

# THE IMPACT OF INTEREST RATE LIBERALIZATION: EMPIRICAL EVIDENCE FROM SUB-SAHARAN AFRICA\*

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## 1. Introduction

Since the seminal works of McKinnon (1973) and Shaw (1973), a large body of empirical research has attempted to assess the effect of financial repression on investment and economic growth. Most of these investigations have concurred with the view that financial repression is associated with low investment efficiency and economic growth. These findings have provided the theoretical foundations to financial liberalization policies. As a result, broad-based macroeconomic stabilization and structural adjustment programs implemented in developing countries since the 1980s have invariably included strong elements of financial liberalization, a key component of which is the liberalization of interest rates.

In particular, the majority of West African countries have embarked upon financial sector adjustment programs (FSAP) designed and implemented under IMF and World Bank supervision since the mid-80s. Unfortunately, in sharp contrast with the scope of financial sector adjustment programs, there has been relatively little empirical works on financial repression and the effectiveness of financial reform policies within the specific context of West African countries.

The purpose of the paper is to analyze the impact of the real deposit rate in West Africa, taking into account two important features of the subregion, namely (i) the prevalence of two blocs of fixed exchange rate regime (WAEMU and CEMU), and (ii) that of an informal *vertical assistance scheme*. The fixed exchange rate regime has entailed a relatively low and stable inflation rate, leaving room for the nominal interest rate to play a larger role in financial deepening than simply "compensating for inflation". The vertical assistance scheme also may affect saving behaviors. In particular, mid-income households are relentlessly solicited by extended family members for the provision of basic needs (food, health, children's education), and they respond as basic insurance *providers* by making planned and unplanned monetary transfers (a form of "social solidarity taxes"), which depletes cash savings. This may lead providers to develop some illiquidity preferences, favoring less liquid saving products that may provide hedges against inflation and social taxes. How effectively can interest rate

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liberalization policy drive savings and investment in such a context? What are the specific impacts of inflation and the role of the nominal interest rate on investment volume and efficiency in this context?

Our key conjecture is that in a "solidarity based economy" where cash holdings are depleted not only by inflation but also by "social taxes", the real return on any form of investment must take into account not only the inflation tax, but also the "social solidarity tax", which is higher for cash holdings. Consequently, the complementarity link between cash and investment may be weakened *when the formal financial system is deficient* (repressed interest rate, restricted access to credit and/or lack of access to interest earning instruments). Indeed, structural deficiencies of the formal financial system limit access to interest earning instruments and leave savings exposed to inflation as well as to "social taxes". This would severely hinder investment and future income growth for the class of "providers" in the vertical solidarity scheme. Also, agents may seek alternative means for saving "without appearing antisocial", such as inflation hedges or low cost and low productivity physical capital. The important consequence is a weaker complementarity link between cash saving and investment because cash savings accumulate at a slower pace in the face of inflation as well as social taxes, or because savings accumulation takes illiquid or irreversible and less productive physical form rather than monetary forms leading to high productivity investment. *But this also implies that within the vertical solidarity framework, financial liberalization – implying removal of impediments to cash savings and higher deposit rate – may yield a high pay-off and considerably strengthen complementarity between cash and physical capital accumulation.*

From the above conjecture, we have formulated a number of key testable hypotheses. (i) First, the fact that cash holdings are depleted by inflation as well as "social taxes" would entail a weaker complementarity link between money and investment at the aggregate macro level, more so in the poorer social environments – or countries – where vertical solidarity practices are more intense. (ii) Also, an interesting peculiarity may emerge with regard to the combined results of inflation and the solidarity tax. Countries that have a history of high inflation may have shifted resources away from monetary holdings in favor of inflation hedges. This may also have shrunk the solidarity tax base as compared to a country with traditionally low inflation, so that, surprisingly enough, complementarity may not be as strong as would be expected in low inflation countries as compared to high inflation countries. (iii) Third, the result of financial liberalization and higher deposit rates may be more on the "efficiency" than on the

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"volume" side. This is because a rise in the deposit rate would raise the cost of diverting savings from potentially productive investment to social transfers, or to low productivity social spending hedges and inflation hedges. In particular, the more educated *providers* would be able to realize more technologically advanced and productive investment as opposed to small and incremental upgrading of traditional technology with insignificant impact on the production frontier.

