International Journal of Business and Economic Sciences Applied Research

IJBESAR
Ijbesar.af.duth.gr

Inflation Threshold and Financial Sector Development in Uganda

Akena Geoffrey Oyoo †[1], John Bbale Mayanja[2], Amandu Yassin Is'haq[3]

[1] Department of Economics, Muni University, Uganda
[2] College of Business and Management Sciences, School of Economics, Makerere University, Uganda
[3] Department of Marketing and Logistic Management, Muni University, Uganda

ARTICLE INFO

Article History

Received 23 October 2023
Accepted 7 June 2024

JEL Classifications
G180, G280, E310

Keywords:
Financial Sector Development, ARDL, Inflation Threshold, Uganda

ABSTRACT

Purpose:
This paper empirically analyzes the inflation threshold for better financial sector development (FSD) in Uganda using the yearly trend data spanning over the period 1980 to 2020. The basic idea of the study was to affirm whether the 5-percent bank of Uganda (BOU) inflations rates target is correct.

Design/methodology/approach:
The analysis incorporates the Autoregressive Distributing Lags (ARDL) model. This is due to the fact that the variables of the study were not all stationary at the same levels but archived strong stationarity after differencing once. To capture the inflation threshold estimation, the Ordinary Least Square model was run with lag value of the dependence variable.

Findings:
The research indicates that the critical inflation threshold is 6 percent. Below 6 percent inflation, there is a positive and decreasing impact but a statistically insignificant connection between inflation and FSD. Beyond 6 percent, the relationship becomes negative, and the intensity increases exponentially as the inflation rate increases. Specifically, the study estimates that at a 5% inflation rate, the FSD has the potential to grow by about 1.3 % and should the inflation rate increase from the optimal of 6% to 7%, it drops by the same magnitude.

Research limitations/implications:
Data Limitation. The time span of 1980-2020, is because of no data for some variables beyond the chosen time frame. Even if some data were available, some are inconsistence and varies within the available data base set.

Originality/value:
The study augment to the development of FSD in Uganda by furnishing the Monetary Authority with evidence that help fix the optimal inflation threshold in the country. Similarly, this research will contribute to the existing body of knowledge on how best to manage the inflation rate in the country.

1. Introduction

Modern macroeconomists argue that the financial sector is crucial in enhancing economic growth and development. Theoretical and empirical evidence uncovered that a well-established financial sector effectively manages savings and direct resources towards productive ventures and as a result, stimulates productivity in the country. Specifically, empirical research confirms a positive impact of FSD on long-run economic growth; (Stephen, 2021; Nexhat & Esat, 2019; King & Levine, 1993; Levine & Zervos, 1998; Beck & Levine, 2004). Conversely, research has demonstrated that inflation impacts both financial sector development and economic growth in many economies. It is thus imperative to examine the relationship between inflation development and economic growth in Uganda since previous studies have provided not only mixed but also inconclusive findings.

The latest research on this topic has revealed three key discoveries. First, a high inflation rate affects FSD and economic growth negatively (Isha & Mathew, 2023; Batayneh et al., 2021; Akena, et al. 2020; Akena, 2018; Hami, 2017). They assert that a high rate of inflation hampers the effectiveness of the financial sector through financial market distortions and decelerate economic performance. On the other hand, maintaining consistent and moderate

†Corresponding Author: Geoffrey Akena Oyoo
e-mail: ga.oyoo@muni.ac.ug

DOI: 10.25103/ijbesar.171.06

inflation rates fosters an environment where businesses can confidently strategize for the future, minimizes disruptions caused by tax distortions, and cultivates a secure atmosphere for commerce. Second, Afangideh et al., (2020), Mundell (1963), and Tobin (1965) findings reveal a notable correlation indicating that inflation positively influences the FSD. They argue that inflation prompts a shift in portfolio allocations, diverting funds from cash into capital investments, consequently resulting in diminished real returns on capital and increased investment. With positive effects on economic growth, the so-called Mundell-Tobin effect. English (1999) further argued that the elevated inflation prompts agents to swap paid transaction services for cash holdings, consequently driving up the demand for financial services and expanding the scope of the financial sector. Lastly, a nonlinear relationship between inflation and FSD is equally established in the literature. Their contention was that financial sectors excel under conditions of low inflation; nevertheless, when inflation rates rise above a certain threshold and persist, the performance of financial sectors deteriorates. Few instances under this argument are the studies by; Nsabiyaremye (2023) in Rwanda; Kosgei (2022) in Kenya; Musoni (2015) in Rwanda; Ahmed & Mortaza (2005) in Bangladesh and, in Pakistan by Zafar (2014), among others.

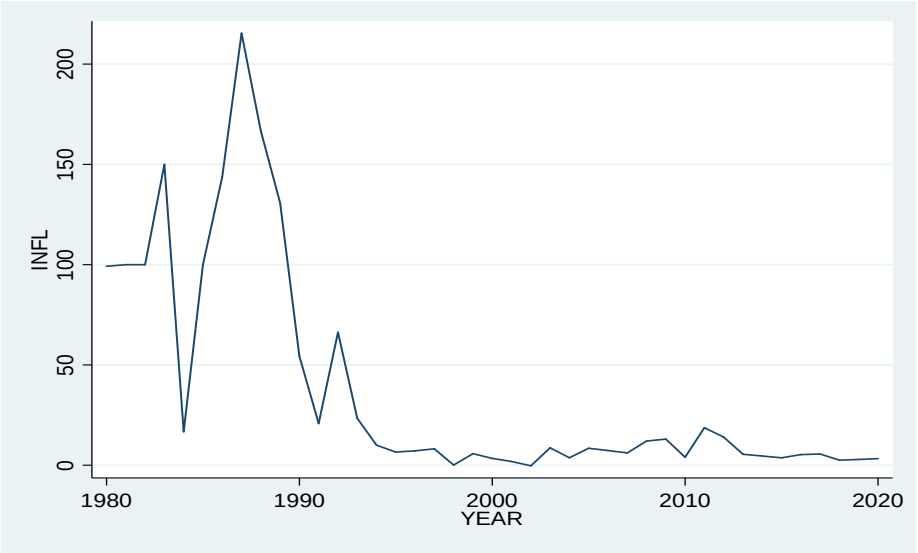

Figure 1 Inflation trend in Uganda 1980-2020.
Source: Author's construct using EViews 10

