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Private Saving in Ghana: The Combined Efforts of Financial Development, Interest Rates, and Inflation

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ABSTRACT
Understanding private saving behaviour of the citizenry is crucial for informed policy decisions in an economy. The reason is not far-fetched; economies gain sustained growth from investment through saving. However, it does appear much of the available literature is on aggregate private savings rather than on private saving behaviour. This study updates the literature by looking at the combined effects of financial development, interest rate and inflation on private saving behaviour among Ghanaians. Data for the study were obtained from the World Bank Development Indicators between 1980 and 2019. We employed Johansen Cointegration Test; attempts are made to ascertain the existence of a long-run relationship among variables using the Vector Autoregressive (VAR) Model. The study confirms a significant positive relationship between private saving behaviour and financial sector development. This partly explains the relevance of deepening the financial sector through reductions in costs of performing transactions and initiating contracts to encourage private saving through improved propensity to save by the old and to rake in new entrants. A reliance on macroeconomic variables to forecast the behaviour of private saving enjoins policy decision makers to consider the implications of their decisions for private saving. Among the recommendations are, lower borrowing costs across the economy, resulting in increased investment and consumption spending, and hence economic recovery only in times of stagnation.

Keywords: Private Saving, FD, Interest Rate, Inflation Rate, VAR Model

JEL Classification: C1, C3, E2, E4, E6, E7

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1. INTRODUCTION

Saving has enjoyed prominence in both theoretical and empirical analyses of macroeconomics and policy design across globe (Le Blanc, Porpiglia, Teppa, Zhu & Ziegelmeyer, 2016; Bonfinger & Ries, 2017; Kapounek, Korab & Deltuvaite, 2016; Thu, 2018). This in part is due to its ability to accumulate capital for investment and economic growth, and also the elusiveness of its precise measurement. And so, this paper describes saving as an essential feature in every economy that needs a considerable policy attention. Households' saving behaviour is tainted mostly with irrationality and needs various levels of engagements whether in the academia, policymaker circles or particularly at national governments' deliberations. It is usual in most situations to want to believe that global economic wellbeing is a function of the interplay of several economic units, of which household saving behaviour ranks favourably but independent of the reasons for their respective behaviour. Thus, aggregate savings is regardless of an individual's or household's rational behaviour; instead, what

matters here is the saving behaviour motivators; what informs the household's intent to saving or dissave? Note that private or household saving is used in the sense of domestic saving to evoke explanations for its fluctuating behaviour (see Figure 1).

Interestingly, 'Saving' and Savings' have had a loose application among economists. Whereas 'Saving' is a flow concept, 'Savings' is a stock item at a given time. Thus, this paper will frequently refer saving as a flow concept whose behaviour is shrouded in ambiguities.

Statement of the Problem
Although there have been extensive studies on saving, the linkage has mostly been to micro-indicators at the blindside of a macro-linkage and has therefore left a literature gap to fill. The need for this current study is threefold; to show that household saving gravitate towards aggregate saving at the macroeconomic level. This is because the financial sector flourish on positive saving. Saving is a function of financial development, described as improving the quality and quantity

of financial services with a comparatively low cost of doing business. This low cost of doing business has influenced the saving behaviour of the average depositor. Güngör, Çiftçioğlu, and Balcılar (2014) posit that financial development has a positive composite index influence on private saving behaviour of the household. Financial development is also regarded as a deliberate macroeconomic policy that focuses on accumulating liquid assets, acquiring investment information, and strategically allocating resources, leading to a positive saving behaviour (Levine, 1997; Paun, Musetescu, Topan, & Danuletiu, 2019). Altaee and Al-Jafari (2019) reveal that financial development does not just propel domestic savings in the short-run but has a long-lasting significant positive effect on the savings culture of the household. There is therefore the need to bring to the fore the relevance of financial sector development in mobilising savings through low contractual costs and affordable business fees. Second, the household saving behaviour is divergently positioned. de Melo and Tybout (1986) and Hondroyiannis Lolos and Papapetrou (2005) hold contrary views on the positive saving-financial development relationship. They appear to agree with the earlier position of Griffin (1972) who laid bare the elusiveness and unpredictability of private saving. Regardless of the deepening level of the financial sector, the average household saving behaviour is not always linear. These unsettled academic brawls need an examination. Although negative (low) interest rates regime is preferred in times of recession, saving is traditionally known to inversely relate with interest rates. High deposit interest rates motivate households to want to increase deposits which could be used for investment purposes for economic growth. Paleyo-Romero (2020) found that low (negative) interest rates regime has both a contractionary effect on saving (substitution effect) and an expansionary effect (income effect). While the substitution effect lowers the reward on private saving, the zeal to maintain financial income causes an expansion in private deposits. And finally, this study also became inevitable due to the need to show that national policy on inflation could improve the saving magnitude. Thus, consumers are biased in their expectations because the individual does not expect equal changes in incomes as in price levels. Cited empirical studies associate a positive link between private saving and unanticipated inflation (Juster & Wachtel, 1972). However, Dash and Kumar (2018), Gashe (2017) showed contrary results from their studies. These findings are inconclusive and therefore need a further verification.