But testing these hypotheses would require cross-country panel data on households<sup>1</sup>. For this essentially macro analysis, we settle for a much narrower objective. We wish to investigate how conventional econometric models of financial liberalization hold in the context of West Africa and whether or not we may detect peculiarities with regard to the role of inflation and the nominal interest rate, which are consistent with our conjectures relative to the solidarity scheme and its broad effects.

The paper is organized as follows: Section 2 briefly assesses the extent of financial repression and the pattern of inflation in a cross-section of West African economies with both flexible and fixed exchange rate regime. In Section 3, we discuss the methodology and the results of the econometric analysis designed to empirically characterize the relationship between real interest rates and savings, financial intermediation, investment and economic growth in the context of financial liberalization in the "solidarity-based economy". We then make some concluding remarks regarding financial liberalization policy strategy and the necessity of developing a sustainable social insurance system that may provide saving products while also allowing household to smooth social spending.

## 2. An Overview of the State of Financial Repression in African Economies

In the following sub-sections, we compute a number of indicators, which may characterize the state of financial repression in SSA. For this, we use a pooled macroeconomic data set including twenty-four African countries<sup>2</sup>, ten of which belong to the fixed exchange rate CFA Franc zone. For each country, we used national income, prices, monetary and interest rate data covering the 1970-95 period<sup>3</sup>. Most of the data were extracted from the World Bank 1997 World Development Indicators. Interest rate

<sup>1</sup> Florence Charlier and Charles N'cho: Saviors or Savers: Can the African Middle Class Do it All?: Evidence from Côte d'Ivoire (draft)

and monetary aggregates were obtained from the IMF International Financial Statistics 1997 or the Central Banks of the CFA zone countries. In the following sections, we briefly analyze the key variables, namely the deposit rate, the rate of inflation and financial deepening.

### 2.1 Real Interest Rate Distribution, Inflation Volatility Inside and Outside the Franc Zone

Since the early 80s, many countries have implemented financial liberalization policies. As a result, we would expect a positive and higher level of the real deposit interest rate since that period. To assess the significance of these changes, we compare the average real deposit interest rate for a sample of African countries inside and outside the franc zone for the periods of 1970-82 versus 1982-95, distinguishing the common currency of the Franc zone (FZ) from the rest (NFZ).

**Table 1: Level of the Real Deposit Rate Inside and Outside the Franc Zone**

Real Deposit Rate Inside The Franc Zone			Real Deposit Rate Outside the Franc Zone		
	70/82	83/95		70/82	83/95
Benin	-3.35	6.03	Botswana	3.33	-1.83
Burkina	2.38	5.62	Gambia	2.82	0.64
Cameroon	-3.11	2.40	Ghana	-20.44	-7.63
Central Africa	-6.75	2.60	Kenya	-3.46	3.27
Côte d'Ivoire	-2.83	5.32	Lesotho	-0.07	-1.80
Gabon	-6.60	5.18	Malawi	-3.34	-2.29
Mali	-2.29	2.94	Mauritius	0.73	2.46
Niger	-1.42	6.42	Mauritania	-2.29	-2.08
Senegal	-1.93	2.35	Nigeria	-6.37	-6.28
Togo	1.83	4.74	Rwanda	0.04	0.37
			Seychelles	2.88	6.37
			South Africa	-4.62	1.23
			Swaziland	-3.82	-1.07
			Zimbabwe	-4.66	-0.67
Total	-2.32	4.28	Total	-2.81	-0.67

Source: Computed Data from World Development Indicators (World Bank).

<sup>2</sup> Benin, Botswana, Burkina Faso, Cameroon, Central African Republic, Côte d'Ivoire, Gabon, Gambia, Ghana, Kenya, Lesotho, Malawi, Mali, Mauritania, Niger, Nigeria, Rwanda, Senegal, Seychelles, South Africa, Swaziland, Togo, Zambia and Zimbabwe.

<sup>3</sup> For some countries, the sample period is shorter because of lack of data.

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We observe that real deposit rates, which were negative for almost all WAEMU countries in the pre-financial liberalization period, became positive thereafter. The statistical analysis also indicates a much lower degree of real deposit rate volatility and a higher variance homogeneity within the Franc zone compared to countries outside the area.

