aspects of financial sector development, is needed. Previous studies have attempted to create a picture of financial sector development by using turnover and bank credit (Beck and Levine, 2004), while others have discussed the excess growth of firms using turnover, bank assets and market capitalization (Demirguc-Kunt and Maksimovic, 1998). The significant results from each regression are marked above. Since the program used for this regression displays p-values as two-sided, the p-values in table 5.3.1 have been divided by two. The potential existence of multicollinearity and omitted variable bias suggest that these results should not be used for further study, besides the conclusions drawn here.

Starting with a regression including only the access aspect of financial development, in model one, using two variables is not enough to get any significant results to reject the null-hypothesis. Adding more variables changes this, as seen in the later regressions.

Firms using banks to finance investments and investments financed by equity or stock sales are both seen to decrease in their p-values the more variables are added to the regression.

As seen above, firms using banks to finance investments provides a positive coefficient throughout every regression done. This shows that the access to financial institutions criterion provides a positive relationship with economic growth, as measured by GDP per capita growth. However, investments financed by equity or stock sales varies greatly in its coefficient value, reflecting the issue of multicollinearity that exists. This can also be seen in the p-value of firms using banks to finance investments, as these also vary between regressions. Yet, in the regression done here, the only severe multicollinearity that exists regards these two variables, as can be seen by the Variable Inflation Factors (VIF) in table 5.3.2.

Model three shows a significantly negative result for stock market total value traded, at the 0.10 level. This variable was expected to have a positive impact on GDP per capita, since greater depth of the financial system would benefit economic growth in the sense of indicating a more developed stock market, but in the regression, the coefficient is repeatedly negative. This shows that an increased value in stocks traded affects GDP per capita adversely since the value of these shares going to firms might not be used towards investment in the domestic economy, but might instead be sent abroad as investment in subsidiaries, assuming there is no corruption.

In the final regression, model four, there are several significant results. Firms using banks to finance investments is significantly positive at the 0.10 level, indicating that an increase in investment funding by firms through banks will have a positive impact on economic growth, measured by GDP per capita growth.

Financial system deposits show a significantly negative result at the 0.10 level. This result was expected due to the fact that more money tied up in savings deposits leads to less money circulating and being spent, thus having a negative impact on economic growth.

Bank cost to income ratio was expected to be negative, but in both models three and four, it is significantly positive at the 0.05 level. The conclusion drawn here is that higher bank costs is a result of higher bank incomes (i.e., banks taking on more costs as they grow), indicating more investments, leading to a positive impact on GDP per capita growth.

In model four, bank credit to deposits also proves to be a significantly positive result. This positive relationship was expected since an increase in the financial resources provided to the private sector leads to more spending and investments, thus increasing GDP per capita. The coefficient here, in model four, is smaller than Beck and Levine (2004) found in their review

due to the size of the sample. Both results, found here and those found by Beck and Levine (2004), are significantly positive.

Stock market turnover ratio, as measured by the total value of shares traded divided by average market capitalization, is not shown to have a statistically significant result in either of the models. The coefficient is found to be negative in both models. This conflicts with the expected results, which were of a positive coefficient, as well as with the results found by Beck and Levine (2004) which were significantly positive at the 0.05 level. However, this discrepancy between the results found here and the expected results, and those found by Beck and Levine, may be due to some variations in the different samples used, as the same region was not studied. Thus, the results here are to be used for the purpose of this study alone, and not as a base of further research. Demirguc-Kunt and Maksimovic (1998) used turnover in their regression measuring the relative growth of firms, and found a significantly positive result at the 0.01 level, indicating that the turnover ratio is important when considering firm-level growth.

The multicollinearity problem mentioned can be shown by the Variable Inflation Factors (VIFs) for each variable used in the regression, as displayed in the table below.

Table 5.3.2: Variable Inflation Factors (VIF)

Variable	Regression
Firms using banks to finance investments	12.187
Investments financed by equity or stock sales	14.779
Financial system deposits	5.194
Stock market total value traded	2.065
Bank cost to income ratio	1.414
Stock market turnover ratio	1.994
Bank credit to bank deposits	4.602
Stock price volatility	6.599
$VIF(\beta_j) = 1/(1 - R_j^2)$, $1 \leq VIF \leq \infty$	

Values over 10 show that severe multicollinearity exists, as can be seen in the access aspect of the financial system for the two variables chosen: firms using banks to finance

investments, and investments financed by equity or stock sales. Values of 1 indicates that no multicollinearity exists, and a value of ∞ indicates perfect multicollinearity. Most variables used in this regression do not have this issue, however. Beck and Levine (2004) used both OLS and GMM methods in their regression, showing that they provide different, yet still significant, results. Another method to use would have been Instrumental Variables, as Beck, Levine, and Loayza (2000) used in their study of productivity growth and capital accumulation. Since severe multicollinearity is an issue in the regression done here, providing alternative methods to the results would have been beneficial, nevertheless was not done due to time constraints and a lack of knowledge in using these methods. Including more variables in this regression would potentially have an effect on the results. Considering that the financial sector in Sub-Saharan Africa is still developing, there is not much data available for a large number of these countries. More data would lend a more complete and comprehensive regression to be done to evaluate the effects of financial sector development on economic growth in Sub-Saharan Africa. Including some variables representing the political and social turmoil, as well as the technological advancements, of the region would benefit the legitimacy of the regression analysis done, however, these measurements are often difficult to obtain in any reliable and comparable way.

6. Discussion and Conclusions

The model used in this study attempts to establish an idea of the comprehensive framework needed for examining financial sector development. Each of the variables used measuring financial sector development contributes differently to economic growth. Although the expected coefficient signs of these variables were proven wrong in some cases, the regression done still provides insights into the complex relationship between financial sector development and economic growth. Relating to the results found in this study, similarities with the results found by Beck and Levine (2004) exist in the case of bank credit to deposits, whereas regarding stock market turnover ratio the results are widely different. These differences may be due to variations in the sample size, as well as in the data used. Other studies regarding financial sector development have attempted to highlight the relationship between firm-level growth and the financial sector, as Demircuc-Kunt and Maksimovic (1998) have done. Concluding the results found here, however, shows that financial sector development is not easy to measure, as the results found above are inconclusive due to severe multicollinearity and omitted variable bias.

Financial sector development is a broad and highly dynamic topic; considering the many aspects that need to be included in order to achieve a comprehensive outlook. Levine (2004) argues for the importance of legal institutions in helping the financial sector develop, whereas others argue for the structure of the financial sector as being crucial (Stiglitz 1985).

Incorporating all of these measures into a model of financial sector development is however a difficult task. More manageable would be to consider financial sector development on a country-per-country basis, including their legal institutions, political stability as well as technological advancement. Seeing as these differ greatly across nations, obtaining a summarization is difficult. Yet, a better understanding of the financial sector is needed in order to foster economic growth in areas around the world. A healthy financial sector will benefit the economy, provided a regulatory framework exists to protect the financial markets and institutions from adverse effects (SIDA, 2004). For countries in Sub-Saharan Africa, this is a difficult task considering the amount of turmoil they have experienced, as well as the existence of corruption. Since SSA is an unstable region in many ways, controlling for some political and social variables might yield different results. However, such variables are difficult to measure, as stated previously, and might differ widely across nations. A more thorough review, on a country-per-country basis, would be the next step if this analysis were to be redone.

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