

Uncertainty and Investment Behaviour in the Democratic Republic of Congo

By

Xavier Bitemo Ndiwulu
and
Jean-Papy Manika Manzongani
Université Kongo,
D.R. Congo

AERC Research Paper 226

African Economic Research Consortium, Nairobi

January 2011

THIS RESEARCH STUDY was supported by a grant from the African Economic

Research Consortium. The findings, opinions and recommendations are those of the authors, however, and do not necessarily reflect the views of the Consortium, its individual members or the AERC Secretariat.

Published by: The African Economic Research Consortium
P.O. Box 62882 - City Square
Nairobi 00200, Kenya

Printed by: Modern Lithographic (K) Ltd.
PO Box 52810 – City Square
Nairobi 00200, Kenya

ISBN 9966-778-98-5

© 2011, African Economic Research Consortium.

Contents

List of tables	iv
List of figures	iv
Abstract	v
Acknowledgements	
vi	
1. Introduction	1
2. Stylized facts	2
3. Literature review	6
4. Methodology and data sources	9
5. Results and discussion	12
6. Conclusion	18
Notes	19
References	20

List of tables

1.	Selected economic indicators (%)	2
2.	List of variables	11
3.	Garch (1,1) estimates	12
4.	Econometric estimates of the investment equation	14
5.	The beta coefficients of the investment equation	16

List of figures

1.	Conditional variance of annual inflation	13
2.	Conditional variance of quarterly inflation	13
3.	Inflation variance and private investment	13
4.	Inflation variance and GDP growth	13

Abstract

The aim of this study was to assess the impact of uncertainty on private investment in the Democratic Republic of Congo (DRC). We conducted an econometric analysis based on a flexible accelerator model of investment spending. The results showed that both macroeconomic uncertainty, as measured by the conditional variance of inflation, and political uncertainty had a negative impact on investment rates. The two main policy implications of these results are: First, stabilization policies, and especially their credibility, are essential to promote private investment in DRC; and second, the government should adopt policies which help to reduce the risk of reverting to conflict.

Key words: Macroeconomic uncertainty, political risk, private investment, irreversibility, Democratic Republic of Congo.

JEL classification: C22, E22.

Acknowledgements

We are grateful for the financial and technical support from the African Economic Research Consortium (AERC). We are also indebted to the International Monetary Fund (IMF) for financial support which enabled us to improve this work while visiting the Fund offices. Finally, we thank the resource persons and the participants at the AERC biannual workshops who made invaluable comments on the early drafts of this paper.

1. Introduction

Investment spending plays an important role in explaining economic performance. Indeed, high rates of investment have been associated with higher economic growth (see, for example, Barro, 1991; Collier and Gunning, 1999; Madsen, 2002). However, the level of investment in most African countries is insufficient to promote development. This is the case in the Democratic Republic of Congo (DRC) where investment rates are abnormally low and declining. Between 1970 and 2001, for example, the gross investment rate was, on average, equal to 10.4% of gross domestic product (GDP) and private investment averaged only 6.6%. In this context, Akitoy and Cinyabuguma (2004) show that the weakness of capital accumulation in DRC during the 1990s contributed to output losses estimated at 3.9% of GDP per year.

According to neoclassical theory, investment spending depends on the cost of capital which in turn is affected by real interest rate and tax rate (see Jorgenson, 1963). In this setting, economic policies can achieve higher investment rates by lowering interest rate and by providing fiscal incentives. While these policies were carried out in DRC since the early 1960s, they did not allow increasing investment rates. So, it appears that there are other factors which depress capital spending in this country.

Among the factors which may affect investment in DRC, one can emphasize the greater uncertainty firms have to deal with, which prevents them from reacting favourably to the incentives provided by monetary and government authorities. This is in accordance with the modern theory of investment which stresses that higher uncertainty reduces the incentive to invest when investment is irreversible since investors prefer to postpone the investment decision until anticipated profits increase sufficiently (see Bernanke, 1983; Dixit and Pindyck, 1994).

Therefore, the objective of this study was to investigate the role of uncertainty in explaining the weakness of private investment in DRC. For this purpose, we used a flexible accelerator model of investment to which we added measures of uncertainty. Empirical studies which have analysed the uncertainty–investment relationship for developing countries more often use cross sectional data (Pattillo, 1998; Gelb, 2001; Serven, 2002) or focus only on macroeconomic uncertainty (Asante, 2000; Dehn, 2000; Kumo, 2006). In this study, we used time series data to assess policy impact and we considered both macroeconomic and political uncertainty. The findings show that, effectively, both macroeconomic and political measures of uncertainty have an important negative effect on investment and therefore account for the weakness of private investment in DRC.

The rest of the paper is organized as follows. Section 2 analyses some stylized facts and Section 3 presents a brief review of the literature. In Section 4 we present the methodology and Section 5 gives and discusses the results. Finally, Section 6 concludes.

2. Stylized facts

Despite enormous natural resources, the overall economic performance of DRC since its independence has been disappointing. The real GDP in 2000 was lower than it was in 1960; between 1970 and 2001 GDP decreased at an average annual rate of 1.45%. This situation is due to many factors of which two may be emphasized: The weakness of investment and the high level of uncertainty.