1.1 Motivation of the study

High rates of inflation constitute a risk assessment for investors making it hard to invest in such an economy. Given uncertainties and negative consequences, it becomes important to ascertain the optimal inflation level conducive to stimulating economic growth without hampering the financial sector's development. Theoretically, the relationship between inflation and the financial sector exhibits a non-linear pattern. What is inconclusive in the literature on the financial and inflation nexus is the turning point (threshold level) at which the signs between the two variables would change. Earlier studies conducted on inflation and financial development nexus have utilized cross-sectional and panel data drawn from extensive samples across many countries. As far as we know, no research has been undertaken to date using the ARDL approach for the Ugandan case to readdress this matter. However, one empirical study based on a panel data set comprising 87 countries, including Uganda; Dong-Kyeon et al. (2005) showed that inflation has a negative log-run relationship with financial sector development coexisting with a positive short-run relationship. Currently, the Government of Uganda is targeting inflation at 5 percent and therefore findings from this paper can lend support to adjust accordingly. Based on the above arguments, therefore, the study objective is to investigate the optimal level of inflation (inflation threshold) for better FSD in Uganda. Hence the study hypothesized that;

Ho: There is no inflation threshold for the financial sector development in Uganda

The following sections of the paper are organized as follows: Section 2 explores the literature review, followed by Section 3 which outlines the methodology and data sets utilized. Section 4 is dedicated to presenting the results and engaging in discussion, while Section 5 encapsulates the summary and concluding remarks.

2. Review of Literature

The research exploring the relationship FSD, and inflation recognizes three primary categories of argument as follows; the initial faction contends that information asymmetries disrupt the allocation of savings and investments within an economy. Hence, in periods of high inflation rates, financial market frictions intensify, consequently impeding the effectiveness of the financial system (Viktor & Vasily, 2018; Huybens & Smith, 1998). The second group looks at the behaviour of governments in financing deficit (Hasan & Zubair, 2019 McKinnon, 1973; Bencivenga & Smith, 1992). In this model, governments with large deficits and seigniorage revenue augment their inflation tax base by relying on financial sector taxation. The model also anticipates government intervention policies when deficits and inflation surpass a specified threshold level (Abbey, 2012). The final group explores the interconnections between FSD, economic growth, and inflation. They identified a negative correlation between economic growth and inflation,

DOI: 10.25103/ijbesar.171.06

suggesting a potential interconnection between inflation and financial market performance (Boyd et al., 1996; Abbey, 2012; Akena, 2018; Akena et al., 2020).

Empirically, studies that investigate the FSD and inflation linkages use time series, cross-section, and panel data analysis with various econometric models. Nevertheless, despite the persistent endeavors of various scholars to ascertain this connection, consensus remains elusive, with some studies indicating positive, negative, or no correlation with different thresholds as briefly explained above. Several studies indicate that a well-developed financial system promotes and maintains economic growth by encouraging capital accumulation and savings, (Romer, 1986; Schumpeter, 1911; Gurley & Shaw, 1955; Goldsmith, 1969). In other words, economies with more efficient financial institutions experience accelerated growth faster than their counterpart, Levine (2004). Conversely, empirical evidence shows that financial market frictions, primarily exacerbated by high inflation rates, dampen investment levels and thereby hinder the country's economic growth (Haslag & Koo, 1999; Azariadis & Smith, 1996). Boyd & Smith (1996) similarly conclude that there is a notably negative relationship between financial sector development (FSD) and inflation, regardless of the periods studied, variables/indicators used, empirical methodologies applied, or the country under examination. They also identify a nonlinear relationship, indicating the presence of an inflation threshold beyond which FSD is significantly impacted. Finally, their research revealed that asymmetric information serves as a mechanism by which rising inflation rates exacerbate credit market friction and lead to detrimental effects on financial sector development.

Recent research has revealed that there may be a positive or insignificant correlation between inflation and growth up to a certain 'threshold' level. Beyond this point, however, the dynamics change, and inflation starts to negatively impact economic growth. Fischer (1993) was one of the pioneers in econometrically recognizing this non-linearity, observing the impact of inflation on economic growth vary across increasing ranges of inflation and they differ from one country to another. Seleteng et al. (2013) argues that the threshold level of inflation represents the point at which the impacts of inflation on growth become detrimentale. From a technical standpoint, it is anticipated that the coefficients of inflation would be positive below, and including, the threshold level of inflation, and negative thereafter. For example, assuming a single inflation threshold, such as a 5-percent inflation rate, the coefficients of inflation rates ranging from 1 percent to 5 percent would typically show a positive sign, regardless of their statistical significance. Some of them may exhibit statistical significance, while some may not. All the statistically significant inflation rates below the threshold level may be considered 'favourable' as they closely correlate with enhancements in well-being and driving economic growth. This proposition aligns with the argument of Garman & Richards (1989) that, from the perspective of society, any inflationary change may be considered desirable if it steers the economy towards its optimal state. Likewise, according to Billi & Kahn (2008), the optimal inflation rate is viewed as the level that maximizes the overall economic welfare of the populace, achieves a balance between the costs and benefits of inflation, and corresponds to a zero nominal interest rate.