There are two reasons for the lower interest rate volatility and higher homogeneity within FZ countries. First, although liberalized, the common regional money market for all FZ countries still insures that banks face roughly the same refinancing cost, which is directly related to the money market rate and to the nominal deposit rate. Secondly and as would be expected, a common currency zone entails a degree of convergence in inflation rates and macroeconomic stability. By contrast, countries outside the zone have undergone a wide range of distinct fiscal, monetary and exchange rate policies, resulting in significantly different experiences in inflation and interest rate developments. This explains the higher degree of volatility as well as heterogeneity outside the FZ. The analysis also indicates that the variability of real deposit rates essentially reflects that of inflation rather than variations in nominal interest rates per se.

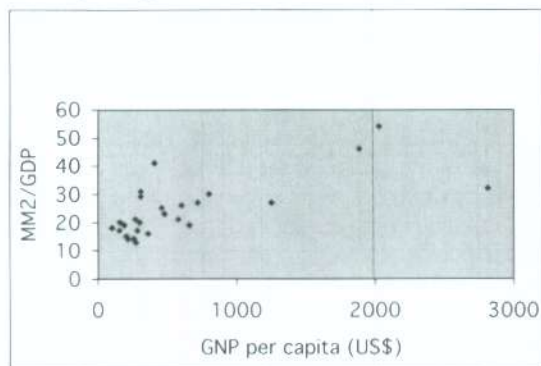
## *2.2 Financial Deepening in Sub-Saharan African Economies*

In most of SSA, financial markets are under-developed so that households and small-scale entrepreneurs have little access to alternative financial assets other than deposits and saving accounts offered by the banking sector. First and foremost, governments typically finance deficits by borrowing from the domestic banking sector or by resorting to external financing. Consequently, there are only limited offerings of government securities that the public could hold as an alternative to money. Second, with the prevalence of large public sector monopolies which essentially borrowed through the government and do not issue stocks or bonds in any significant fashion to finance investment, stock and bond markets have remained at best embryonic in many countries in the sub-region.

Typical of low-income countries and indicative of the weak financial depth, the ratio of broad money to GDP is invariably low in most countries of the sub-region. We would later argue that this may be compounded by the prevalence of the vertical solidarity scheme.

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**Figure 1:** *Financial Deepening and Real GDP Per Capita in African Countries*

### 3. Assessing the Role of the Real Deposit Rate in the Traditional Complementarity Framework

In this section, we assess the role of the deposit interest rate on savings, investment and economic growth in West Africa using simple econometric models developed in the traditional complementarity literature. In a stepwise manner, we assess the role of the deposit interest rate on cash accumulation, savings, investment and growth using aggregate cross-country macroeconomic series. One important gain from pooling and cross-country analysis is the possibility of estimating group-wise parameters while isolating, and testing for, country-specific effects and differences between groups under various statistical assumptions. In the context of this study, such a method allows us to take into account factors that are particular to each country, including exposure to production shocks (the Sahelian countries for example are more sensitive to climatic variations), quantity and quality of human capital (differences in population as well as in level of education of the labor force), institutional and structural factors (extent and efficiency of physical infrastructure and economic, political and judicial institutions).

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### 3.1 Real Deposit Rate and GDP Growth

#### 3.1.1 Assessing the Global Link between the Real Deposit Rate and GDP Growth

Under financial repression, nominal deposit rates were regulated, so that we may regard the interest rate as a pre-determined variable in the econometric analysis. In order to obtain a more robust relationship between the interest rate and growth, we augmented the base model with a number of important control variables that may affect growth outside the financial channel. These include the investment rate as it determines potential growth, the terms of trade and other determinants of import capacity such as net foreign capital flows. The estimated augmented model using a two-stage procedure<sup>4</sup> yields:

$$(1) \text{ DYY} = c + 0.231 \text{ RR} + 0.195 \text{ IGDP} + 0.117 \text{ VTOT} + 0.160 \text{ VTOT}[-1] \quad (\text{RsQAdj} = 0.31)$$

(6.88)                      (3.39)                      (2.21)                      (3.20)

DDY is the continuously compounded real GDP growth rate and RR the real deposit interest rate<sup>5</sup>. IGDP is the ratio of investment to GDP and VTOT is the variability of the terms of trade<sup>6</sup>. The results support conventional complementarity relation of a positive and robust association between real deposit rates and GDP growth when other growth determinants are controlled. This also suggests that the real deposit rate influences positively growth beyond its impact on the rate of private investment. The coefficient on the investment rate (IGDP) and the real deposit rate (RR) are both statistically significant at the 5 percent level.