This current study rides on the backdrop of inadequate empirical studies pointing to outcomes of different macroeconomic policy decisions on private saving in Ghana, except those on aggregate savings tainted with irrationality of the household. If ever there are studies, policy decisions on the joint role of financial development, interest rate, and inflation in determining private saving behaviour have not had a deserving recognition in the empirical literature. Some authorities in economics outside Ghana have effortlessly linked household saving behaviour to psychological, economic, and demographic factors (see Crespo-Cuaresma, Fidrmuc Hake, 2014; Fidrmuc, Hake & Stix, 2013; in Kapounek et 2016; Basabose, 2020).

Hypothesis Development

There is a form of symbiosis between household saving and financial development. This paper therefore hypothesises that financial sector development affects private saving positively. This is because, a well-functioning financial market is adequate grounds for encouraged saving. Likewise, improved household saving strengthens the activities of financial markets and therefore there is need to want to know the weight and direction of the relationship between saving and financial development through hypothesis building. Even with real interest rates, we do know that a higher propensity to save eventually lowers interest rates which again is linked to demographic factors (see Bonfinger & Ries, 2017). This study fills a literature gap by effortlessly identifying the saving-interest rates nexus. Are positive or negative interest rates panacea for improved saving? We hypothesise that there is a direct relationship between saving and positive interest rates. The economy flourishes in a stable financial system and interest rates regime. These two variables working for improved saving will grow the economy as expected. There is a hypothesised positive link between saving and inflation. Mathematically, we have the following hypotheses:

H_0 : Financial sector development has a positive effect on private saving
H_1 : Financial sector development has no effect on private saving
H_0 : Interest rates have a positive effect on private saving
H_1 : Interest rates have no effect on private saving
H_0 : Inflation has no effect on private saving
H_1 : Inflation has a positive effect on private saving

The Trend of Saving in Ghana

In the period 2006 to 2011, Ghana registered severe instability of the private saving trend. Thus, from a five-year average of 6.54 (2001-2005) to an average decline rate of 1.78 between 2006 and 2010 (see Figure 1). This severe instability could have partly been attributed to the global economic crunch of 2007/2008 with its spill-over effects on the global economy. Despite these developments, private savings rose appreciably in 2012 and witnessed a seven-year astronomical rise until 2019, with minimal deviations (see Figure 1).
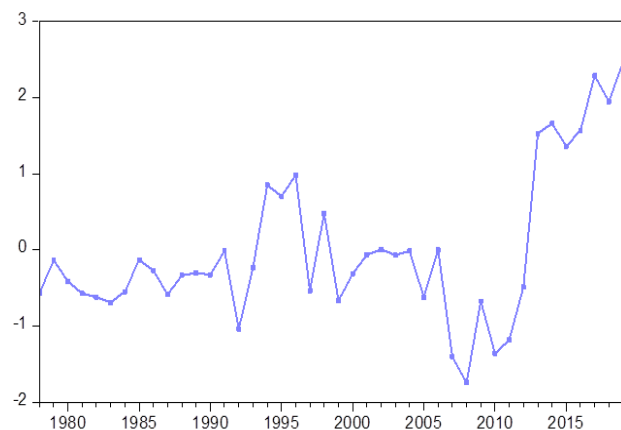
Source: World Bank Development Data (2020)
Figure 1 : Trend of Savings in Ghana (1981-2019)

