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INFLATION AND INVESTMENT DECISION IN NIGERIA: THE RELEVANCE OF THEORY

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Over the past two decades, Nigeria's economic achievements have been mixed with substantial unsatisfactory growth records. During this period inflation has been on the upturn, greatly depressing economic activity in many key sectors. The view persists that unmitigated inflation has significantly adverse effects on the economy, particularly on investment decisions. This paper addresses the "dust" raised by inflation and the persistent inflation expectation in public and private sector investment propositions in Nigeria since the 1970s and evaluates their effects.

Introduction

Inflation is frustrating to corporate managers. If there is rapid inflation or rather a state of inflation expectation, we

know that prices will change dramatically in the future and, deductively, we can suspect that an adjustment in the investment process will be made. What then is "Inflation"? We could define inflation as an increase in the general price level. Elementary economics teaches us that "too much" money chasing "too few" goods causes inflation. When one complains about inflation, one is actually complaining about the fact that the prices of the things being bought are now more expensive.

Combining the "wrong naira" with the "wrong interest rate" could lead to a major error in investment decision, under inflationary conditions. A look at the data of individual African countries indicates that the average inflation rates of 17 to 20% largely reflect the experiences of a smaller group of countries with high inflation rates in the early 1990s.

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Table 8.1

Inflation Rate in Africa, Sub-Saharan Africa
Developing and Industrial Countries:
A Comparison (1971-88)

	Average 1971-80	Average 1981-88
Africa	15.2%	17.2%
Sub-Saharan Africa	17.2%	20.4%
Developing Countries	20.5%	37.0%
Industrial Countries	8.7%	4.9%

Source: IMF Working Papers 89/86, October 19, 1989.

A variety of forces are held responsible for inflation in African countries and some other developing countries. According to a recent World Bank Study of inflation in some selected countries, the mechanisms giving rise to inflation in these countries are complex, frequently involving a combination of monetary and cost-push factors and influenced by exchange rate development and change in price control regimes. In Nigeria, particularly, the instability of the exchange rate regime, between 1986 and 1994 has manifested itself in unstable price positions and oscillatory investment propositions.

Green (1989), states that recent theoretical and empirical work on inflation has identified at least three models for explaining the acceleration of inflation in some countries. One is a straight-monetarist model where

uncontrolled levels in the amount of money in circulation have provided inflationary tendencies. This reflects Milton Friedman's well-known adage that "inflation is always and everywhere a monetary phenomenon" (Bilson, 1979). The second, which can be termed a "fiscal" approach, acknowledges the role of money in inflation, but identifies large fiscal deficits as the underlying cause of monetary expansion and, ultimately, inflation. The third approach focuses on the role of exchange rate depreciation, either in conjunction with monetary policy or as an influence on other factors feeding into inflation. In addition to these three complementary approaches, some other factors have been identified as responsible for the inflationary trends in these countries. These factors include change in import prices, increases in income arising from higher wages and increase in agricultural produce prices. According to this view, inflation should be positively correlated with rates of monetary expansion, with the most inflation-prone countries experiencing the largest rate of monetary growth. Moreover, as the increase in the money supply can come from various sources, it is the monetary growth responsible for it.

It was found, as in Chibber *et al.* (1989) that the exchange rate, acting through the prices of imported goods, had a positive effect on domestic inflation. Harber (1989), in his analysis of inflation during the period of its

foreign exchange auction, between 1985-87 and Isu (1995) also confirmed the statistical relevance of monetary expansion as a major factor in the inflationary build-up in Nigeria during the period, 1970-1991.

The objectives of this paper include trying to ascertain the real effects of inflation on long-term investment decision in Nigeria and the ultimate impact(s) on the macroeconomy. Ways of ameliorating the adverse effects of inflation on our economy are also advanced.

Framework of Analysis

Research on the effects of inflation on the financial sector of developing countries has been very limited. Certainly, one of the effects of inflation on the financial system of African countries is a tendency for residents to economise on the use of money as "money" continually buys less and less. The velocity of money in the high inflation countries is significantly higher than that in the other African countries, confirming Friedman's monetary paradox (Green, 1989).

A second consequence of inflation that arises in the context of negative real interest rate is a persistence of excess request for credit from the private sector, particularly for short-term ventures. Where the expected inflation rate exceeds nominal interest rates, borrowing for certain types of private venture becomes very attractive. This

same force encourages consumers to spend, so as to avoid future price increases. Accordingly, private savings are discouraged, and firms may prefer to stockpile consumer goods or other real assets or financial assets as a way of maintaining financial reserves.