A similar analysis distinguishing countries inside the Franc zone (FZ) from the others (NFZ) allows us to compare the effect of the real deposit rate on growth in the

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<sup>4</sup> The investment rate is an endogenous explanatory variable, since it is itself a function of the real deposit rate and GDP growth, hence the use of a TSLS procedure. The domestic fixed investment ratio was first estimated by a set of instrumental variables including past investment ratio and growth, an indicator of external indebtedness, the evolution of the country terms of trade and an indicator of public investment policy.

<sup>5</sup> We perform the standard likelihood ratio test to show that the country-specific fixed-effect model didn't add any significant explanatory power to the above model.

<sup>6</sup> The variability of the terms of trade is measured as the change in the terms of trade.

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fixed exchange rate environment relative to the flexible rate regimes in SSA. To this end, we conducted separate regression analyses for the two groups of countries. The equations are reported below.

**The Countries inside the Franc Zone**

$$(2) \text{ DYY} = c + 0.135 \text{ RR} + 0.035 \text{ IGDP} + 0.179 \text{ VTOT} + 0.207 \text{ VTOT}[-1]$$

(2.08)            (0.21)            (1.93)            (2.40)

(RsqAdj = 0.23)

**The Countries outside the Franc Zone**

$$(3) \text{ DYY} = c + 0.336 \text{ RR} + 0.28 \text{ IGDP} + 0.071 \text{ VTOT} + 0.11 \text{ VTOT}[-1]$$

(7.72)            (3.71)            (1.06)            (1.86)

(RsqAdj = 0.37)

The results indicate that the impact of the real deposit rate on growth, while remaining positive, appears somewhat weaker within the fixed exchange rate zone than outside the Zone. On average, a one-percent increase in deposit rate generates 0.336 percentage points outside the zone and 0.135 percentage points rise in GDP growth for WAEMU countries. This result is an interesting puzzle: Why should there be a weaker marginal effect of real deposit rate on growth in the relatively stable and low-inflation economic environment of the FZ, compared to the volatile and high-inflation environment that characterizes NFZ countries? Does this finding contradict or support the commonly held belief that countries which maintain positive real interest rates with a low inflation rate may achieve higher GDP growth rate than countries which also manage to maintain a positive real interest rate in a higher inflation environment, but only through even higher nominal interest rate? In other words, does countries achieve higher GDP growth by lowering inflation or by raising nominal interest rate high enough to offset high inflation? In the following sections, we investigate this issue by disentangling the various channels whereby the two components of the real deposit rate – namely the nominal interest rate and the inflation rate – affect real GDP growth.

### 3.1.2 Real Deposit Rate, Inflation, Financial Deepening and Growth

We develop our argument in two steps. First, following Gelb (1989), we show that

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financial depth ratio is negatively and significantly affected by inflation. The link is far weaker and insignificant in a low inflation environment. More specifically, the results suggest that an increase of 5 percent in the rate of inflation decreases the monetization ratio by nearly one full point in an inflationary environment<sup>10</sup>.

### □ Real Deposit Rate, Inflation and Growth

Finally, we address the last hypothesis (iii), namely that higher growth can be achieved through lower rather than higher inflation, assuming the same real deposit rate. This result can indeed be inferred from the previous analysis, by compounding the effect of inflation on financial deepening (equations 5 and 6) and that of financial deepening on growth (equation 4). This is essentially Gelb's approach. Our approach is rather similar to King and Levine's (1993). We developed an "inflation-augmented" version of the full growth model of equation (5), in order to simultaneously test for the significance and the relative magnitudes of the "own" real interest rate effect and the inflation-adjusted effect of financial deepening on growth. To do so, we designed a full "covariance-analysis" model with growth as a function of real deposit rate ("direct channel"), financial depth ratio, and taking into account possible interaction between inflation and financial depth. To this end, we computed an inflation dummy (DINF) to distinguish a high inflation sub sample from low inflation. We then regress real GDP growth on financial depth, the real deposit rate and the interaction terms between financial depth and the inflation dummy. This method allows us to test various sub-hypotheses: How significantly do financial depth and the real interest rate separately affect growth? How does inflation affect the effect of financial depth on growth? How do test results hold as the cut-point for low vs. high inflation is varied (from 15 to 20 and 30 percent)?