2. THEORETICAL REVIEW

The Lifecycle Model of Modigliani

Most of the theories on household saving have been replaced for irrelevance and others improved with the passage of time. One of such theories that have undergone metamorphosis is the Life-Cycle Model of Modigliani (1949; Ando & Modigliani,1963; Modigliani & Brumberg, 1990). This theory sees saving as an inevitable and unpredictable variable that enhances productivity and economic growth. The early classical economic theories on individual saving behaviour before the 1930s linked savings and investment linearly to deposit interest rate (see Caminati, 1981 and Smyth, 1993). However, a print controversy rose between Keynes' (1936) general theory of savings and investment (cited in Richert-Kazmierska, 2019) and the classical economic thought over saving-investment equality. Keynes's position on saving is dichotomous; at one level, Keynes sees saving as being equal to investment on their levels. In a different instance, Keynes thinks that only when the economy exhibits equilibrium characteristics will the equality of saving-investment be accepted, replacing the early classical economic thought. This double approach to saving-investment behaviour triggered debates among economists and has led to the reliance on the life-cycle theory of consumption and savings by Modigliani (1949; cited in Ando & Modigliani, 1963). The life-cycle theory of savings argues that the willingness of a person to save surges only with an improvement in income. The life-cycle theory affirms the linear saving-individual age relationship. Thus, the demographic structure of the individual is a dominant determinant of a potential depositor's behaviour. These powerful raging arguments on what determines saving propensities in an economy have partly mooted the idea to undertake a study verifying the grounds on which these entrenched positions are taken. These academic interactions have not stopped at only the theoretical concerns but have extended to include several cited empirical studies on the various roles played by certain macroeconomic variables to either boost or discourage a person's willingness to save (e.g., Griffin, 1972 and Juster & Wachtel, 1972; Larbi, 2013).

The compelling fact is even that, a reliance on macroeconomic variables to forecast household saving behaviour will mean policy decision-makers will have to consider the implications of their actions for household saving-consumption reactions. Since the saving-consumption hypothesis is transitionary, policies should reflect every stage of the transition. The life-cycle theory underpins this study in several facets; it response to questions on how households maintain the same level of consumption as far as human lives are concern, reminiscent of certain factors, and in this study; financial development, interest rates and inflation, which are the exogenous variables presumed to work for or against household saving. In a sense, Keynes (1936) first saw saving as a good that households seek to expend their scarce financial resources on; deferring consumption at the initial stages of life. And in doing so, saving is regarded as a function of national policies on the variables that are studied in this research paper. The facts about the life-cycle theory in this paper are stylized. First, we look at how saving becomes a function of financial market (financial system) development. Financial sector development describes conditions under which clients do business fairly and at comparatively low cost. Entering into a contractual relationship to transact financial business should not threaten potential profits, part of which is slated for saving. This encourages potential customers of financial institutions to improve saving by increasing old accounts till and opening new ones. Consumption must be prudently discouraged to positively affect saving since the life-cycle model professes the maintenance of a uniform level of consumption throughout lifetime. How is this done in order not to venture or invite recessionary tendencies? Deposit interest rates are increased optimally. Inflation, particularly the hyper type, works against the lifecycle model since it deteriorates the real purchasing power. This enjoins national governments to implement policies that contain inflation to boost both saving and consumption.

Empirical Literature

Savings-financial sector development nexus

Domestic saving is not done for its sake; it is intended for the individual and national wellbeing (Bayar, 2014). At the individual level, it minimizes financial stress, helps leave financial legacy, and provides a greater sense of financial freedom. Undisputedly, national saving is partly a function of economic growth (Group Deputies, 1995). Pant and Kindness (2021) note that saving does not imply the absence of spending but a deliberate setting aside of part of one's income for an intended purpose in the foreseeable future. Indeed, the financial sector of every economy is responsible for this fundamental role of saving. Financial development focuses on the process that allows for low cost of transacting business in the financial sector to enable potential customers to deposit their surplus funds to earn interest. As one of the cardinals of this study, the researchers attempt to establish the link between saving and financial development in Ghana. Numerous studies have been undertaken to confirm the presence of a link between private Saving (PS) and Financial Sector Development (FSD). Bayar (2014) studied emerging Asian Countries and reports that PS and FD are positively linked. In this study, Bayar appears to have supported results produced by the studies of Sahoo and Dash (2013), Horioka and Yin (2010).

The relevance of financial sector restructuring to domestic saving was established by Newlove (2008) in one of the pioneer studies in Ghana. Quartey (2008) equally emphasized the need to deepen financial sector development to boost domestic savings. Recent, Altaee and Al-Jafari (2019) agree with the results of these strands of studies in their revelation that financial development does not just propel domestic savings in Turkey in the short-run but has a long-lasting significant positive effect on the savings culture of the Turkish people. In Nigeria, Ewetan, Ike, and Urhie (2015) provided yet another evidence of a long-run relationship between financial sector development and domestic saving. On the contrary, Horioka and Yin (2010; Ewetan et al., 2015) studied household saving behaviour in OECD countries and its relationship with FD (computed by private credit to GDP) using Modigliani's (1949) life-cycle theory. He finds that FD is key to increasing savings in the environment of moderate interest rate, stable prices, and regularized income.