Low and declining investment rates

The poor performance of the Congolese economy resulted from, among others, very low and declining rates of investment, as we see in Table 1. During the entire period of 1970–2001, the gross investment rate was on average equal to 10.4% of GDP and private investment averaged only 6.6% with a minimum of 2% during the period 1997–1999. Private investment was higher than 10% only in 1972, 1975 and 1977. These outcomes were disappointing since the minimum average rate of investment required for robust growth must be higher than 15% (Asante, 2000). Furthermore, investment rates fell dramatically during the 1990s, a period characterized by a great depression, with an average gross investment rate of 5.3%. Consequently, the low and declining rates of investment contributed largely to the depression of the economy during the 1990s (Akitoy and Cinyabuguma, 2004).

Table 1: Selected economic indicators (%)

Year	Gross investment	Private investment	FDI	GDP growth	Discount rate	Inflation rate
1970	14.8	8.6	0.08	-0.2	3.25	n.a
1971	18.3	8.9	0.07	6.0	3.25	5.8
1972	18.4	11.4	0.13	0.1	3.25	15.8
1973	16.8	7.0	0.21	8.1	3.25	15.6
1974	16.9	7.7	0.61	3.1	3.25	29.5
1975	17.5	11.5	0.11	-5.0	3.25	28.7
1976	14.5	7.8	3.12	-5.3	3.25	80.4
1977	21.3	14.8	0.23	0.8	3.25	68.9
1978	11.9	7.7	1.34	-5.3	5.0	48.8
1979	12.8	5.6	1.97	0.4	5.0	101.1
1980	10.0	3.7	1.47	2.2	12.0	46.6
1981	10.5	4.6	0.91	2.4	12.0	35.4

continued next page

Table 1 Continued

Year	Gross investment	Private investment	FDI	GDP growth	Discount rate	Inflation rate
1982	8.3	6.9	-0.02	-0.5	12.0	36.7
1983	9.3	7.2	-2.50	1.4	12.0	76.5
1984	10.5	6.7	-0.39	5.5	12.0	52.2
1985	12.5	7.8	0.84	0.5	26.0	23.8
1986	13.2	8.8	0.07	4.7	26.0	44.4
1987	14.2	9.0	-0.62	2.7	29.0	78.7
1988	14.4	7.9	-0.04	0.5	37.0	71.1
1989	14.3	7.9	-0.06	-1.3	50.0	104.1
1990	9.0	8.9	-0.17	-6.6	45.0	81.3
1991	5.6	3.5	0.16	-8.4	55.0	2154.4
1992	6.9	4.3	-0.01	-10.5	55.0	4129.2
1993	1.8	1.4	0.12	-13.5	95.0	1986.9
1994	7.9	7.0	-0.03	-3.9	145.0	23773.1
1995	9.4	5.3	-0.39	0.7	125.0	541.9
1996	7.1	4.6	0.45	-0.9	238.0	658.8
1997	2.5	2.0	-0.84	-5.7	13.0	175.5
1998	2.1	2.0	1.18	-1.7	22.0	29.1
1999	3.1	2.0	0.22	-4.3	120.0	284.9
2000	3.5	3.0	0.50	-6.9	120.0	550.0
2001	5.2	5.1	1.83	-2.1	140.0	357.3
1970-2001	10.4	6.6	0.33	-1.45	44.90	192.5
1990-2001	5.3	4.1	0.25	-5.31	97.75	721.2

Note: Gross investment, private investment and foreign direct investment (FDI) are expressed as a percentage of GDP. GDP growth is the annual growth rate of real GDP. Discount rate is the Central Bank interest rate and inflation rate is the annual change of the CPI.

Sources: AfDB, 2006; Nankara, 1994; World Bank, 2005.

The weakness of private investment in DRC can be justified partially by the inability of the country to attract foreign direct investment (FDI). We see in Table 1 that FDI inflows as a percentage of GDP were very low with an average rate of 0.33% during the entire period of the study. FDI represented only 5% of private investment between 1970 and 2001 and 6% in the 1990s.

Furthermore, the weakness of private investment is in contradiction with the low cost of capital as approximated by interest rates. Indeed, the average discount rate was four times lower than the average inflation rate over the period suggesting that interest rates were low with respect to inflation (Table 1). This situation should lead to over-investment since capital was cheap. However, since real interest rates were negative most of the time, they cannot be considered as a good indicator of the cost of capital. Further observation of the Congolese economy reveals that lower rates of private investment are associated with the hostile business climate characterized by the higher macroeconomic and political uncertainty firms are faced with.

Higher uncertainty and its sources

Many sources of uncertainty exist. They can be divided into two main types: Macroeconomic and political. Both types of uncertainty can stem from internal

or external shocks and they may concern both policy and exogenous variables. In the following sections we discuss the political uncertainty economic agents are dealing with in DRC, then briefly analyse the macroeconomic sources of uncertainty.

Political uncertainty

The Congolese environment is characterized by great political uncertainty. The reason for this is twofold. First, DRC has experienced political turmoil resulting in strikes, disputes and civil wars. Second, the poor governance of the country has led to administrative problems and to uncertain political decisions.

Looking at the recent history of the country, the greatest uncertainty was experienced in the 1990s when people needed more freedom after 25 years of dictatorship. In April 1990, the country moved from a single party regime to a multiparty democracy. This unanticipated state of political freedom led to political and social turmoil, resulting in a decade-long period of higher political uncertainty. The country experienced violent plundering in 1991 and 1993 which destroyed capital stocks and discouraged investment. The plundering was followed by several strikes and disputes.