The estimated model is:

$$(7) \text{ DYY} = c + 0.364 \text{ RR} + 1.915 \text{ M2/GDP} - 1.685 [\text{DINF} * (\text{M2/GDP})] \quad (\text{RsQAdj} = 0.22)$$

(11.05)                      (2.08)                      (-1.80)

DINF is the inflation dummy and DINF\*(M2/GDP) the interaction term between inflation and the ratio of broad money supply to GDP. The results confirm our previous findings. All key estimated coefficients have the expected signs and are significant.

According to the results, when inflation is "high" (above 15 percent), a one-point increase in the ratio of financial depth (M2/GDP) has a much lower impact (0.23 percent) on the rate of growth than in a low inflation environment (1.915 percent). In conclusion, raising the real interest rate through a reduction in inflation has a more beneficial impact on growth than increasing the nominal deposit interest rate to match a high inflation rate.

### 3.2 Real Deposit Rates and the Efficiency of Investment

#### 3.2.1 Real Deposit Interest Rates, Financial Intermediation and Investment Efficiency

We now turn to investigating the role of the real deposit rate on growth through the investment rate (volume effect) and productivity (efficiency effect) in the context of West Africa. First, we consider the "efficiency" effect. In order to test whether or not a higher deposit rate is associated with higher average productivity of capital, we estimate a model relating the incremental output-capital ratio (IOCR) to the level of the real deposit rate<sup>11</sup>. We adopt an approach similar to that proposed by Lany and Saracoglu (1983) to address the efficiency issue. We compute the country average real deposit interest rate and we divide countries in three different categories. The first group includes countries with positive real interest rates, the second, countries with moderately negative real interest rates, and the last, those with severely negative real interest rates. The diversity of our existing pool of countries suggests an heteroscedastic error pattern. We therefore use GLS procedure to efficiently estimate the equation:

$$(8) \quad \text{IOCR} = c + 0.027 \text{ DRR} \quad (\text{RsQAdj} = 0.009) \\ (1.36)$$

IOCR is the inverse of the country average ICOR and DRR take the value  $-1, 0$

<sup>11</sup> For this analysis, we dropped the time series cross section approach in favor of a simple country cross-section method. The reason is that the ICOR is a structural variable indicating gross efficiency of capital, and is not expected to vary widely like ordinary time series from year to year, except perhaps over a longer time frame. Also, because of the high volatility of the investment rate and GDP growth resulting more from terms-of-trade and climatic shocks rather than real productivity changes in most African economies, it is more convenient as well as pertinent to use average country ICORs rather than straight time series ICORs for real efficiency analysis.

and 1 respectively for countries with severely, moderately negative and positive real interest rate. Our results support the view that a higher positive real deposit interest rate contributes to a higher efficiency of investment. The interest rate coefficient is positive but not very significant. We reported another regression using GLS with a country period- average real deposit interest rate. The results reinforce our conclusion on the positive role of the real deposit rate on the efficiency of investment.

$$(9) \quad \text{IOCR} = c + 0.0085 \text{ RR} \quad (\text{RsQAdj} = 0.05) \\ (1.99)$$

### 3.2.2 The Impact of the Real Deposit Interest Rate: Volume Effect versus Efficiency Effect

Having assessed the significance of the "efficiency effect" per se, we now wish to compare it to the traditional "volume effect", that is the extent to which higher real deposit rates may lead to higher saving and investment rates. We have previously argued that because of the indivisibility of investment and the high frequency of social expenditure shocks, the impact of the interest rate on investment efficiency is likely to be stronger than that on investment volume. From the previous analysis, we are now in a position to empirically assess that proposition.