Where inflation is virulent and real interest rates are highly negative, the share of time and savings deposit in broad money may also decrease, (Bond, 1980). Given the uncertainties arising from inflation, borrowers are more likely to seek funding for short-term ventures offering relatively secure returns, thereby avoiding riskier propositions that may require more time to turn profitable, as is the case in Nigeria. In countries with volatile exchange rates and high inflation, there may be a move into short-term speculative activities, such as stockpiling of imported consumer goods or agricultural commodities in anticipation of a future price increase (Montiel, 1989).

Policy Response and Demonstration of Effects

Given the negative effects of high inflation on financial sector decision, many developing countries have attempted to put in place programmes aimed at reducing the incidence of inflation in their countries. Financial systems stand to gain especially. Whereas in Nigeria, institutional rigidities make it difficult for interest rates to reflect the real cost of capital,

thereby subsidising borrowing and discouraging financial savings.

These problems should be mentioned:

- i. Banking sector activity is likely to decrease, particularly where national authorities use outright ceilings on the growth of the private sector; where credit is used as the instrument for achieving their monetary and credit objectives.
- ii. Where higher interest rates accompany the economic adjustment process, a variety of consequences may follow, some of which may appear unfavourable to the financial sector as the economy adapts to a more realistic set of price incentives. In Nigeria, price levels have changed markedly since the 1970s, from a mere 3.2% in 1972, as the table below illustrates:

Table 8.2

Inflation Rate In Nigeria 1970-1992 (% Annual Changes)		
1970	-	13.8
1971	-	15.6
1972	-	3.2
1973	-	5.4
1974	-	13.4
1975	-	33.9
1976	-	21.2
1977	-	15.4
1978	-	16.6
1979	-	11.8

Table 8.2 (Contd)

Inflation Rate In Nigeria 1970-1992 (% Annual Changes)		
1980	-	9.9
1981	-	20.9
1982	-	7.7
1983	-	23.2
1984	-	39.6
1985	-	5.5
1986	-	5.4
1987	-	10.2
1988	-	38.2
1989	-	40.9
1990	-	7.5
1991	-	13.0
1992	-	44.5

Source: CBN Statistical Bulletin Vol. 5, No. 2. Dec. 1994.

Table 8.1 above shows trends in inflation in Nigeria during the period under review. One can see that the inflation tendencies were really high in 1975, 1976, 1982, 1984, 1985, 1988, 1989 and 1992.

An Illustration

Let us assume a one-period inflation rate is 15% or (.15) and that one-period debt cost is 18% or (.18) and that the investment is available within an interest rate of return of 20% or (.20). These naira measures are nominal i.e. revenue and cost measured as it should be when the cash is received and disbursed.

0	1	IRR
₦1,000	₦1,200	.20

Under the above conditions, the investment is acceptable. Thus, if ₦1,180 must be paid after one year, this implies that there will be a ₦30 net gain over and above the initial capital outlay of ₦1000, given the inflation rate and cost of capital of 15% and 18%, respectively. If we use constant naira (price level adjusted naira) we have $\frac{₦1,200}{1.15} = ₦1,043.5$ in the first period.

0	1	Real Return
₦1000	₦1043.5	.0435

i.e. $(₦1,043.5 - ₦1000)$

$$= ₦43.5$$

The investment is still acceptable as long as the borrowing rate remains 18%. There are several ways of injecting inflation forecasts into cash-flow. The most straightforward method is to forecast the rate of inflation and the effect the price level change will have on the cash flows. Van Horne (1980), states that the presence of inflation in an economy distorts capital budgeting decisions.

The principal reason is that depreciation changes are based on original, rather than replacement, cost. As income grows with inflation, an increasing portion is taxed, with the result that real cash flows do not keep up with inflation.

Consider an investment proposal costing ₦24,000 under the assumption that no inflation is expected, that depreciation is straight line and that tax rate is 50%. The following cash flows are expected as shown below in Table 8.3.