From 1996 to 2003 the successive regimes and the population were faced with rebellions and civil wars. The rebellion in 1996 degenerated into an armed conflict which ended the autocratic regime and ushered in a new government in 1997. This was followed by civil war which lasted from 1998 to 2003, and caused four million deaths. The conflict involved seven foreign countries with four supporting the government and three the rebels.¹ The civil war ended with the agreements of Sun City in South Africa which also introduced the period of transition to a democratic regime: 2003 to 2006. After elections in 2006, DRC established democratic institutions with elected authorities for the first time since independence. However, some areas in the country — mainly in the east — still have disputes with many people suffering insecurity. To sum up, since the 1990s DRC has experienced high and generalized uncertainty and insecurity such that the investment climate has been difficult; investors were confronted with increasing risk on their physical assets and property rights.

Macroeconomic uncertainty

The second main source of risk stems from high macroeconomic uncertainty. While the volatility of economic variables has been a key feature of the Congolese economy since independence, macroeconomic instability was particularly greater in the 1990s (see Table 1). The 1990s was a period characterized by hyperinflation with high and unpredictable inflation rates which resulted in resource misallocation. The inflation rate was equal to 4,129% in 1992, 1,986% in 1993, and 23,773% in 1994. For the period 1970–2001, the annual average inflation rate was about 721.2%. The Congolese hyperinflation stemmed from the increased budget deficit which was financed by the money supply. This situation is related to the sudden cave-in at the copper mine of Kamoto which caused a dramatic fall of public revenues as the copper revenues accounted for about 50% of the budget of the state. The fall in public revenues was not compensated by reduced public spending. This situation led to a budget deficit financed by the supply of money as the country was unable

to borrow from abroad given the foreign debt burden. Therefore, the hyperinflation was due to the excess supply of money. Furthermore, the government was unable to collect more taxes because of the spread of the informal sector which was the consequence of economic depression coupled with job losses in the formal sector of the economy. In the 1990s, the average tax rate was less than 5% of GDP (World Bank, 2005).

In this context characterized by high uncertainty, and when investment spending is irreversible, the investment decision becomes more costly as the probability of experiencing negative shocks and incurring substantial losses increases.² Thus, with increasing uncertainty, investors prefer to postpone their investment decision and to reduce the level of their capital spending waiting for the environment to become more favourable. This is why the incentive to invest and the investment rates are very weak in DRC.

3. Literature review

Theoretical work

The traditional theory of investment [Jorgenson (1963) and Tobin (1969)'s q models] generally fails to correctly predict investment spending, as investment behaviour is less dependent on real interest rate and tax policies than assumed by the neoclassical approach (see Dixit and Pindyck, 1994). This is due essentially to the fact that the traditional theory does not allow for many important features associated with investment expenditures. For example, the neoclassical theory ignores the irreversible nature of investment decisions, the possibility to delay investment awaiting new information, and the uncertainty about the investment project. Owing to these limitations, the modern approach of investment decisions emphasizes the role of uncertainty which characterizes any investment project. Indeed, either the revenues or the cost associated with an investment decision are uncertain and this fact modifies the way the investor makes decisions.

There are two sets of literature on the investment-uncertainty relationship. The first was pioneered by Abel (1983) and Hartman (1972) and builds on the Tobin (1969) q model of investment by adding uncertainty to the output price. This body of the literature supposes that the environment of the firm is characterized by perfect competition in the output market, constant returns to scale and that the investment decision is reversible. In this setting, it can be shown that uncertainty has a positive effect on investment. This positive relationship stems from the convexity of the profit function relative to the price. Indeed, when the returns to scale are constant and if there is perfect competition in the output market, the profit function becomes convex with respect to the price. That is, increasing uncertainty on price raises the expected value of profits and thus increases investment. This one is increased since, due to the underlying assumptions of competition and constant returns to scale, the marginal revenue of capital is independent of the capital stock. In this case, investing today positively affects profits tomorrow without affecting the decision of investing tomorrow (Caballero, 1991).

However, the above analysis ignores the fact that most investment decisions are irreversible in the sense that immediately after having invested, the investor cannot change his mind by disinvesting when the perceived return on the investment project falls.³ In this context, and when uncertainty is higher, the investor can do better by awaiting new information about the future before investing. Indeed, when uncertainty increases, the probability of having high prices and making high profits increases as well as the

probability of having dramatic falls in price. When the prices fall the enterprise is unable to disinvest without incurring significant costs. In this case the entrepreneur becomes particularly sensitive to bad news. Thus, increased uncertainty raises the probability of receiving bad news and reduces investment (Bernanke, 1983).

The second set of the literature supposes that investment is irreversible and builds on the theory and techniques of real options. This approach was pioneered by Dixit and Pindyck (1994) and supposes that the investor has the option of delaying the investment decision. In this setting, and when the environment is uncertain and investment is irreversible, the option of waiting has value, that is, it is often profitable for the entrepreneur to wait for new information or the realization of important positive shocks before investing. With irreversible investment, a project is a set of call options to invest into the project and each dollar invested has an opportunity cost since it reduces the option value of increasing the production capacity in the future. Consequently, uncertainty exerts a negative effect on investment, as it increases the opportunity cost of investing (see Pindyck, 1988; Dixit and Pindyck, 1994).