From the familiar Domar growth accounting equation, the rate of GDP growth can be decomposed as the product of the incremental output capital ratio (IOCR) and the rate of investment (IGDP)<sup>12</sup>. Differentiating this relation with respect to the real deposit interest rate yields a decomposition of the impact of the real deposit rate into a "volume effect" and an "efficiency effect". This is summarized in the following two equations:

$$\begin{aligned} \text{DYY} &= \text{IOCR} * (\text{IGDP}) ; \\ \text{dDYY/dRR} &= [\text{d}(\text{IOCR})/\text{dRR}] * \text{Avg}(\text{IGDP}) + [\text{d}(\text{IGDP})/\text{dRR}] * \text{avg}(\text{IOCR}). \\ &\quad \text{"efficiency effect"} \qquad \qquad \text{"volume effect"} \end{aligned}$$

<sup>12</sup> As noted by McKinnon, this definition assumes that the increase in average productivity over time is zero, i.e. the only source of increased output emanates from new investment and not improved efficiency on existing capital.

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The volume effect is measured by the second term of the above equation. The marginal effect of the real deposit rate on investment ratio is assessed through the slope of the real deposit rate in the equation where the investment ratio is regressed on the deposit rate:

$$(10) \quad \text{IGDP} = c + 0.139 \text{ RR} \\ (3.53)$$

The marginal impact of the deposit interest rate on the investment ratio and IOCR are respectively 0.139 and 0.0085. The average IOCR and investment ratio over our sample amount to 0.286 and 20.85. Using the above formula, we found that the "volume effect" amounts to 18 percent whereas the "efficiency effect" amounts to 82 percent in explaining differences in real GDP growth across our sample. This confirms the preponderance of the "efficiency effect" over the "volume effect". Therefore, our results confirm the hypothesis that the real deposit rate affects growth and investment predominantly through the efficiency rather than the volume channel. The reason is that a low negative real deposit interest rate creates a disincentive to channel funds towards the banking system. When the real deposit rate is low, moderate and mid-income individuals have no disincentive for investing in "social spending hedge" and wealthier agents may even indulge in grandiose and prestigious but economically unprofitable investments (e.g. residential real estate). A rise in the real deposit rate will discourage these types of investments. Moreover, an increase in the rate of return to savings will shorten the time necessary to accumulate cash and maximize the probability that a given agent could implement a more expensive but more modern and productive investment project, which would affect positively the efficiency, if not the volume of aggregate investment.

### 3.2.3 The Impact of Inflation on Investment Efficiency

By analogy to the analysis of Section 3.1.2, we disentangle the above "efficiency" conduit in order to highlight the impact of the two components of the real deposit rate, - namely the inflation rate and the nominal interest rate - on investment efficiency. Here again, it is our conjecture that inflation is the key variable that drives capital productivity and explains to a large extent the response of investment efficiency to the real deposit rate. In a high inflation environment, there is an incentive for many agents, -

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particularly the wealthy ones - to invest in inflation hedges and/or prestige-related and unproductive projects, which reduce the efficiency of capital. Conversely, a reduction in inflation increases the opportunity cost of undertaking such unproductive investments. As people are more inclined to invest in more productive projects, the global productivity of capital rises. This analysis can be confirmed by a simple regression of IOCR on inflation (INF):

$$(11) \quad \text{IOCR} = c - 0.436 \text{ INF} \quad (\text{RsqrAdj} = 0.008) \\ (-2.39)$$

An important question still remains: If, as we argued above, inflation is the critical variable behind the "efficiency effect", does the nominal interest rate have any effect whatsoever on investment efficiency, beyond compensating for inflation? In other words, does the nominal interest rate significantly affect investment efficiency once its "inflation-offsetting effect" has been accounted for? It is our conjecture that, indeed, the nominal interest rate does have its "own" effect on investment efficiency, beyond its "inflation-offsetting effect" in the particular context of West Africa. We have previously alluded to the fact that holding time deposits may better *protect* monetary savings from *predatory social spending requests* for "sharing" and increase the probability that important investment projects may be realized. To this extent, increasing the nominal time deposit rate may constitute an added incentive for faster saving accumulation, a shorter waiting period prior to investment, a higher probability of realizing productive investments, and as a result, improved overall quality and productivity of capital. We may therefore conclude that raising the nominal rate to an extent would have a favorable effect on investment efficiency and investment beyond what is achieved by compensating for inflation. This would be particularly so in an environment characterized by low inflation but high social solidarity. We tested this assumption by regressing the incremental output capital ratio on the nominal deposit rate, allowing for interaction between inflation and the nominal deposit rate:

$$(12) \quad \text{IOCR} = c + 1.095 \text{ NR} - 1.103 (\text{NR} * \text{DINF}) \\ (1.68) \quad (-1.68)$$