Saving-interest rates relationship

As benchmark, the Central bank uses the Policy Rate (PR) to signal the cost of credit (Kwakye, 2010). This is reflected in the financial system through inter-bank transactions on one side and bank-customer transaction relationship on the other. The old saving-interest rate model is a linear relationship (see Caminati, 1981; Smyth, 1993). One pioneer article in Uruguay on real interest rate-saving relationship is that of de Melo and Tybout (1986; cited in Balassa, 1989). Their results exhibited a positive relationship, albeit weak. The regression estimates showed a t-value of about 1.5. Another study within the same period by McDonald (1983) on twelve selected Latin American countries, including Paraguay, Peru, Mexico, and Argentina, established evidence of a positive real interest rate-private saving relationship. Similarly, a study conducted on the nexus between saving and interest rate using sampled Asian countries of India, Korea, Pakistan, Philippines, Singapore, and Taiwan, among others, by Gupta in 1984, hypothesized an inverse relationship between interest rate and household saving. Results in most of these countries failed to accept the hypothesis at 5 percent significance level.

The elites in the insurance sector have also waded into the empirics of interest rate-saving behaviour among households. One such authority is Patricia Paleyo-Romero. In a study of household saving behaviour in sixteen European Union countries, Paleyo-Romero (2020) used balanced panel data spanning 2008 to 2018, to analyse a cross-sectional saving behaviour of households. The study brought forth two interesting revelations; low (negative) interest regime has both a contractionary effect on saving (substitution effect) and an expansionary effect (income effect). While the substitution effect lowers the reward on private saving, the zeal to maintain financial income causes an expansion in private deposits (Paleyo-Romero, 2020). Stakeholders in the financial sector appreciate the fact that interest rates are among levers used to maintain balance in every economy, as such, central banks adjust the prime rates to influence individual bank lending decisions. Following these developments, Smith (2021) thinks that negative interest rates boost the economy by encouraging consumption and enabling banks to borrow and lend to the public. Smith (2021) further states that negative interest rates fight deflation and save the economy from recession. Low interest rates, Smith emphasizes, make it expensive to hold more money, thereby incentivizing spending. Reasoning in the same direction, Hughes (2016) theoretically advanced an argument that negative interest rates stimulate the economy. This is done by the central bank through increased lending to commercial banks at lower rates during recession.

The link between saving and inflation

Depending on whether it is an anticipated or unanticipated inflation, its effect on private saving could either be symmetrical or asymmetrical (Juster & Wachtel,1972). Thus, consumers are biased in their expectations because the individual does not expect equal changes in incomes as in price levels. Thus, empirical studies associate a positive link between private saving and unanticipated inflation (Juster & Wachtel, 1972). Campbell and Lovati (1979) associate price level increase with improvement in savings. This is so because households usually respond to increased prices

through cut-back in borrowing and spending, thereby saving. In a study by Santosh and Lakshmi (2018), both domestic and private saving were negatively affected by inflation.
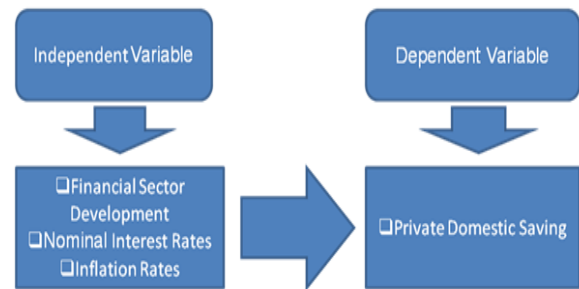
Source: researchers' own construct (2022)
Figure 2 : Conceptual Framework

3. METHODOLOGY AND SPECIFICATION OF THE MODEL

This paper assessed the possible effect of financial development (FD), interest rates (IR), and inflation rates (INFLR) on domestic and private savings in Ghana. To make this possible we obtained data from the World Bank Development Indicators (WDIs), United Nations Development Programme (UNDP), and annual reports from the Ghana Statistical Service (GSS) from 1980 to 2019. While Domestic Savings (DS) served as the outcome variable, FD, IR, and INFL-R were used as regressors to boost or discourage citizens' desire to save. Series of tests were carried to standardize the model used. The Dickey-Fuller (1979) [Test for stationarity (Unit Root Test)] of variables was first used to establish the suitability of selected variables. Having performed the Unit Root Test, all variables were found to be stationary at order one (see Table 4). Next in line was to establish the long-run relationship among variables using the Johansen (1991) Cointegration Estimation Model (see Table 4). There was need to meet a necessary underlying condition before all these tests were carried out, making sure issues of spurious or useless regression did not arise. E-views 9.0 software was used to perform the tests for time series properties