Empirical work

Given that theoretical results are inconclusive on the sign and the magnitude of the investment-uncertainty relationship, a growing number of empirical studies attempt to address this issue in order to overcome this indeterminacy. Huizinga (1993) distinguishes three variables about which the firm can be uncertain, namely the real price of output, the real wages and the profit rates. His analysis is carried out at the industry level and uses the vector autoregression modelling. The findings of this study are controversial. Indeed, while uncertainty about the real price of output has a negative effect on investment, uncertainty about real wages has no effect and uncertainty about profit rate encourages capital spending. Ghosal and Loungani (1996) also find contrasted results. Pooling the data for all industries, they show that uncertainty has no impact on investment. However, for those industries which are highly competitive, the effect is negative.

Byrne and Davis (2004b) investigated the relationship between inflation uncertainty and aggregate investment in the United States. Using an autoregressive distributed lag model and distinguishing between permanent and temporary inflation uncertainty, they find that both types of uncertainty measures have a negative effect on investment spending both in the short and in the long run. Finally, Drakos and Goulas (2006) investigated the role of market power, irreversibility and returns-to-scale in explaining the sign of the investment-uncertainty relationship. Their findings are in line with theoretical results that when the firm setting is close to the neoclassical environment (that is, investment is reversible, the market is competitive and the returns-to-scale are constant), uncertainty positively affects investment spending. In contrast, when the situation is far from neoclassical hypotheses, the effect is negative.

Studies which have verified the investment-uncertainty relationship in the context of sub-Saharan African countries are few. Among these are Patillo (1998), Asante (2000), Dehn (2000), Fielding (2000, 2001), Gelb (2001) and Kumo (2006). Patillo (1998) and Asante (2000), both using data from Ghana, found that macroeconomic uncertainty

and firm-specific uncertainty have a negative impact on investment expenditures. In the same line, Kumo (2006), using data from South Africa, also found that macroeconomic uncertainty, especially real exchange rate uncertainty, has an important negative effect on investment spending. In contrast, Fielding (2001) found that macroeconomic uncertainty has a marginal impact on physical capital stock in the manufacturing sector in South Africa. Using a data set of 44 developing countries, Dehn (2000) also found that macroeconomic uncertainty has no effect on private investment rates when controlling for shocks to commodity prices.

To sum up, we can argue that even if most empirical studies found that uncertainty depresses investment, the findings are not unambiguous; so they suggest further analysis. Furthermore, most of the studies mentioned above have considered only economic uncertainty while investors in many developing countries are also confronted with political uncertainty. Fielding (2001) and Gelb (2001), for example, found that political instability deteriorates investment expenditures in South Africa. This study makes a contribution to the empirical analysis of the uncertainty-investment relationship by considering both

macroeconomic and political uncertainty.

4. Methodology and data sources

Specification of the investment equation

We carried out an econometric analysis of aggregate investment based on a flexible accelerator model which is a version of the partial adjustment model. This model has two main advantages. First, the accelerator model takes into account, in line with the Keynesian theory, conditions that prevail in the product market. Second, this model enables us to account for the inertia mainly observed in the investment behaviour at the aggregate level. While this inertia is often attributed to the “time to build” capital goods (see Jorgenson, 1963), it may also be caused by non-convex adjustment costs (including irreversibility) and by the “wait and see” behaviour in an uncertain environment.

The flexible accelerator model of investment we estimate takes the following form⁴:

$$\frac{(I/Y)_t}{1 - \beta_1} = \beta_0 + \beta_1(I/Y)_{t-1} + \beta_2\Delta y_t + \beta_3U_t + Z_t\beta_4 + \varepsilon_t \quad (1)$$

where $(I/Y)_t$ is the investment rate at time t , Δy_t is the growth rate of GDP, U_t measures uncertainty, Z_t is a vector of control variables and ε_t is the error term.

Equation 1 describes the short-run dynamic of investment spending; the parameter β_3 measures the short-run effect of uncertainty on investment. The long-run impact of

uncertainty is given by $\frac{\beta_3}{1 - \beta_1}$.

In the empirical model above, we added uncertainty measures into the traditional investment equation following the common practice in the empirical literature. Therefore, the structural parameters of uncertainty variables are unknown and we cannot assess the magnitude of different channels by which uncertainty affects investment. Nevertheless, we can assess the overall effect of uncertainty. We expect that uncertainty has on the whole a negative impact on investment, that is, the parameter β_3 is negative.

Many variables are used in the literature to control for the effect of other determinants of investment. Due to the limitations of the data, we considered two control variables among the most relevant: The public investment rate (PI/Y) and the debt burden (D/Y). We included $(PI/Y)_t$ as a variable of control to test for the crowding out effect or the complementary effect of public investment. Many authors include this variable in their

empirical investment equation (see, for example, Asante, 2000; Dehn, 2000). The debt burden variable tests for the debt overhang hypothesis according to which higher levels of external debt have a negative incidence on private investment and on economic growth, particularly in developing countries. It would also be useful to include the real interest rate as an explanatory variable to test for the neoclassical theory which emphasizes the role of the cost of capital in explaining investment. However, during the period considered here, the nominal interest rate was controlled by the government and was set far below the inflation rate. The real interest rate was negative during the entire period and cannot be used as a proxy of the cost of capital.

Uncertainty measures

We supposed that macroeconomic uncertainty is related to the difficulty to anticipate some key economic variables. Thus, our measure of macroeconomic uncertainty is based on the unanticipated component of inflation rates. Indeed, many authors consider inflation uncertainty as a measure of aggregate uncertainty because the variability of innovations on most macroeconomic variables are associated with the unpredictable inflation movements (see Goel and Ram, 2001; Byrne and Davis, 2004b). We supposed that expectations are made following a univariate Garch (1,1) model⁵:

$$\begin{aligned}\pi_t &= \gamma_0 + \gamma_1 t + \gamma_2 \pi_{t-1} + u_t \\ h_t &= \phi_0 + \phi_1 u_{t-1}^2 + \phi_2 h_{t-1}\end{aligned}\tag{2}$$

where π is the inflation rate, u is the unanticipated component of π and h is the variance of u . The conditional variance h is our measure of macroeconomic uncertainty.