NR is the nominal deposit interest rate and NR\*DINF the interaction term between the nominal deposit rate and the inflation dummy. We found that, indeed, the nominal

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deposit rate has an effect of its own beyond its interaction with the rate of inflation (the "offsetting effect") but mainly in a low inflation environment. Sensitivity analysis reveals that this effect becomes significant when the "high inflation" cut-point is raised beyond 20 percent. This result supports our conjecture that in a low inflation environment where social spending shocks may impede the pace of saving accumulation, an increase in the nominal deposit rate would by itself be beneficial to the productivity of investment via a better protection of savings against predatory demands. On the contrary, in a high and volatile inflation environment, the nominal deposit rate has no significant influence on the productivity of investment.

### 3.3 *The Shaw "Intermediation Model" and the McKinnon Complementarity Hypothesis*

#### 3.3.1 Shaw Intermediation Model

The intermediation model postulates that a rise in the real deposit rate increases the volume of deposits, which enhances the capacity of the banking system to make loans to the private sector. To test this hypothesis, we regress the ratio of credit granted by the banking sector on the real deposit interest rate. The results confirm the positive link between the real deposit rate and the level of credit:

$$(13) \quad \text{TXCPV} = c + 0.096 \text{ RR} \quad (\text{RsQAdj} = 0.118) \\ (6.57)$$

TXCPV represents the ratio of bank credit to the private sector over GDP. We further assess the proportion of the interest rate effect on the ratio of bank credit that operates through the volume of deposits inside the banking system. To do this, we regress the volume of deposits<sup>17</sup> on the real deposit rate and the credit ratio on the volume of deposits. The first equation indicates that an increase in the real deposit rate significantly attracts deposits inside the banking system:

<sup>17</sup> The level of deposit is computed as the sum of demand and time deposit.

savings out of cash into non-monetary forms. To further assess this hypothesis, we isolated the Franc zone group as representing a set of poor countries with a strong currency and low inflation, where we would expect complementarity to be stronger as compared to high inflation countries. The results again indicated a weaker than expected complementarity link in the Franc zone.

We further investigate the complementarity hypothesis comparing the bottom poor to the other countries. We estimate the equation for countries at the bottom of the development ladder, then we conduct the same analysis for countries with a more advanced development level<sup>18</sup>.

#### **Complementarity hypothesis: very poor countries**

$$(17) \text{Log}(m) = c + 0.03RR[-1] + 0.96 \log(GNPPE) + 0.004 \text{IGDP} + 0.025 \text{IGDP}[1] + 0.062 \text{IGDP}[2]$$

(1.89)            (5.88)            (0.11)            (0.76)            (2.15)

$$(\text{RsQAdj} = 0.25)$$

#### **Complementarity hypothesis: less poor countries**

$$(18) \text{Log}(m) = c + 0.21RR[-1] + 1.16 \log(GNPPE) - 0.209 \text{IGDP} + 0.025 \text{IGDP}[1] - 0.067 \text{IGDP}[2]$$

(4.66)            (3.61)            (-1.75)            (0.19)            (-0.6)

$$(\text{RsQAdj} = 0.33)$$

These results are consistent with the findings of the empirical literature. The conventional conduit holds, but interestingly enough, the level of investment two periods ahead has a higher coefficient and is more significant to explain today's cash accumulation<sup>19</sup>. It appears that the complementarity hypothesis holds more for the poorest countries than for the others.

<sup>18</sup> We ranked countries according to level of GDP per head. Countries with a real GDP per head below \$500 belong to the first group, whereas countries with GDP per head above this cut-point belong to the second group.

<sup>19</sup> Laumas (1980) and Ram (1982) also used lead investment expenditure to account for the fact that monetary balances are built up in advance of future investment expenditures. They also reported significant positive coefficients

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#### 4. Conclusion

Our empirical analysis applied to West Africa suggests that a higher real deposit interest rate is conducive to higher investment and growth as indicated in the traditional financial liberalization literature. More specifically: (i) Our analysis supports the fact that the main effect of the real deposit rate operates through improved efficiency rather than volume; (ii) We have gained some insight as to the respective role of inflation and the nominal deposit rate. It appears that inflation is the critical variable determining the effect of the real deposit rate. From the policy standpoint, this implies that more can be gained out of a credible reduction of the inflation rate rather than through higher nominal interest rate, particularly for high inflation countries; (iii) However, our analysis suggests that the nominal deposit rate has its own effect beyond compensating for inflation, more so in low inflation countries. We found this consistent with the *saving protection* role of the nominal interest rate and of time deposit accounts in the context of the *solidarity based economy*; (iv) We have also found a weaker than expected complementarity link between cash and investment, which is also consistent with leakage on cash accumulation created by social spending shocks as described in the *vertical solidarity scheme*.