.Table 1. Variable definition

Variable Acronym	Acronym Interpretation	Description
PS / DS	Private savings / Domestic Saving	Gross domestic savings (% of GDP)
FD	Financial Development	Domestic credit to private sector (% of GDP)
IR	Interest Rate	Deposit interest rate (%)
INFL	Inflation	Consumer price index (annual %)

Source: world Bank development indicators (2020)

Specification of the model

Following similar works in the extant literature, a stylized savings model was adopted to enable easy analysis and conclusion to be made (see Abou El-Seoud, 2014; Adeleye, 2018)

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$$DS_t = \delta + \sum_{t=1}^{k} \beta_1 \, DS_{t-1} + \sum_{j=1}^{k} \phi_j \, FD_{t-j} + \sum_{m=1}^{k} \varrho_m \, IR_{t-m} + \sum_{s=1}^{k} \varphi_s \, INFLR_{t-s} + \vartheta_{it1} \qquad (1)$$

$$FD_t = \alpha + \sum_{t=1}^{k} \beta_1 \, FD_{t-1} + \sum_{j=1}^{k} \phi_j \, DS_{t-j} + \sum_{m=1}^{k} \varrho_m \, IR_{t-m} + \sum_{s=1}^{k} \varphi_s \, INFLR_{t-s} + \vartheta_{it2} \qquad (2)$$

$$IR_t = \psi + \sum_{t=1}^{k} \beta_1 \, IR_{t-1} + \sum_{j=1}^{k} \phi_j \, DS_{t-j} + \sum_{m=1}^{k} \varrho_m \, DS_{t-m} + \sum_{s=1}^{k} \varphi_s \, INFLR_{t-s} + \vartheta_{it3} \qquad (3)$$

$$INFLR_t = \varpi + \sum_{t=1}^{k} \beta_1 \, FD_{t-1} + \sum_{j=1}^{k} \phi_j \, DS_{t-j} + \sum_{m=1}^{k} \varrho_m \, IR_{t-m} + \sum_{s=1}^{k} \varphi_s \, INFLR_{t-s} + \vartheta_{it4} \qquad (4)$$

Where:
DS = Domestic Saving
FD = Financial Sector Development
IR = Nominal Interest rate on Savings
INFLR = Annual Inflation Rate
β_1 = coefficient of each variable in the equation

$\sum_{t=1}^{k} = Maximum$ Lag Length in each equation (k), while t = lag time for each variable

δ, α, ψ, and ϖ = Constant

$\vartheta_{it1} \; \vartheta_{it2} \; \vartheta_{it3}$, $and \; \vartheta_{it4}$ = Are stochastic error terms known as; Impulses / Innovations / Shocks in the system in each equation
Note: Under the VAR Model, the dependent variable is a function of itself and all other variables in the Model (Adeleye, 2018).

4. RESULTS AND DISCUSSION

This study assessed the combined effect of financial development, interest rate, and inflation on private saving behaviour in Ghana. It was done by considering Private Saving behaviour (PS) as the variable of interest.

Table 2 : Descriptive statistics

Var	Obsvs.	Mean	Max	Mini	Std.Dev	Jacque-Bera	
DS	42	7.3976	22.09	-2.96	5.9364	5.306	(0.07)
FSD	42	9.009	15.88	1.54	5.2444	4.864	(0.08)
INF	42	28.257	122.87	7.13	25.7735	88.116	(0.00)
IR	42	16.759	35.76	8.89	7.2473	11.882	(0.00)

Source: Researchers' computation based on the world Bank development indicators (2020)

Domestic saving (DS) proxies gross domestic saving, measured as a percentage of gross domestic product. Averagely, DS has a figure of about 7%, which is way below the Sub-Saharan African average of 21.102 in its 2019 estimates (World Bank Development Indicator, 2020). There is a corresponding standard deviation of about 6% depicting the variability from the expected normal average saving of a country. While the Maximum and Minimum values of DS stood at 22.09% and -2.96%, respectively, the Lagrange test (Jacque-Bera) probability values for DS and FSD are normally distributed since they are more than 0.05. Those of INF and IR are not normally distributed since their respective Jacque-Bera probability values are less than the alpha value of 0.05. It is observed from Table 2 that data is normally distributed for domestic saving and financial sector development. With respect to the inflation rate, a higher standard deviation of 25.7734 against its mean of 28.257 is reported, which is not good enough. A higher standard deviation mostly turns to

throw sway off results as not reflecting realities on the ground. When it occurs this way, it destabilizes the policy intentions of governments. Interest rate performed comparatively better, considering a mean of 16.759 as against 8.89 of its standard deviation. This describes the general relative interest stability in the economy, although not satisfactory.