Nsabiyaremye (2023) examined the threshold impacts of inflation on economic growth in Rwanda, using time-series data from 1972 to 2021. The study employed both Least Squares (LS) and Two-Stage Least Squares (2SLST) methodologies, incorporating variables such as GDP growth rate, investment growth rate, inflation rate, and population growth rate. Additionally, instrumental variables were incorporated to model the estimated equation. The study reveals a 6% inflation threshold which means that below 6% inflation stimulates economic growth while beyond it hampers. Also, in Saleem's study (2020), the threshold effect of inflation on economic growth was reassessed for 27 countries, comprising 16 developing and 11 developed economies. This re-evaluation employed the methodologies of fixed effects and feasible generalized least squares (FGLS) across the time frame of 1975 to 2018. The findings indicated that the inflation thresholds were 12.23% for developing countries and 5.36% for developed countries. This result is consistent with our result of 6% in this study, yet they use different data sets, time, location, and econometric methods of analysis.

Kosgei & George (2022) identified the threshold level of inflation for Kenya by examining 48 years of annual time series data from 1971 to 2019. They first estimated the threshold level using the threshold regression method. Then, they applied an augmented regression model that included inflation at structural breaks. An econometric analysis of the constrained parametric model was performed to validate each estimated threshold level of inflation derived from the two methodologies. The threshold regression technique determined a statistically significant threshold inflation rate of 5.83%. In contrast, the augmented regression model, which included inflation at structural breaks, produced a statistically insignificant threshold inflation rate of 5.7%. The constrained parametric model identified a statistically significant positive and negative impact for threshold inflation rates of 5.8% and 5.7%, respectively. Specifically, at threshold inflation levels of 5.8% and 5.7%, a one-unit increase in inflation corresponded to a 2.89% increase and a 3.29% decrease in GDP growth, respectively.

Sani & Ismaila (2012) investigated the threshold effect of inflation on economic growth in Nigeria using quarterly time series data from 1981 to 2009. They applied the threshold regression model developed by Khan & Senhadji (2001). The study identified a threshold inflation level of 13 percent for Nigeria, indicating that below this level, inflation has a minimal impact on economic activities, whereas above it, the adverse effect of inflation on growth becomes significant. This paper utilizes a similar model of analysis though with emphasis on lag values of financial indicators.

In Bangladesh, Ahmed & Mortaza (2005) found a statistically significant long-term negative relationship between inflation and economic growth. They analyzed annual data on real GDP and CPI from 1980 to 2005 using co-integration and error correction models. Their analysis revealed an inflation threshold level of 6 percent (structural-break point), beyond which inflation was observed to detrimentally impact economic growth. Below is the summary of some related studies.

DOI: 10.25103/ijbesar.171.06

Table 1. Summary of inflation threshold.

Authors	Country of study	Time Frame	Estimated threshold (in %)
Nsabiyaremye (2023)	Rwanda	1972-2021	6
Kosgei (2022)	Kenya	1971-2019	5.8
Fringpong & Oteng (2010)	Ghana	1960-2008	11
Zafar (2014)	Pakistan	1961-2010	5
Phiri (2010)	Soth Africa	2000-2010	8
Munir & Mansur (2009)	Malaysia	1970-2005	3.89
Hussain (2005)	Pakistan	1973-2005	5
Wahid et al (2011)	Bangladesh	1985-2005	5
Ahmed and Mortaza (2014)	Bangladesh	1981-2005	6
Sweidan (2004)	Jordan	1994-2002	2
Musoni (2015)	Rwanda	1968-2010	12.7
Salami & Kelikume(2010)	Nigeria	1970-2008	8
	Cross-Country		
Saleem (2020)	27 Countries	1975-2018	5.36
Khan & Senhadji (2001)	140 Countries	1960-1998	11
Rousseau and Wachtel (2002)	84 Countries		6
Kremer & Nautz (2009)	124 Countries	1950-2004	17
Mi (2006)	118 Countries	1961-2000	14
Sarel (1996)	87 Countries	1970-1990	8

Source: Authors' Compilation

3. Methodology

3.1. Data sources

The study utilized annual secondary data spanning from 1980 to 2020 for Uganda. Domestic Credit to the Private Sector (DCPS), measured as a percentage of GDP, served as the dependent variable to assess Financial Sector Development (FSD). Additionally, variables such as Inflation Rates (INFL) based on CPI, Gross Domestic Product (GDP) annual growth rate, Trade Openness (TOP), Investment (INV), and Government Expenditure (GOVT) were also measured as percentages of GDP. These data are obtained from World Bank Development Indicators (WDI), the World Bank Economic Outlook database, International Financial Statistics from IMF, and the Ministry of Finance Planning and Economic Development.

3.2 Model Specification

The study uses the following cross-sectional regression equation to evaluate the impact of inflation on financial development commonly used in analyzing the relationship between financial sector growth dynamics;

$$FSD = \alpha + \beta infl + \gamma Control\ variables + \varepsilon_t \quad (1)$$

Where; FSD is the financial sector development, $infl$ is the inflation rates, $Control\ variables$ includes other variables such as Gross Domestic Product (GDP), Government spending (GOVT) Trade openness (TOP), Private investment (INV) while ε are white noise. To explore the inflation threshold and financial sector development in Uganda, this paper adapted the model to align with the regression technique established by Khan & Senhadji (2001). The same method was used in South Africa by Temitope (2012), Nigeria by Sani & Ismaila (2012) Jordan by Sweidan (2004), in Pakistan by Hussain (2005), Mubarik (2005), Nasir & Nawaz (2010), in Bangladesh by Shamim & Mortarza (2005) and in Malaysia by Munir & Mansur (2009). All the above studies used different explanatory variables that suit their particular country characteristics. Likewise, this study carefully chooses the variables that reflect the Uganda context. The equation (2) below specifies the model for the threshold effect of inflation.

$$FSD_t = \theta_1 + \theta_2 Infl_t + \theta_3 d_t^* (infl_t - infl^*) + \beta' x_t + \varepsilon_t \quad (2)$$

Where,

FSD_t - Financial sector development proxied by DCPS as a percentage of GDP

$infl_t$ - Inflation rates based on CPI

$infl^*$ - Threshold level of inflation

DOI: 10.25103/ijbesar.171.06

x_t - is a vector of control variables (GDP, GOVT, TOP and INV)
ε_t - is the error term
d_t - Dummy variable that takes value one for inflation level greater than the threshold inflation $infl^*$ and zero otherwise in period t. This can be written mathematically as;

$$d_t = 1 \; if \; infl_t > infl^* \; and \; d_t = 0 \; if \; infl_t \leq infl^* \quad (3)$$

The subtraction of $infl^*$ from $infl$ in equation 3 is to ensure continuity at the threshold level. This is due to the fact that slight discrepancies in both the inflation rate and the threshold level can result in varied effects on financial sector development, contingent upon whether inflation rises or remains stable.