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## Abstract

A large number of African countries have undertaken far reaching financial liberalization policies in the past two decades in order to deepen financial markets and accelerate growth. Yet, so far, there has been only scant empirical studies of the real impacts of these reforms, with due attention to the social context within which saving decisions are made by various household groups. This paper is part of an empirical research project which sets out to investigate how social constraints that characterize the sub-continent may affect saving behaviors and hence the effectiveness of financial reform policies. The paper analyzes the impacts of the real deposit rate on aggregate savings, investment and real growth in West Africa, paying a special attention to key feature of the social context, namely the fact that most mid-income savers are also informal "social insurance providers" for poorer and extended family members. We have argued that this "vertical solidarity scheme" leads households to develop some illiquidity preferences, favoring time deposit and even low yielding physical assets over cash holdings as means for protecting saving from relentless requests for sharing from extended family members. At the macro level, one consequence is that in this context, the nominal interest rate may play a dual function: (i) compensating for inflation, and (ii) shielding saving from the "social solidarity tax" that depletes cash holdings. Our empirical analysis based on cross-country estimation of key "complementarity" relations for West Africa indicates that indeed, the nominal interest rate may have a "residual effect" beyond compensating for inflation, and that this effect is more pronounced in "strong solidarity" environments. We have also found a weaker than expected complementarity link between cash and investment, which again is consistent with leakages on cash accumulation due to frequent social transfers resulting from the "vertical solidarity scheme".

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## L'IMPACT DE LA LIBÉRALISATION DES TAUX D'INTÉRÊT: ANALYSE EMPIRIQUE EN AFRIQUE SUB-SAHARIENNE

### Résumé

*Depuis les deux dernières décennies, un grand nombre de pays africains ont mis en œuvre des politiques de libéralisation financière afin de renforcer la profondeur financière et d'accélérer la croissance. La plupart des études empiriques sur l'impact de ces réformes sur le secteur réel ont négligé l'environnement socio-économique dans lequel elles s'inscrivent. Ce papier fait partie intégrante d'un ensemble de travaux qui analysent comment les contraintes sociales qui caractérisent l'ensemble du sous-continent affectent les comportements d'épargne des ménages et de ce fait l'efficacité des réformes financières. Plus spécifiquement, ce papier analyse l'impact du taux d'intérêt réel au dépôt sur l'épargne, l'investissement et la croissance en Afrique de l'Ouest en tenant compte de contraintes sociales liées au contexte économique et culturel. En effet, la plupart des épargnants de la classe moyenne doivent simultanément fournir de façon informelle "une assurance sociale" aux plus pauvres et à la famille "étendue". Ce système "d'assurance verticale" conduit les ménages à développer des préférences pour l'illiquidité, ce qui favorise le recours aux dépôts à terme ou même à des actifs physiques à très faible rendement au dépens de la détention d'actifs monétaires. Ainsi, les agents parviennent à mieux se protéger des requêtes incessantes émanant de leur entourage. Il en résulte au niveau macro-économique que le taux d'intérêt joue un double rôle : (i) de compensation du niveau d'inflation, et (ii) de protection de l'épargne contre la taxe de solidarité sociale qui pompe continuellement leur réserve de cash. L'étude empirique, fondée sur une analyse en coupe dans un ensemble de pays d'Afrique sub-saharienne indiquent que, en effet, le taux d'intérêt nominal peut avoir un effet résiduel au delà de l'effet de compensation du niveau d'inflation et que cet effet est plus prononcé dans un environnement caractérisé par de forts liens de solidarité. On a également trouvé un lien de complémentarité plus faible que prévu entre la détention de cash et l'investissement, ce qui est également cohérent avec l'hypothèse de ponction des chocs et transferts sociaux sur l'épargne liquide conformément au système de "solidarité verticale".*