Table 3 : Correlation matrix

	DS	FSD	INF	IR
DS	1	0.7789**	-0.5809**	0.6015***
FSD	0.7789**	1	-0.5997**	-0.5468**
INF	-0.5809**	-0.5997**	1	0.6198**
IR	0.6015***	-0.5468**	0.6198**	1

Source: Researchers' computation based on the world Bank development indicators (2020)

*Note: ** denotes 5% significant level while ***
denotes 1% significant level*

The correlation coefficient is used to determine the level and direction of the relationship between paired independent variables and or between paired dependent and independent variables in some instances. Whereas variables are said to correlate inversely when the sign of the coefficient is negative, there is always a direct relationship when the sign of the coefficient is positive. The absolute coefficient figure explains the magnitude of the relationship. A correl value of 0.8 or more

between paired variables raises the issue of multicollinearity and should be fixed. The results in Table 3, have no collinearity challenges between paired explanatory variables. Again, the correl values are comparatively moderate, still confirming a case of the absence of multicollinearity issues (see Bryman & Cramer 1997). Excepting the case of INFL-R, where DS inversely relates with at 5 percent significant level, DS has positive relationships with FSD and IR at 5% and 1% respectively

Table 4: Augmented Dickey-Fuller Stationarity Unit Root Test Results

| Variable | Constant | | | | | Constant & Trend | | | | | OI |
| | Level | | First Difference | | | Level | | First Difference | | | |
	ADF t-stats	Critical Value	ADF t-stats	Critical Value Integration	OI	ADF t-stats	Critical Value	ADF t-stats	Critical Concl. Value	OI	
DS	-1.591626	-2.935001	-8.047533	-3.605593***	1	-1.591626	-2.935001	-8.154399	-4.205004***	1	I(1)
FD	-1.113494	-2.935001	-7.345794	-3.605593***	1	-1.113494	-2.935001	-7.314765	-4.205004***	1	I(1)
IR	-1.795573	-2.935001	-6.403373	-3.605593***	1	-1.795573	-2.935001	-6.388536	-4.205004***	1	I(1)
INFLR	-4.733001	-2.600987	-3.904208	-3.632900***	1	-4.733001	-2.600987	-4.456374	-4.243644***	1	I(1)

Notes: *** under first difference at 1% significant level. OI=Order of Integration, and Concl. =Conclusion.
Source: Researchers' computation based on the world Bank development indicators (2022)

The results in Table 4 indicate a non-stationarity at levels of all variables I (0). At first difference or Integration of order one [I (1)], all variables became stationary, satisfying a necessary condition for the estimation of cointegration and error correction models.

Determination of the optimal lag length
Another necessary condition before estimating the Johansen Cointegration Test is the determination of the optimal Lag Length. Table 5 provides results after running the test.

Table 5 : Determination of the optimal lag length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-548.1499	NA	23298912	28.31538	28.48600	28.37660
1	-449.3555	172.2569*	335602.3*	24.06951*	24.92262*	24.37560*
2	-441.2189	12.51797	516646.7	24.47276	26.00836	25.02372
3	-436.2013	6.690064	975181.3	25.03596	27.25405	25.83179

* Indicates lag order selected by the criterion
LR: sequential modified Likelihood Ratio (LR) test statistic (each test at 5% level)

FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Researchers' computation based on the world Bank development indicators (2020)

Lag 1 under AIC is appropriate for the model analysis since AIC has the lowest value among the asterisked. What that means is that, if there are shocks or displacements in the system with respect to the regressors, the response variable will take a year to react to the shocks brought about by these explanatory variables (FD, IR & INFL-r). Unfortunately, this paper deals with only the short-run analysis since available data failed to establish any long-run relationship among variables, hence the use of the VAR Model. Table 6 provides details of the failure of the Trace Test to establish long-run characteristics.