3.3 Estimation techniques

The correlation between inflation and FSD is investigated using the Autoregressive Distributing Lag (ADRL) technique with the measure of FSD as a response variable. The strength of this ADRL approach lies in its versatility, as it can be applied irrespective of whether the underlying variables exhibit pure stationarity at levels, after differencing, or, mutually co-integrated. To determine the critical point of inflation conducive to stimulating FSD, the value of $infl^*$ is to be chosen arbitrarily for estimation ($infl^* = 1, 2, 3 \ldots and \; so \; on$), but particularly to integrate the BOU target range that was established. The estimation of $infl^*$ is to be found by setting the value of $infl^*$ that reduces the sum of squared residuals to the lowest extent, and this is the point where R-square is maximum. This is the point where inflation begins to exert a statistically significant influence on financial performance and growth (Mubarik, 2005; Salami & Kelikume, 2010). Mubarik (2005) further stressed that, the correlation between inflation and financial FSD as represented by the level, $infl^* \; is \; given \; by \; \theta_2$ for the low inflation and $\theta_2 + \theta_3$ for the level of high inflation. Therefore, the high inflation level means that we need to add $\theta_2 + \theta_3$ in the model to demonstrate the impact of inflation on the FSD, and this is the inflation threshold point being investigated. Here the observation in equation 3 becomes:

$$FSD_t = X\beta_\pi + \epsilon_t, infl = infl_l, \ldots infl_h \quad (4)$$

Where;
FSD_t– is the measure of financial sector development at time t
$\beta_\pi = (\theta_1, \theta_2, \ldots \beta)$ is the parameter vector, along with the matrix of observations on explanatory variables, represented by X, form the basis of our model. The coefficient β is labeled by $infl$ to reflect its variation based on the level of threshold inflation, with the span given by $infl_l \; and \; infl_h$. R (π) represents the residual sum of squares when the inflation threshold is set at π. The optimal threshold estimate level, denoted as $infl^*$, is selected to minimize R ($infl$) according to the following procedure.

$$infl^* = \arg\min \{R(infl), infl = infl_{l \ldots} infl_h\} \quad (5)$$

4. Estimation and Interpretation of Results

Before using the data in the analysis, several checks and tests are carried out to evaluate the statistical properties and reliability of all variables. Table 2 displays the descriptive statistics of the variables, indicating a reasonably normal distribution patternare.

Table 2: Descriptive Statistics of the variables

Variables	DCPS	INFL	GDP	GOVT	TOP	INV
Mean	7.90	38.04	5.49	11.89	35.30	16.71
Median	6.02	8.45	6.30	11.30	32.80	16.10
Maximum	16.80	215.40	11.50	17.30	62.20	26.00
Minimum	2.60	-0.29	-3.30	7.00	16.20	7.30
Std. Dev.	4.64	55.94	3.43	2.71	11.77	5.54
Skewness	0.46	1.61	-0.98	0.17	0.89	-0.06
Kurtosis	1.65	4.47	3.66	2.22	2.84	1.84
Jarque-Bera	4.57	21.43	7.37	1.23	5.51	2.34
Probability	0.10	0.00	0.03	0.54	0.06	0.31
Sum	324.08	1559.65	225.09	487.60	1447.10	685.30
Sum Sq. Dev.	859.72	125186.70	470.20	293.17	5538.54	1227.57
Observations	41	41	41	41	41	41

Source: Author's construct using EViews 10

DOI: 10.25103/ijbesar.171.06

To ascertain the dependence between two or more explanatory variables, the multicollinearity test was conducted, and the outcomes are shown in Table 3 below. It's evidenced that the variables are not multi-collinear since the values of the Correlation Matrix are all closer to 0 than 1.

Table 3: Correlation Matrix

Variables	INFL	GDP	GOVT	TOP	INV
INFL	1				
GDP	-0.262	1			
GOVT	-0.377	-0.085	1		
TOP	-0.373	0.153	0.071	1	
INV	-0.540	-0.016	0.292	0.371	1

Source: Author's construct

Similarly, to prevent misleading outcomes, a stationarity test is conducted using the Augmented Dickey-Fuller (ADF) unit root test, and the results are presented in Table 4.

Table: 4 Unit Root Tests

ADF TEST						
	LEVELS			FIRST DIFFERENCE		
VARIABLES	T-STAT.	P-VALUES	COMMENT	T-STAT.	P-VALUES	COMMENT
FSD	-0.497	0.881	Non-stationary	-9.055	0.000***	Stationary
INV	-0.977	0.752	…….……	-5.921	0.000***	…….……
TOP	-1.957	0.304	…….……	-4.851	0.000***	…….……
GOVT	-3.117	0.0332*	…….……	-7.922	0.000***	…….……
INFL	-6.629	0.000***	Stationary	…….……	…….……	…….……
GDP	-4.699	0.0005***	Stationary	…….……	…….……	…….……

Note: *, **, *** stands for stationary at 10%, 5%, and 1% at all levels respectively

The findings from the stationarity test indicate that certain variables exhibit stationarity in their original form, whereas others achieve stationarity only after undergoing the first difference. Specifically, GDP and INFL are stationary at I(0) at all levels at 1 percent while GOVT is stationary at I(0) but at a 5% significant level. Similarly, FSD, INV, and TOP are stationary at all levels after the first difference. Since the variables of the study are stationary at different levels [I(0) and I(1)], and non-stationary variables all become stationary after first differencing I(1), ARDL becomes the only best model in this case and as a result, OLS for threshold estimation should be done with lags.