In the context of DRC, political uncertainty can be captured by information on armed conflicts experienced by the country. Hence, our measure of political uncertainty provided quantitative information on the occurrence and intensity of civil wars. The values reported are 0 in the absence of armed conflict during a year, 1 in the presence of armed conflicts of weak intensity and 2 for a conflict of higher intensity. An alternative variable is the battle-related deaths during civil wars.

Data sources

The empirical analysis covered the period 1964–2004 and used data mainly from the World Bank (2005), the AfDB (2006) and IMF (2007) for macroeconomic data and from the International Peace Research Institute, Oslo (PRIO, 2007), for political uncertainty variables. The sources of data for each variable and the definition of the series are given in Table 2.

Table 2: List of variables

Variable	Definition	Sources
I	Private investment	Nankara, 1994; World Bank, 2005.
PI	Public investment	Nankara, 1994; World Bank, 2005.
Y	Gross domestic product (GDP)	World Bank, 2005.
Δy	Annual growth rate of GDP	AfDB, 2006; World Bank, 2005.
D	Stock of external debt	IMF, 2005; World Bank, 2005.
C_f	Political uncertainty approximated by the occurrence and intensity of civil wars	International Peace Research Institute, Oslo (PRIO, 2007)
h	Inflation uncertainty measured by the conditional variance of annual inflation rates	Inflation rates from World Bank (2005)
h_t	Inflation uncertainty measured by the conditional variance of quarterly inflation rates	Inflation rates from <i>Financial statistics</i> , various issues, IMF.

5. Results and discussion

Garch (1,1) estimates

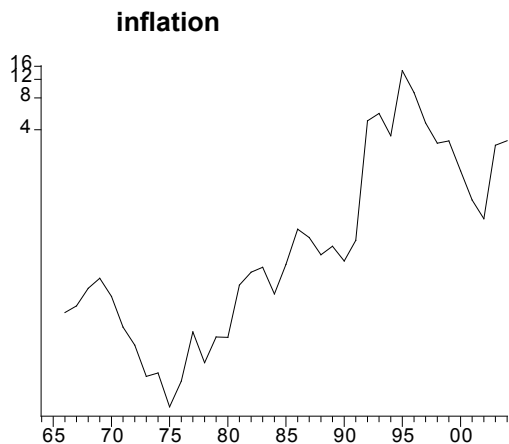
Before we discuss the effect of uncertainty on investment rates, we recall that macroeconomic uncertainty is measured by the conditional variance of inflation as calculated using the Garch(1,1) model. We used both annual rates of inflation for the period 1964–2004 and quarterly inflation rates for the period 1975.1–2004.4.⁶ The use of the quarterly series was motivated by the fact that the Garch modelling is more appropriate for high frequency data which are mainly daily, weekly and monthly.⁷ The Garch estimates are presented in Table 3. For the two variance equations, the coefficient associated with the Garch component was significant and the parameters were also significant on the whole. Looking at Figure 1, we see that macroeconomic uncertainty increased between 1975 and 1996. Furthermore, the results in Figure 2 show that economic uncertainty was particularly high between 1993 and 1996.

Table 3: Garch (1,1) estimates

Dependent variable	Variance equation	
	h_t	$h_{1,t}$
C	-0.01 (0.014)	0.01 (0.001)
ARCH(1)	1.104 (0.896)	0.360 (0.107)
GARCH(1)	0.514 (0.178)	0.777 (0.048)
Prob(F-stat)	(0.001)	(0.000)

Note: h is the conditional variance of annual inflation rates estimated over the period 1964–2004 and h_1 is the conditional variance computed using quarterly rates of inflation over the period 1975.1–2004.4.

As a preliminary analysis of the impact of uncertainty, the conditional variance of inflation is linked to investment rates and GDP growth using scatter graphs. As shown in Figure 3, private investment is negatively correlated with the inflation uncertainty as measured by the Garch conditional variance. Hence, the higher the inflation uncertainty, the lower the investment rates. Therefore, macroeconomic uncertainty has a depressing effect on investment in DRC. When we look at Figure 4, we see again a negative correlation between inflation uncertainty and GDP growth rates. This means that macroeconomic uncertainty has a negative effect on both private investment and economic growth.