Table 8.3

Effects of Inflation on Investment: An Illustration				
	1	2	3	4
1	₦10,000	₦6,000	₦2,000	₦8,000
2	₦10,000	₦6,000	₦2,000	₦8,000
3	₦10,000	₦6,000	₦2,000	₦8,000
4	₦10,000	₦6,000	₦2,000	₦8,000

Depreciation is deducted from the cash savings to obtain taxable income, on which taxes of 50% are based. Without inflation, depreciation changes represent the 'cost' of replacing investment as it wears out. The last column represents real cash flows after taxes. The Internal Rate of Return (IRR), which equates the present value of cashflows with the cost of the project, is 12.6%.

Now, consider a situation where inflation is at a rate of 7% per annum and cash savings are expected to grow at this overall rate of inflation i.e. the cash savings are expected to grow at 7%. The after-tax cash flows are as demonstrated in Table 8.4 below:

Table 8.4

Year	Cash Saving 1 ₦	Depre- ciation 2 ₦	Taxes 3 ₦	Cash Flow 4 ₦
1	10,700	6,000	2,350	8,350
2	11,449	6,000	2,725	8,724
3	12,250	6,000	3,125	0,125
4	13,108	6,000	3,554	9,554

While these cash flows are larger than before, they must be deflated by the inflation rate if one is concerned with the real, as opposed to the nominal rate of return. The real cash flows for the years under review are as follows:

Year 1 ₦8,350/(1.07) = ₦7,804	Year 2 ₦8,724/(1.07) ² = ₦7,619.8
Year 3 ₦9,125/(1.07) ³ = ₦7,448.7	Year 4 ₦9,554/(1.07) ⁴ = ₦7,288.7

As can be seen, the real-after tax cash flow is less than before and declines steadily over time. The reason for this is that an increasing portion of the tax savings is subject to taxation. The internal rate of return base on real after-tax cash flows is 9.9% compared with 12.6% without inflation. It is therefore clear, from the foregoing analysis that the presence of inflation results in low real rates of return.

Hong (1977) found that inflation affects stock prices through the additional tax burden on the firm. Therefore, there was wealth transfer

from corporation to the government. Therefore, there is less incentive for companies to undertake capital investment under a situation of inflationary growth. There is simply a disincentive for companies to undertake capital expenditures with the result that the amount invested typically is less than what it would be in the absence of inflation. It follows also that there will be an incentive to seek investments with faster paybacks (shorter economic lives). Nigeria fits perfectly into this model and this possibly explains why there is a dearth of long-term investment proposals in the economic framework.

Table 8.5

Capital Flow in Nigeria 1970-1990
(in ₦) Million

1970	62.4
1971	319.6
1972	248.3
1973	192.6
1974	48.4
1975	475.4
1976	46.3
1977	197.6
1978	331.8
1979	289.9
1980	467.0
1981	137.8
1982	1624.9
1983	564.7
1984	536.8
1985	329.7
1986	2499.6
1987	68.6
1988	1345.6
1989	-439.6
1990	-460.4

Source: Statistical Bulletin of the CBN 1992 and other years.

Looking at the net capital flows in the economy reveals oscillations, brought about by uncertainties in the national landscape, during a greater part of the period 1970-1990. Figure 8.1 is a graphical representation of the net capital flows during the period, clearly showing considerable volatility, notably in the period 1982-1990.

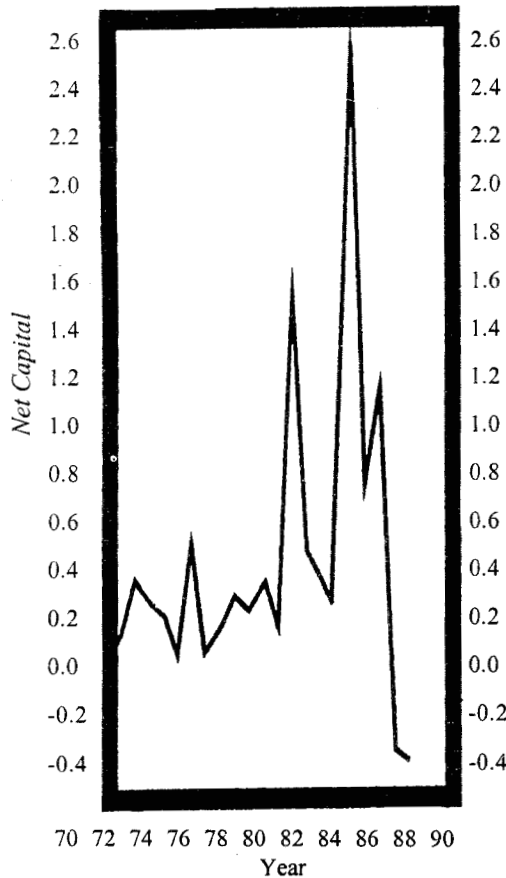


Fig. 8.1: Net Capital Investment into Nigeria (Approx.) (1970-1990)