4.1 Autoregressive Distributed Lag (ARDL) model

Our Stationarity analysis shows mixed stationarity and here, the ARDL model approach addresses this scenario. For OLS regressions, it's necessary that all variables exhibit stationarity at their original levels. Likewise, the ECM or VECM model necessitates stationarity for all variables following the first difference. All in all, we want to avoid spurious regression that eventually leads to wrong statistical inferences. We must first determine the suitable lags for each variable, which is one of the initial prerequisites for employing the ARDL model estimation technique.

4.1.1 Lags selection

Prior to conducting the ultimate regression analysis, it's imperative to establish the ARDL model with suitable lags for each variable. As a reminder, the ARDL model is represented as ARDL (p, q_1, q_2, q_3, q_4), where, in this context, p signifies the lag of the dependent variable, while q_1 to q_4 denote the lags of the explanatory variables INFL, GOVT, TOP, and INV, respectively. Figure 4.1 shows the model using Schwarz Criterion (SIC) and the criterion suggested ARDL (3, 1, 1, 2, 0, 0) as the best model out of the top twenty (20) evaluated since it portrays the lowest SIC value. In this scenario, the dependent variable (DCPS) is incorporated into the model with a lag of 3, while the other explanatory variables enter the model with their respective subsequent lags as identified.

DOI: 10.25103/ijbesar.171.06

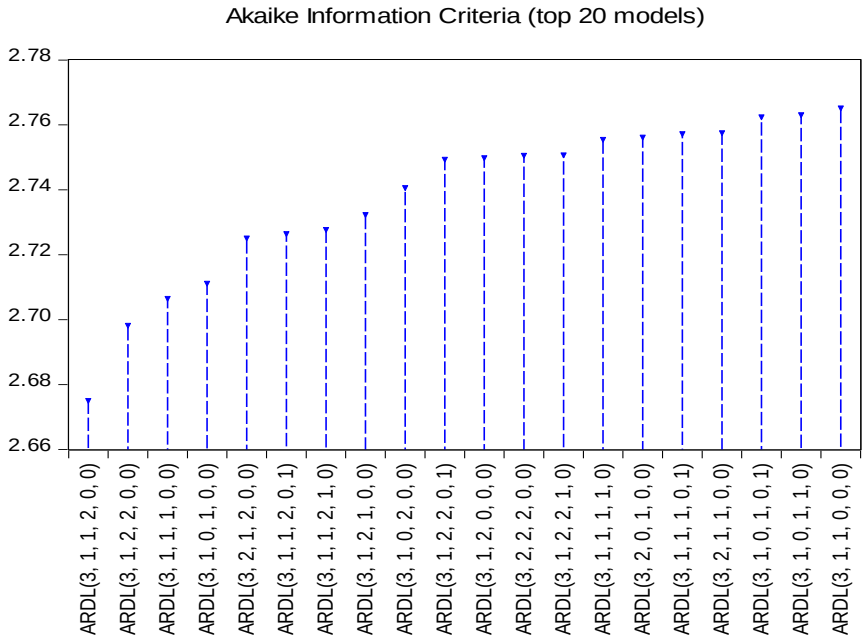

Figure 2 Model selection summary graph
Source: Author's construct using Eviews 10

4.2: Determination of the optimal inflation rate (Inflation Threshold)

The regression coefficients were estimated in the model for the correlation between the variables of the study using the model developed in equation (2) in subsection 3.2. The use of estimated values for the variable rate of inflation (inflation threshold) from INFL = 1, 2, 3…. to INFL = 9 was employed as we keep observing where the coefficient of inflation switch sign as well as the value of the coefficient of R-square being maximum, based on studies by Mubarik (2005) and Frimpong & Abayie (2010). The OLS estimation with lag values of variables is shown in Table 5.

Table 5. Inflation Threshold Estimation Results

Regression Estimates of Inflation threshold in Uganda at inflation=1 to inflation =9

Dependent variables DCPS with lag 3

INFL in %	Variable	Coefficient	Std. Error	t-Statistic	R-Square
	C	-1.055836	3.422905	-0.308462	
1	INFL	**1.317064**	1.483305	0.887925	0.806337
	D1*(INFL-1)	-1.329512	1.483352	-0.896289	
	GDP	0.043627	0.118853	0.367065	
	GOVT	-0.355372	0.171595	-2.070999	
	TOP	-0.022946	0.035153	-0.652741	
	INV	0.724149	0.079499	9.108962	
	C	-1.114906	3.448878	-0.323266	
2	INFL	**0.700897**	0.788528	0.888867	0.806428
	D2*(INFL-2)	-0.713472	0.788691	-0.904628	
	GDP	0.042133	0.118665	0.355056	
	GOVT	-0.355338	0.171439	-2.072671	
	TOP	-0.023048	0.035148	-0.655741	
	INV	0.723075	0.079591	9.084891	
	C	-1.031442	3.464795	-0.297692	
3	INFL	**0.44072**	0.532262	0.828013	0.805858
	D3*(INFL-3)	-0.453427	0.532568	-0.851397	
	GDP	0.040996	0.118781	0.345136	

