# METHODOLOGY

## Empirical model

To estimate the effect of credit to government and state owned enterprises on banking sector development, this study uses a modified version of the model used by Anyanwu et al. (2017). The model is specified as:

|  |  |  |
| --- | --- | --- |
|  |  | (1) |

The dependent variable () refers to banking sector development. Credit to government and state owned enterprises (is the main explanatory variable of interest. *Xit* represents a vector of control variables as standard determinants of banking sector development: GDP per capita, inflation, financial openness, and an institutional quality indicator. The variables and data sources are described as:

= Banking sector development is measured as private credit by deposit money banks and other financial institutions to GDP (%) of country *i* at year *t*. The variable is obtained from the World Bank Global Financial Development Database.

= Credit to government and state owned enterprises to GDP (%) of country *i* at year *t* with the variable obtained from the World Bank Global Financial Development Database.

= GDP per capita (log) (constant 2010 US$) of country *i* at year *t* obtained from the World Bank WDI.

= Consumer price index (log) (2010=100) of country *i* at year *t* obtained from the World Bank WDI.

= Stock of foreign liabilities/GDP of country *i* at year *t* following Gehringer (2013) with the data obtained from the “External Wealth of Nations Mark II” database (updated) of Lane and Milesi-Ferretti (2007).

= Institutional quality of country *i* at year *t*. The Heritage Foundation’s Index of Economic Freedom is used as proxy for institutional quality following Anyanwu et al. (2017). The index provides an overall score that aggregates 10 components with equal weight namely: property rights, government integrity, tax burden, government spending, business freedom, labour freedom, monetary freedom, trade freedom, investment freedom, and financial freedom. The index range from 0-100 with higher scores corresponding to higher levels of institutional quality.

Public debt could be beneficial for financial development up to a certain threshold, after which it may become detrimental (Hauner, 2009). A second model is specified where the quadratic term of credit to government and state owned enterprises captures the possible non-linear relationship between credit to government and financial development.

|  |  |  |
| --- | --- | --- |
|  |  | (2) |

## Theoretical underpinning of the model

The existing theoretical and empirical literature has revealed that the relationship between public debt and financial development still presents open and unresolved questions. For sub-Saharan Africa, Christenson (2004) found that domestic debt use crowded out private sector lending while Mbulawa (2015) reported a positive relationship between credit to the public sector and financial development for Southern African Development Community countries. Hauner (2009) hypothesized that the “safe asset” and “lazy banks” view need not be mutually exclusive and this study similarly expects the “safe asset” view to prevail below a certain threshold after which the effect of credit to government on banking sector development becomes detrimental.

More developed countries usually have a higher level of private credit (Claessens and Van Horen, 2014) with a positive relationship expected between GDP per capita and banking sector development. An increasing inflation rate decreases the real return on financial assets that increases credit market frictions resulting in credit rationing and a decrease in intermediary activity (Boyd et al., 2001). Therefore, this study expects a negative relationship between inflation and banking sector development.

Financial openness increases the size of markets generating increasing demand for financial services (David et al., 2015). Conversely, financial openness could induce volatile capital flows and volatile interest rates increasing countries’ vulnerability to crises episodes and external shocks (Hwang et al., 2013) negatively impacting banking sector development. The link between financial openness and banking sector development is, therefore, a priori unclear. The importance of efficient institutions for financial development and positive financial reforms has been highlighted in the empirical literature (Trabelsi & Cherif, 2017). This study therefore expects a positive relationship between institutional quality and banking sector development.

## Estimation approach

As the availability of data having a greater frequency increases, the recent panel-data literature has focused on panel datasets where both the cross-sectional and time dimensions are reasonably large. This should be compared with more conventional panel datasets having large cross-sectional but small time dimensions that generally rely on traditional fixed- or random-effects estimators, or combining fixed-effects estimators with instrumental-variable estimators including the generalized method-of-moment estimators (Blackburne & Frank, 2007). It has been shown that using these traditional estimators in a dynamic panel data setting when the time dimension is reasonably large can result in inconsistent and possibly misleading estimates unless the slope parameters are homogenous, often an inappropriate assumption (Pesaran & Smith, 1995). In addition, as the time dimension in the panel dataset increases, unit root processes also becomes an issue.

This study employs data for 27 sub-Saharan African countries covering the period 1996-2014. The sample countries are provided in Appendix B. Given the nature of the panel dataset and to account for heterogeneity in the short-run slope parameters and potential unit root processes, this study uses the PMG estimator of Peseran et al. (1999). The PMG estimator is an intermediate estimator that involves both pooling and averaging where the intercepts, short-run coefficients, and error variances differ across groups, but where the long-run coefficients are constraint to be similar (Pesaran et al., 1999). The mean group (MG) estimator of Pesaran and Smith (1995) for non-stationary heterogeneous panels that allows all parameters (short-run and long-run coefficients) to differ across groups is also employed. The Hausman specification test will subsequently be used to ascertain whether the PMG estimator is efficient and consistent when choosing between the PMG and MG estimator.