quarterly inflation

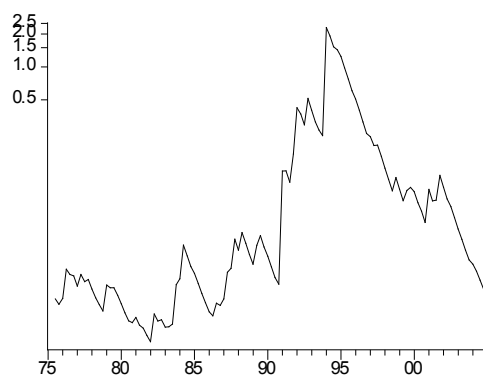
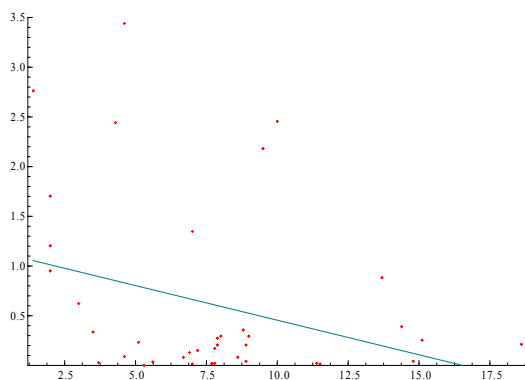
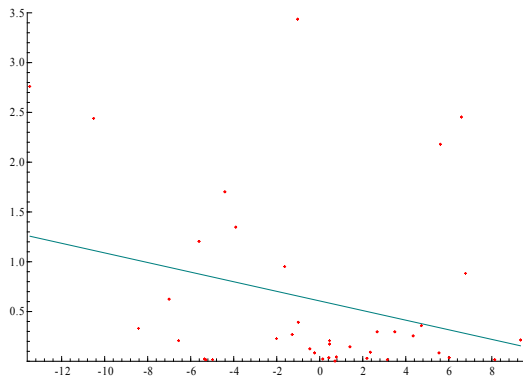


Figure 3: Inflation variance and private investment

Figure 4: Inflation variance and GDP growth





Estimated investment equations

The results of estimation are presented in Table 4. They show that the estimated econometric model is good since the coefficients are significant in the whole and the error terms are uncorrelated as indicated by the serial correlation LM test.

The model was estimated using the ordinary least squares method. The use of this method of estimation can be problematic since private investment and GDP growth seem to be simultaneously determined. However, the estimated coefficients are not affected when the two variables are cointegrated. For this purpose and to avoid spurious regressions, the cointegration test was carried out using the two-step procedure of Engle and Granger (1987). Following this procedure, cointegration of the variables was verified by examining the stationarity of the residuals using the Augmented Dickey-Fuller (ADF) test. The results of the test show that the series are cointegrated and so the results we find do not stem from spurious regressions and are valid. For the five equations listed below, the null hypothesis of unit root in the residuals is rejected at the 5% level of significance.

Column 1 of Table 4 presents the results for the simple accelerator model of investment. We found that first, the accelerator principle applies since the rates of output growth determine the accumulation of capital. As suggested by the accelerator model, the coefficient associated with the output growth is positive and significant. Hence, the acceleration of the economic growth increases the demand for investment.

Table 4: Econometric estimates of the investment equation

Dependent variable : $(I/Y)_t$					
	(1)	(2)	(3)	(4)	(5)
C	3.265*** (1.024)	3.746** (1.400)	5.122*** (0.881)	4.639** (1.795)	4.048*** (1.075)
$(I/Y)_{t-1}$	0.545*** (0.145)	0.623*** (0.183)	0.344*** (0.073)	0.585*** (0.170)	0.368*** (0.127)
y_t	0.194*** (0.067)	0.169** (0.075)	0.164** (0.076)	0.172* (0.099)	0.127 (0.089)
h_t		-0.176*** (0.062)		-0.167** (0.074)	

$h_{1,t}$			-0.797** (0.288)		-1.087*** (0.254)
$C_{t,t}$		-0.864* (0.495)	-1.294*** (0.382)	-1.058* (0.590)	-1.599*** (0.367)
$(PI/Y)_t$				-0.257** (0.123)	0.047 (0.228)
$(D/Y)_t$				-0.001 (0.010)	0.009 (0.006)
R^2	0.684	0.808	0.792	0.773	0.793
X^2_{sc}	0.965	0.148	0.263	0.884	0.237
ADF	-4.409***	-3.255**	-3.724***	-4.129***	-4.985***

Note: C is the constant term; I/Y is the investment rate; y represents the GDP growth; h is the conditional variance of annual inflation rates; h_1 is the conditional variance computed using quarterly rates of inflation; and C_t measures political uncertainty as provided by the occurrence and the intensity of civil wars. $(PI/Y)_t$ denotes the rate of public investment and D/Y is the rate of external debt. Some dummies were included into the equations to deal with residual outliers. R^2 is the coefficient of determination; X^2_{sc} represents the Breusch-Godfrey serial correlation LM test with two lags (the values reported are probability of rejecting the null hypothesis while it is true). ADF is the Augmented Dickey-Fuller test for unit root on residuals (with a constant and one lag). Values in parentheses are standard errors of coefficients. *** denotes significance at 1% level; ** indicates significance at 5% level; and * denotes significance at 10% level. Standard errors were corrected for heteroscedasticity using the Newey-West HAC procedure.

Second, the last period investment rate accounts for the current level of investment. The coefficient of the lagged investment rate was not only significant but also higher, so there is an important inertia in the evolution of investment spending. The inertia phenomenon can be attributed to the costs of adjustment, particularly to the presence of asymmetric adjustment costs when the cost of disinvesting is greater than the cost of investing. Indeed, Abel and Eberly (1994) showed that when the costs of adjustment are asymmetric, there exists a regime of inaction within which the firm cannot invest even if the marginal value of capital increases. Therefore, within this zone of inaction, the investment becomes independent of the value of capital and the current investment will rely on its past values. Dehn (2000) also found a significant and higher coefficient for the lagged investment rate.