DOI: 10.25103/ijbesar.171.06

	GOVT	-0.353588	0.173183	-2.041699	
	TOP	-0.02386	0.035246	-0.676954	
	INV	0.723972	0.079653	9.089089	
	C	-0.821478	3.428135	-0.239628	
4	INFL	**0.294389**	0.396843	0.741827	0.806077
	D4*(INFL-4)	-0.307384	0.397533	-0.773227	
	GDP	0.039022	0.118904	0.32818	
	GOVT	-0.357064	0.173789	-2.054588	
	TOP	-0.026963	0.035817	-0.752808	
	INV	0.73081	0.079417	9.202198	
	C	-0.527311	3.397648	-0.155199	
5	INFL	**0.185056**	0.308647	0.599572	0.806909
	D5*(INFL-5)	-0.19817	0.309659	-0.639962	
	GDP	0.036789	0.119152	0.30876	
	GOVT	-0.364689	0.17409	-2.094837	
	TOP	-0.027575	0.03639	-0.757786	
	INV	0.735698	0.080034	9.19235	
	C	0.267748	3.390992	0.078959	
6	INFL	**0.038957**	0.253233	0.153837	0.807581
	D6*(INFL-6)	-0.051633	0.254521	-0.202863	
	GDP	0.033712	0.119753	0.281512	
	GOVT	-0.388637	0.174568	-2.226285	
	TOP	-0.024176	0.037048	-0.65257	
	INV	0.733917	0.081663	8.98718	
	C	0.774985	3.374151	0.229683	
7	INFL	**-0.031251**	0.216791	-0.144153	0.806369
	D7*(INFL-7)	0.01903	0.218445	0.087114	
	GDP	0.032785	0.119854	0.273543	
	GOVT	-0.403597	0.173654	-2.324149	
	TOP	-0.021014	0.037609	-0.558754	
	INV	0.728684	0.083501	8.726677	
	C	1.064306	3.364417	0.316342	
8	INFL	**-0.06112**	0.189827	-0.321977	0.801741
	D8*(INFL-8)	0.049306	0.19182	0.257042	
	GDP	0.030648	0.120063	0.255266	
	GOVT	-0.411653	0.173172	-2.377135	
	TOP	-0.018582	0.038061	-0.488222	
	INV	0.723523	0.084845	8.527608	
	C	1.228886	3.390352	0.362466	
9	INFL	**-0.071281**	0.172258	-0.413801	0.802067
	D9*(INFL-9)	0.059775	0.17458	0.342394	

DOI: 10.25103/ijbesar.171.06

GDP	0.027978	0.12052	0.232148
GOVT	-0.417125	0.174196	-2.394569
TOP	-0.017013	0.038478	-0.442136
INV	0.720011	0.085921	8.379908

Source: Authors construct using Eviews 10

The outcome above indicates that the coefficients of inflation are positive from inflation rates of 1 percent up to 6 percent and in decreasing order of magnitude. Beyond 6 percent, the coefficients of inflation become negative and increase in magnitude exponentially as the inflation rate increases. This is the point where the highest value for the coefficient of determination R-squared (R-Squared=0.807581) is archived. The result obtained allows us to conclude that the optimal level of inflation (inflation threshold) in Uganda is 6 percent, beyond which inflation rates change sign from positive to negative. At this point (INFL=6 percent), the coefficient of inflation and its dummies (recall equation 3.3) are θ_2=0.038957 and θ_3=-0.051633 respectively. Thus, to demonstrate the effect of increasing the rate of inflation on the optimal rate of change in FSD, we required to estimate $\theta_2 + \theta_3$, Mubarik, (2005). Therefore, $\theta_2 + \theta_3 = 0.038957 + (-0.051633) = -0.012676$, this implies that an increase in the inflation rate by 1 percent beyond the inflation threshold of 6 percent will be accompanied by a lack of optimal growth rate of financial sector development by about 1.3 percent. At an inflation rate of 5 percent, we see that $\theta_2 + \theta_3 = 0.185056 + (-0.19817) = -0.013114$. This means that there is an opportunity to increase the FSD by 1.3 percent if we increase the optimal rate of inflation from 5 percent to 6 percent.

This inflation threshold finding in Uganda is consistent with other findings such as that of the Republic of Rwanda (Nsabiyaremye, 2023), Bangladesh (Ahmed & Mortaza, 2014), and Rousseau & Wachtel (2002) for 84 countries. This consistent finding interestingly, had different study time frames and econometric models applied yet the outputs are the same. However, it's slightly higher than that of the Republic of Kenya which got a 5.8% threshold value (Kosgei, 2022), which we can still round off to 6%, and Saleem (2020) a panel study of 27 countries which got 5.36-percent threshold. The finding also has a significant deviation from Khan & Senhadji (2001) who obtained an 11 percent inflation threshold for developing countries as well as Fringpong & Oteng (2010) in Ghana among others with the deviation in results, (see table 1).

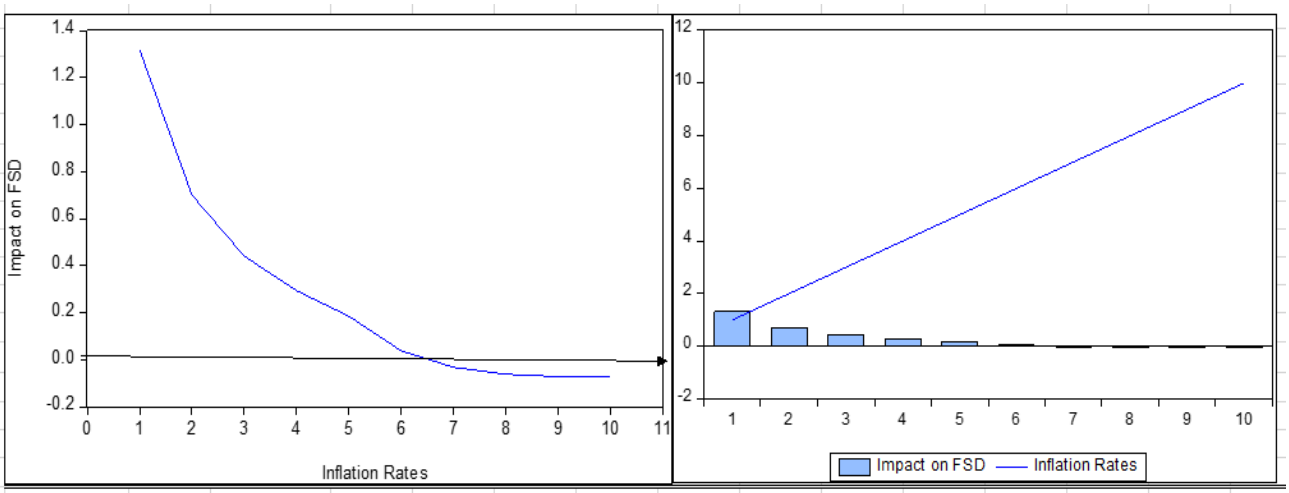

Figure 3 Long run effects of inflation on Financial Sector Development in Uganda
Source: Author's construct using EViews 10

Figure 3 illustrates that, the impact of inflation on FSD is positive from an inflation rate of 1 percent to 6 percent and the marginal effect diminishes as the inflation rate increases. Beyond 6 percent, the influence of inflation on financial sector development becomes negative and its intensity increases as inflation rates increase.