Table 6: Johansen unrestricted cointegration test (Trace & Max-Eigen Value)

| No. of CEs Hypothesized | Trace Test | | | | Max-Eigen Value Test | | |
	Eigen Value	Trace Stats	5% Critical Value	Prob**	Max-Eigen Stats	5% Critical Value	Prob**
None	0.33891	29.12653	47.85613	0.7623	16.14012	27.58434	0.6539
At most 1	0.18621	12.98641	29.79707	0.8922	8.035535	21.13162	0.9015
At most 2	0.10950	4.950876	15.49471	0.8140	4.523009	14.26460	0.8004
At most 3	0.01091	0.427868	3.841466	0.5130	0.427868	3.841466	0.5130

Trace Test indicates no cointegration Eqn. at 0.05 level
* Denotes rejection of the hypothesis at 0.05 level

    ** Mackinnon-Haung-Michelis (1999) p-values

Source: Researchers' computation based on the world Bank development indicators (2020)

Johansen Cointegration Test

As suggested by Granger (1969), if variables of interest are found to be cointegrated amongst themselves at first difference, then there is need to ascertain proper statistical inferences through the Vector Autoregression VAR Model and the Vector Error Correction Model (VECM). Unfortunately, after estimating the Johansen Cointegration Test, the system failed to establish the presence of cointegration equation among the variables. As such, the study opted for the VAR model (see Adeleye, 2018).

Table 7 : Simple vector auto-regression (VAR) analysis

Variable	Coeff	Stand. Err	t-statistic	Prob
PS (-1)	0.811241	0.11762	6.89691	0.0000
FD (-1)	0.466941	0.15211	3.06976	0.0155
IR (-1)	-0.464438	0.08897	-5.22016	0.0211
INFL (-1)	0.013338	0.03060	1.98017	0.7167
Constant	14.936269	2.77927	5.37417	0.0000
	PS	FSD	IR	INFL
R-quare	0.597507	0.922389	0.739211	0.318995
Adj. R-sq	0.552785	0.913766	0.710235	0.243328
F-statistic	13.36062	106.9631	25.51071	4.215767
Log likelihood	-112.3819	73.15271	-111.558	-181.9123
Akaike AIC	5.725947	3.812327	5.68578	9.117673
Schwarz SC	5.934919	4.021299	5.894731	9.326645
Durbin Watson	2.198961	2.3929	2.029602	2.037348

Source: Own Elaboration Based on Local Macroeconomic Data/WDI (1981-2019)

Private Saving (PS) serves as the dependent variable with Financial Development (FD), Deposit Interest Rate (DIR) and Annual Inflation Rate (INFL-R) subordinating as regressor variables. From past realisation, PS significantly increased by 81 percent over the previous performance. Relative to the regressor variables, FD has a significant positive effect on PS, implying private saving in Ghana is strongly a function of financial development. This finding resonates with those of Bayar (2014), Horioka and Yin (2010), Ewetan et al (2015) including that of Park and Shin (2009). Placing emphasis on the relevance of financial sector development, Quartey (2008) and Al-Jafari (2019) explain that serious financial sector restructuring improves domestic saving. In terms of interest rate-private savings relationship, this paper reliably estimates an inverse one. In making calculations for the same purpose, the old saving model fails to support the results of this paper (Caminati, 1981 and Smyth, 1993). The results produced in this paper are further discounted by the estimates of De Melo and Tybout's study of 1986, pp. 570, cited in Balassa (1989, pp. 8), as their findings exhibited a positive relationship although with weak t-static and prob values. The empirical sense of the results in this paper is that, as deposit interest rates shoot up, ceteris paribus, private saving worsens. Corroborating these results by inference, a study in Ghana by Osei-Fosu et al (2014) estimated long-run interest rate elasticity of household savings which showed a statistically negative value.

An interesting strong argument mounted in support of results in this paper, Paleyo-Romero (2020) proximates that low (negative) interest regime has both a contractionary effect on saving (substitution effect) and expansionary effect (income effect). She used a balanced panel data of sixteen European Union countries from 2008 to 2018 to analyse cross-sectional saving behaviours of households. She starts by explaining that stakeholders in the financial sector appreciate the fact that interest rates are among levers used to maintain balance in every economy, as such, central banks adjust the prime rates to influence individual bank lending decisions. There are other supporting results to the negative interest rates-saving behaviour. A very recent one is that of Smith (2021) who thinks that negative interest rate hypothesis boosts economic activities by lending at low rates to commercial banks to give out loans to the public to encourage consumption and investment during recession. Thus, negative interest rates are antidotes to deflation.

Although this paper finds inflation to influence private saving albeit weak t-statistic positively, it is worth discussing. The position of Juster and Wachtel (1972) on inflation is one of a support to the positive association with private saving. However, they succinctly state that, depending on whether the inflation regime is anticipated or unanticipated, the effect on private saving could either be symmetrical or asymmetrical. Another study whose results are in tandem with those of this paper is Campbell and Lovati's (1979) paper which associates price level increases with improvement in savings. This is done through cut-back in borrowing and spending, thereby having enough to save. Finally, Santosh and Lakshmi (2018) established results opposite to those revealed in this paper. They found both domestic and private saving to be negatively influenced by inflation in India.