In column 2 we added inflation uncertainty into the investment equation. As anticipated, our measure of macroeconomic uncertainty had a significant negative effect on investment spending. Hence, the higher uncertainty firms are dealing with is an important cause of the weakness of private investment in DRC. As previously stressed, investors are unwilling to invest when they are confronted with an uncertain environment as the decision to invest is associated with sunk costs. Because the decision to invest is irreversible, investors cannot change their minds by disinvesting immediately after having committed investments. Consequently, when uncertainty is higher, entrepreneurs prefer to postpone investment awaiting higher expected profits before investing.

The uncertainty variable in column 2 is the conditional variance calculated using annual inflation rates. When we considered the conditional variance which stems from quarterly inflation rates (column 3), we found that the results remain unchanged (except the fact that the coefficient associated with political uncertainty became more significant and its size increased). The parameter associated with macroeconomic uncertainty was still negative and significant, that is, higher macroeconomic uncertainty deters private

investment.

As firms are also dealing with political uncertainty, we added a political risk variable into the preceding model. The variable we considered (denoted C_j) reports the occurrence and the intensity of civil wars during the period of analysis.⁸ As we can see, the coefficient associated with this variable had the correct sign and was significant. This result shows that civil wars increased political risk which in turn lowered investment spending. DRC has experienced civil war many times since independence in 1960, beginning with the secession in Katanga and the rebellion of the “independent mining State of South Kasai”, both in 1960–1962. The country has also experienced rebellions in 1964, 1965, 1967, 1977–1978 and finally in 1996–2001. While many of these conflicts were minor in intensity, the 1964–1965 and the 1996–2001 rebellions were major conflicts. These conflicts have increased political risk in many ways. First, during civil war there is a greater risk that the stock of capital will be destroyed. Second, and more generally, property rights are unsecured during armed conflicts and so investment projects become more risky. Lastly, economic and political institutions are weak during and after conflicts, including the necessary institutions to enforce contracts. Moreover, economic policies are dysfunctional and uncertain during armed conflict (Collier, 2007). To sum up, the firms were confronted with greater political risk which negatively affected the incentive to invest and private investment rates in DRC.

Column 4 of Table 4 reports the results for all the explaining variables. Public investment had a crowding out effect on private investment. The coefficient associated with public investment was negative and significant. The rationale for this effect is that when public investment is financed by domestic borrowing, the amount of savings available for the private sector is reduced by the government investment (Dehn, 2000). Furthermore, the coefficient associated with the external debt ratio is insignificant. We cannot find a possible overhang effect of the external debt.

In column 5 we replaced the conditional variance of annual inflation with the variance from quarterly inflation. The results were modified in two ways. First, the effect of uncertainty was improved compared with the previous model. The coefficient associated with h_t was more significant and, the size of the coefficient associated with C_j increased. Second, the parameters associated with the GDP growth and public investment became insignificant. Remember that this equation was estimated for a period which started from 1975 instead of 1964 and it is possible that the estimates are less efficient than those in Equation 4 of Table 4 as the number of observations is limited. For this reason, the previous model is our preferred equation.

The size of the impact

To determine the relative importance of uncertainty variables vis-à-vis other determinants of investment, we estimated the beta coefficients by normalizing the variables. To do this, sample means were subtracted from each variable and the result divided by the standard deviation. The estimated beta coefficients are presented in Table 5.

Table 5: The beta coefficients of the investment equation

Dependent variable: $(I/Y)_t$

effects	Short-run equations			Long-run
	(1)	(2)	(3)	(4)
y_t	0.211 (0.094)	0.205 (0.094)	0.213 (0.115)	0.516
h_t	-0.125 (0.045)		-0.123 (0.041)	-0.298
$h_{1,t}$		-0.280 (0.101)		
C_{ft}	-0.156 (0.089)	-0.233 (0.069)	-0.192 (0.097)	-0.466
$(PI/Y)_t$			-0.171 (0.078)	-0.415

Note: y represents the GDP growth; h is the conditional variance of annual inflation rates; h_t is the conditional variance computed using quarterly rates of inflation; C_t measures political uncertainty as provided by the occurrence and the intensity of civil wars; and (PI/Y) is the rate of public investment.

The first equation in Table 5 shows that a 1 standard deviation increase in the conditional variance of inflation generates a 0.125 standard deviation decrease in investment spending and a 1 standard deviation increase in the conflict variable is followed by a 0.156 standard deviation decrease in investment. In contrast, when the GDP growth rises by 1 standard deviation, the investment rate increases by a standard deviation of 0.21.

When political risk and macroeconomic uncertainty are considered jointly, their absolute impact is greater than the effect of GDP growth. This implies that uncertainty is the main factor which explains the weakness of private investment in DRC. By considering the conditional variance based on quarterly inflation rates, the impact of uncertainty becomes more important than before, but we can question the efficiency of the beta coefficients in this equation as we did before. In column 3 public investment has an important negative effect on private investment but its relative size was less than that of the uncertainty variables. Finally, column 4 of Table 5 reports the long-run effects of the variables of interest. We can see that a 1 standard deviation increase in the output growth leads to a 0.516 standard deviation increase in the investment rates in the long run.⁹ In contrast, a 1 standard increase in both political risk and macroeconomic

uncertainty generates a 0.764 standard deviation decrease in the investment rates. Therefore, uncertainty has an important negative effect on private investment in DRC.

6. Conclusion

The objective of this study was to investigate the role of uncertainty in explaining the weakness of private investment in DRC. The findings indicated that, as anticipated, macroeconomic uncertainty as measured by the conditional variance of inflation and political risk have an important negative effect on investment rates in DRC and account for the weakness of private investment in this country. Indeed, the beta coefficients indicate that political risk and macroeconomic uncertainty are the main factors which explain the weakness of investment followed by output growth and public investment.