5. Conclusion

This paper investigates the optimal inflation level (inflation threshold) for better financial sector development in Uganda using the ARDL model. The results obtained reveal that Uganda's optimal inflation rate is 6 percent beyond which it becomes harmful to the financial sector development. In absolute terms, a unit increase in the inflation rate beyond 6 percent will lead to a decrease in financial sector development by about 1.3%. Studies that have been conducted on this theme have agreed that the correlation between inflation and FSD is nonlinear in such a way that the impact of inflation on FSD is positive up to a certain level beyond which it becomes negative. The paper concludes that a country with a high rate of inflation experiences weak FSD hurting the growth process of a country. The study recommend that the central bank should focus on policies to maintain inflation rates at or below 6 percentat. The current BOU inflation target of 5 percent is slightly lower than necessary, and this finding statistically established that we are missing the opportunity for financial sector development by 0.013114.

DOI: 10.25103/ijbesar.171.06

5.1 Suggested areas for further research

The study concentrates on analyzing the correlation between inflation and financial sector development in Uganda spanning the period 1980 to 2020 with variables GDP, DCPS, INFL GOVT, TOP, and INV. Domestic credits to private sectors (DCPS) were used to proxy the financial sector development. There is a need, however, to widen the scope such as; geographically to cater for the entire EAC as a new emerging market in the region, variables that measured the financial inclusions such as the ICT in the banking sector, period, and methodological scope.

References

Abbey, E. N. (2012). Inflation and financial development: Evidence. *American Journal of Economics and Business Administration*, *4*(4), 227-236

Abdullah, A. and Khaled, B. (2015). "The relationship between inflation and financial sector development in Saudi Arabia "*Proceedings of Australasian Conference on Business and Social Sciences*, Sydney.

Ahmed S. and Mortaza M.G. (2005). "Inflation and Growth in Bangladesh, 1981-2005". *Policy Analysis Unit*, Working Paper Series: WP0604.

Afangideh. U. J., Garbobiya T. S., Umar F. B., and Usman N. (2020) " The Impact of Inflation on Financial Sector Development: Evidence from Nigeria"International Journal of Economics and Finance. Vol 12. No. 2

Akena G O (2018). The Relationship between Inflation and Financial Sector Development: Evidence from Uganda'' International Journal of Science and Research (IJSR), Vol 7. Issue 12; 1279-1289

Akena G O, Mubazi and John Mayanja Bbale (2020). Does Inflation Matter for Financial Sector Development in Uganda? Evidence from Autoregressive Distributed Lag (ARDL) Co-Integration Approach " International Journal of Innovative Science and Research Technology" Volume 5, Issue 12.

Azariadis Costas and Smith Bruce. (1996). " Private Information, Money and Growth: Indeterminacies, Fluctuations, and the Mundell-Tobin Effect", *Journal of Economic Growth 1*, 309-312.

Batayneh. K., Wasfi A S & Mohammad Q.M. (2021). " The impact of inflation on the financial sector development: Empirical evidence from Jordan, Cogent Economics & Finance, 9:1, 1970869.

Beck, T. and Levine, R. (2004). " Stock Market, Bank, and Growth - Panel Evidence". *Journal of Banking and Finance*, 28, 432-32.

Bencivenga, V. R and Smith, B. D (1993). " Some Consequences of Credit Rationing in an Endogenous Growth Model". *Journal of Economic Dynamics and Control*, 17, 97-122.

Billi, R. M and Khan, G. A (2008). "What is the optimal inflation rate?". *Federal Reserve Bank of Kansas City, Economic Review*, Second Quarter, 5-15

Boyd, J. H, Levine, R and Smith B (2001). "The Impact of Inflation on Financial Market Performance". *Journal of Monetary Economics*. Vol 47, 221-248.

Dong-Kyeon, Shu-Chin Lin and Yu-Bo, (2005): *Dynamic Relationship between Inflation and Financial Sector Development*. The Department of Finance, Providence University.

English, W. (1999). " Inflation and Financial Sector Size". *Journal of Monetary Economics*, 14, 379-400.

Fischer, S. (1993). "The Role of Macroeconomic Factors in Economic Growth". *Journal of Monetary Economics*, Vol.32, 485-512.

Fringpong, J M and Oteng Abeyie (2010)."When is Inflation Harmful? Estimating the Threshold Effect for Ghana". *American Journal of Economics and Business Administration*, Vol. 2, No. 3, 225-232.

Garman, D. M and Richards , D . J (1989) , "Policy rules, inflationary bias and cyclical stability". *Journal of Money, Credit and Banking*, Vol 21, 409-421.

Gurley, J. G. and Shaw E. S. (1955). " Financial Aspects of Economic Development". *American Economic Review*, 45: 515-38.

Goldsmith, R. W (1969). *Financial Structure and Development*. New Haven: Yale University Press.

Hami Mahyar (2017)" The Effect of Inflation on Financial Development Indicators in Iran". *Studies in Business and Economics Vol. 12 Issue 2*.

Haroon and R. Khan (2015)."The Impact of Inflation on Financial Sector Development", *International Journal of Innovation and Economic Development*, Vol 1, No. 4, 42-48.

Hasan and Zubair (2019) " Deficit financing in developing countries: Applications and consequences" *International Center for Education in Islamic Finance, Malaysia* (MPRA)

Haslag, J. H. and Koo, J. (1999). " Financial Repression, Financial Development and Economic Growth". *Federal Reserve Bank of Dallas*, Working paper 99-02.