Table 8 : The VAR model

	PS	FD	IR	INFL
PS(-1)	0.811241	0.013804	-0.007241	-0.110858
	(0.11762)	(0.04518)	(0.11528)	(0.64121)
	[6.89691]	[0.30552]	[-0.06281]	[-0.17289]
FD(-1)	0.466941	0.931201	-0.140207	-2.785481
	(0.15211)	(0.05843)	(0.14909)	(0.82922)
	[3.06976]	[15.9373]	[-0.94044]	[-3.35916]
IR(-1)	-0.464438	0.048615	0.837554	-0.446391
	(0.08897)	(0.03417)	(0.08720)	(0.48500)
	[-5.22016]	[1.42255]	[9.60501]	[-0.92039]
INFL(-1)	0.013338	-0.008483	-0.000788	-0.038624
	(0.03060)	(0.01175)	(0.02999)	(0.16679)
	[1.98017]	[-0.72180]	[-0.02627]	[-0.23157]
C	14.936269	0.158391	4.102557	61.43966
	(2.77927)	(1.06756)	(2.72398)	(15.1508)
	[5.37417]	[0.14837]	[1.50609]	[4.05522]

Source: Researchers' computation: World Bank Development Data (1980-2020)

The VAR Mode in Table 8 has PS as the core variable of interest. From the coefficients, it is realized that PS has a strong significant endogenous effect on itself. Thus, it has increased by about 81 percent over the past performance. This is observed from the t-statistic of about 6.9. This reaffirms Griffin's (1972) assertion that the saving behaviour of the depositor or policy maker is elusive and cannot be predicted. In terms of FD, it strongly influences itself, contributing about a 93% increase of its past realisation. Relative to its contribution to the saving behaviour of an average household in Ghana, a percentage change in FD will bring about approximately 47 percent improvement in private saving in Ghana. Thus, exhibiting strong endogeneity, signifying that if government's policies are tilted towards reducing expenses incurred in the financial system through reductions in the average cost of obtaining financial information and enforcing contracts, the floating customers' willingness to save, all things equal, will improve, and vice versa. In like manner, with a percentage fall in interest rates, all things held constant, there will be deterioration in the saving potential of aspiring depositors. Thus, the willingness of potential depositors will be negatively affected by a 46-percentage point. Interest rates are seen to negatively influence private savings.

In the case of the inflation rate, there is least to discuss because of its inability to significantly influence private savings as portrayed by the results (see Table 8). Besides, from past realization, FD has a strong endogenous on itself, influencing its status of increase by 93 percent, indicative of its t-statistic. Interest rate is also seen to have a strong influence on itself, depicting an influence strength of about 84 percent.

5. CONCLUSION AND RECOMMENDATION FOR POLICY

This study updated available literature on the determinants of private savings in Ghana. Efforts were made to establish the combined role of financial development, interest rates, and annual inflation rate in influencing private saving. Among findings of the study included the significant positive relationship between financial development and savings. It reemphasized the need to reduce the cost of transactions within the financial system to boost the households' propensity to improve saving and also to rake in new entrants into the saving web. The results also supported the negative lending rates hypothesis by the central bank to encourage consumption and investment in times of recession. Although evidence on inflation-saving relationship was positive, it rather showed an insignificant t-value. It is practical that lowering the deposit interest rates by the banks deter potential customers and also serve as panacea for panic withdrawals as in the case of the just passed into law of the electronic transaction tax that implicitly demotivates customers from doing business electronically. It is crucial that policymakers pay attention to macroeconomic variables that are central in influencing private saving encouraging new customer to buy into the culture of saving since it helps grow the economy. Besides, there appears to be less money in circulation in Ghana considering the global pandemic and the Russian-Ukrainian war that hit all nations. Therefore, a reduction in interest rates

either explicitly or implicitly by financial sector operators could release more money into the system to rejuvenate the once vibrant economy.

6. LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Since the study is confined to Ghana's situation, the generalization of results is quite problematic, except where aspiring researchers wish to do a comparative analysis of peculiar occurrences in individual economies. Besides, the use of more variables would have appeared better; however, the original intention of researchers was to establish a link between domestic saving prospects of citizens and three macroeconomic variables (SD, INF & IR). Having identified these gaps, the researchers aim to suggest that an entailing study involving several African economies, or a cross-country analysis will fit as a solution to the established gap. The inclusion of additional variables into the model will, together, place the research in a preferred position to generalize results.

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