Investment Decision Under Inflation

More Highlights

Nigeria has experienced persistent inflation since the early 1980s at levels exceeding normal expectations. What effects does this have on investment decisions? The expression for calculating the net present value (NPV) of the investment is shown below.

$$NPV = \sum_{t=1}^n \frac{NCF_t}{(1+k)^t} - I_0$$

Where:

NPV = Net present value of the project.

NCF_t = Net cash flow per year.

K = Cost of capital applicable to project.

n = Number of years the NCF is expected to flow.

I_0 = Required investment outlay for the project.

$$NPV = \frac{\sum \text{N}26,500 - \text{N}100,000}{(1.09)^t}$$

$$= 26,500 \times (3.8896) - \text{N}100,000$$

$$= 103,074 - 100,000$$

$$= \text{N}3,074 \text{ (Profit) (NPV)}$$

We have determined that the NPV is

₦3,074 and is clearly profitable at that occurrence. Now suppose an inflation rate of 6% will persist during the five years of the project. Since investment and security returns are based on expected future returns, the anticipated inflation rate will be reflected in the required rate of return on the project or the applicable cost of the capital for the effects. In formal terms we have:

$$(1 + kj) (1 + n) = (1 + kj)$$

Where *kj* is the required rate of return, in nominal terms and *n* is the anticipated annual inflation rate over the project's life. Thus

$$(1 + .09)(1 + .06) = (1 + .09 + .06 + .0054) = 1.1554$$

The applicable discount rate reflects the summation of the 6% anticipated inflation rates to the 9% rate of return in real terms to obtain the total of 15%. We can now introduce some of the biases under which inflationary conditions may be introduced. Without adjustment for inflation in the cash flows the analysis would appear as follows:

$$\begin{aligned} NPV_1 &= \sum_{t=1}^n \frac{₦26,500}{(1.09)_t + (1.06)_t} - ₦100,000 \\ &= \sum_{t=1}^n \frac{₦26,500}{(1.15)_t} - ₦100,000 \\ &= ₦26,500 (3.3522) - ₦100,000 \\ &= ₦88,833 - ₦100,000 \\ &= \underline{-11,167.00} \end{aligned}$$

The project will have a negative NPV of ₦11,167 and therefore will be rejected. However, a sound analysis required that the anticipated inflation also be taken into consideration. Let us now assume that the same inflation of 6% is applicable to the net cash flows.

$$\begin{aligned} NPV_2 &= \sum_{t=1}^n \frac{₦26,500 (1.06)^t}{(1.09)_t + (1.06)_t} - ₦100,000 \\ &= \sum_{t=1}^n \frac{₦26,500}{(1.15)_t} - ₦100,000 \\ &= ₦103,074 - ₦100,000 \\ &= \underline{₦3,074} \end{aligned}$$

This confirms the adverse effects of inflation on investment decisions, given its tendency to produce negative NPVs. Our investigation confirms the general view that inflation tends to discourage capital investment, given the fact that periods of high rising inflation tend to be matched with declining net profits.

Concluding Observation

Policy makers typically believe that inflation has important adverse effects on long-run economic performance. This conviction is based on the logic summarised by Fisher and Modigliani (1978) that firms and workers devote productive resources to dealing with inflation; that inflation uncertainty reduces efficiency by discouraging long-term contracting and increasing relative price variability. While most authors find

growth and inflation to be inversely related, with the implication that inflation is quite costly, it is not easily measurable in exact terms. On the basis of work done by Fisher (1991), Bond (1980) Levine and Renelit (1992) and others, one can comfortably state that investment rate and inflation volatility are inversely related in almost all the country samples tested.

Inflation has had a number of adverse consequences for the financial sectors of African countries, notably Nigeria, which have been magnified by structural rigidities and ineffective policy prescriptions. This tended to encourage borrowing for short-term trade activities, while discouraging savings. Lending for long-term investment has also been discouraged, lending credence to the "Infrastructure Deficit Hypothesis" considered to be at the root of Nigeria's economic problems. As we know, less inflation makes long-term investment viable for Nigeria as she must strengthen her financial sector in order to achieve healthier economic environment.

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