Hussain, M. (2005). " Inflation and Growth: Estimation of Threshold Point for Pakistan". *Pakistan Business Review*, Vol.7, No.3, 1-15.

Huybens, E. and Smith, B. (1998). " Financial market frictions, monetary policy and capital accumulation in a small open economy". *Journal of Economic Theory*, Vol. 81, No. 2,353-400.

Isha Agarwal & Mathew Baron (2023) " Exploring the link between rising inflation and economic growth: The role of the banking sector" (World Bank)

Khan, M. and Senhadji. A. (2001), "Threshold Effect in the Relationship between Inflation and Growth". *IMF staff working paper*, 48:1-21.

King, R. G., and Levine. R (1993). "Finance and Growth: Schumpeter Might be Right". *The Quarterly Journal of Economics*, 108 (3), 717-37.

Kosgei Kiptum & George. (2022). Relationship between Kenya's economic growth and inflation. SN Business & Economics. 2. 10.1007/s43546-022-00376-2.

Kremer S, B and Nautz, D (2009). " Inflation and Growth: New Evidence from a Dynamics Panel Threshold Analysis." *Discussion Paper No. 2009/9, School of Business and Economics*, Free University Berlin.

Levine, R. (2004). "Finance and Growth: Theory and Evidence". *National Bureau of Economic Research*, Cambridge, M A, NBER Working Paper No.10766.

DOI: 10.25103/ijbesar.171.06

Levine, R and Zervos, S. (1998). " Stock Markets, Banks, and Economic Growth." *American Economic Review*, 88, 537-558.
McKinnon, R. (1973) Money and Capital in Economic Development. The Brooking Institute, Washington DC.
Mubarik, Y. (2005), " Inflation and Growth: An Estimation of Threshold Level of Inflation in Pakistan". *State Bank of Pakistan-Research Bulletin* Vol.1, No.1, 35-44.
Mundell, R. (1963). "Inflation and Real Interest", *Journal of Political Economics*, 71, 280-283.
Munir, Q and Mansur, K. (2009). " Nonlinearity between Inflation rate and GDP Growth in Malaysia." *Economics Bulletin*, Vol. 29, No. 3, 155-1569.
Musoni, J. R. (2015). "Threshold effect in the Relationship between Inflation and Economic Growth: Evidence from Rwanda. " *African Economic Research Consortium*, Research Paper, No. 293.
Nasir Iqbal and Nawaz S. (2010). "Investment, Inflation, and Economic Growth Nexus". *Pakistan Institute of Development Economics Islamabad, Pakistan.*
Nexhat Kreziu and Esat Ali. D (2019). "The Impact of Inflation on Economic Growth ". *International International Journal of Finance & Banking Studies.* Volume 8 (1)
Nsabiyaremye Jean D'amour (2023) "Threshold effects of Inflation on Economic growth in Rwanda" *International Journal of Management and Commerce Innovations*, Vol. 10, Issue 2 page 364-372
Phiri, A. (2010). "At what level is inflation detrimental to finance growth activity in South Africa?." *Journal of Sustainable Development in Africa*, Vol.12, No. 6, 354-364.
Romer, P. M. (1986). "Increasing Returns and Long-run Growth". *Journal of Political Economy*, 94 (5): 1002-37.
Rousseau P and Wachtel P (2002), "Inflation Threshold and Growth Nexus". *A Journal of International Money and Finance.* Vol. 21, 779-793.
Salami D and Kelikume I, (2010). "An Estimation of Inflation Threshold for Nigeria", 1970-2008. *Lagos Business School, Pan African University, Nigeria.*
Sani Bawa and Ismaila S. Abdullahi (2012) " Threshold Effect of Inflation on Economic Growth in Nigeria "CBN Journal of Applied Statistics Vol. 3 No.1.
Seleteng, M., Bittencourt, M. and van Eyden, R., (2013). Non-linearities in inflation-growth nexus in the SADC region: A panel smooth transition regression approach. Economic Modelling, 30(1), pp.149–156. https://doi.org/10.1016/j.econmod.2012.09.028.
Schumpeter. J. A. (1911). *Theory of Economic Development.* Cambridge, MA: Havard University Press.
Shamim Ahmed and Mortaza Golam. (2005), "Inflation and Economic Growth in Bangladesh." *Policy Analysis Unit, Research Department, Bangladesh Bank, Working Paper Series:* WP0604.
Stephen Smith (2021), " Impact of Inflation on the Growth of Indian Economy: Global Journal of Human-S0cial Science: Economics". Volume 21 Issue 2 Version 1.0
Sweidan, O. D. (2004). "Does Inflation Harm Economic Growth in Jordan? An Econometric Analysis for the period 1970-2000". *International Journal of Applied Econometrics and Quantitative Studies*, Vol.1, No 2, 41-66.
Temitope, L. (2012), "Estimating the Inflation Threshold for South Africa". *Economic Research for Southern Africa*, Working Paper 285.
Tobins, J. (1965). "Money and Economic Growth". *Econometrica*, 33, 671-684.
Wahid Abu N., Shahbaz Muhammed, and Azeem.P. (2011)." Inflation and Financial Sector Correlation: The case of Bangladesh". *International Journal of Economics and Financial Issues*, Vol.1, No 4, 145-152.
Viktor Ivanitskiy & Vasily Tatyannikov (2018) "Information Asymmetry in Financial Markets: Challenges and Threats,"Economy of region, Centre for Economic Security, Institute of Economics of Ural Branch of Russian Academy of Sciences, vol. 1(4), pages 1156-1167
Zafar Hayat (2014), *Optimal, Desirable and Threshold Inflation on Growth-nexus: An Empirical Assessment of a Typical Discretionary Monetary Policy Strategy.* School of Economics and Finance, Massey University, Palmerstone North.

DOI: 10.25103/ijbesar.171.06