At least two policy implications emerge from these results. First, to encourage private investment spending in DRC, the government needs to implement stabilization policies in order to reduce the higher variability of inflation rates. The credibility of these policies is essential to their success because it helps reduce both uncertainty and the negative impact of political decisions. Second, the government should pay more attention to the reduction of the risk of conflict. This risk is high in DRC as the country is emerging from an armed conflict. The risk of reversion to conflict can be reduced by adopting appropriate economic recovery policies which reduce poverty and increase employment.

Notes

1. Angola, Namibia, Chad and Zimbabwe fought on the government side while Burundi, Rwanda and Uganda were on the rebels' side.
2. Indeed, in such an environment, the investor is confronted with many sources of risk like the risk of loss of the capital when the government decides, for example, to nationalize foreign firms or when the capital stock is destroyed during armed conflict.
3. See for example Cooper and Haltiwanger (2006) for evidence of irreversibility in explaining the pattern of investment in the United Kingdom.
4. Many other studies have used an empirical investment equation based on the flexible accelerator model. See, for example, Dehn (2000), and Bond and Cummins (2004) who

use this model in combination with Hayashi (1982)'s q model, and the study by Byrne and Davis (2004a).

5. Many authors have used this approach to model uncertainty (see, for example, Byrne and Davis, 2004a; Drakos and Goulas, 2006; Kumo, 2006; Escaleras and Thomakos, 2008; Servén, 2002).
6. After estimating the quarterly conditional variance, its values were aggregated to obtain the annual conditional variance as we were working on the basis of annual data.
7. It would be better to use monthly data on inflation, but they were not available for the period before 1990. We also could not get data for the quarterly inflation for the period before 1975.
8. An alternative variable which can be considered is the battle-related deaths during armed conflicts. However, although the coefficient associated with this variable had the correct sign, it was not significant. Therefore we considered the occurrence and the intensity of armed conflicts.
9. Considering this value, we can argue that the production function of the economy is characterized by increasing returns to scale. There are constant returns to scale when the long-run beta coefficient associated with the output growth is equal to unity.

References

- Abel, A. 1983. "Optimal investment under uncertainty". *American Economic Review*, 73: 228–33.
- Abel, A. and J. Eberly. 1994. "A unified model of investment under uncertainty". *The American Economic Review*, 84: 1369–84.
- AfDB. 2006. *Selected Statistics on African Countries*. Statistics Division, Development Research Department. Tunis: African Development Bank.
- Akitoy, B. and M. Cinyabuguma. 2004. "Sources of growth in the Democratic Republic of the Congo: A cointegration approach". IMF Working Paper 114. International Monetary Fund, Washington, D.C.
- Asante, Y. 2000. *Determinants of Private Investment Behaviour*. AERC Research Paper No. 100. African Economic Research Consortium, Nairobi.
- Barro, R. 1991. "Economic growth in a cross section of countries". *The Quarterly Journal of Economics*, 106(2): 407–43.
- Bernanke, B. 1983. "Irreversibility, uncertainty, and cyclical investment". *The Quarterly Journal of Economics*, 98(1): 85–106.
- Bond, S.R. and J.G. Cummins. 2004. "Uncertainty and investment: An empirical investigation

- using data on analysts' profits forecasts". Institute for Fiscal Studies. London. Mimeo.
- Byrne, J. and E.P. Davis. 2004a. "Investment and uncertainty in the G7". Brunel University, London. Mimeo.
- Byrne, J. and E.P. Davis. 2004b. "Permanent and temporary inflation uncertainty and investment in the United States". *Economics Letters*, 85: 271–77.
- Caballero, R. 1991. "On the Sign of the Investment-Uncertainty relationship". *The American Economic Review*, 81(1): 279–88.
- Collier, P. 2007. "Post-conflict recovery: How should policies be distinctive?" Centre for the Study of African Economies, Oxford University, Oxford. Mimeo.
- Collier, P. and J. Gunning. 1999. "Explaining African economic performance". *The Journal of Economic Literature*, 37(1): 64–111.
- Cooper, R. and J. Haltiwanger. 2006. "On the nature of capital adjustment costs". *Review of Economic Studies*, 73: 611–33.
- Dehn, J. 2000. "Private investment in developing countries: The effects of commodity shocks and uncertainty". CSAE WPS/2000-11. Centre for the Study of African Economies, University of Oxford, Oxford.
- Dixit, A. and R. Pindyck. 1994. *Investment under Uncertainty*. Princeton: Princeton University Press.
- Drakos, K. and E. Goulas. 2006. "Investment and conditional uncertainty: The role of market power, irreversibility, and returns-to-scale". *Economics Letters*, 93: 169–75.
- Engle, R. and C. Granger. 1987. "Co-integration and error correction: Representation, estimation, and testing". *Econometrica*, 55(2): 251–76.
- Escaleras, M. and D. Thomakos. 2008. "Exchange rate uncertainty, sociopolitical instability, and private investment: Empirical evidence from Latin America". *Review of Development Economics*, 12(2): 372–85.
- Fielding, D. 2000. "Investment under credit rationing and uncertainty: Evidence from South Africa". *Journal of African Economies*, 9: 189–212.
- Fielding, D. 2001. "Human rights, political instability and investment in South Africa: A note". CSAE WPS/2001-4. Centre for the Study of African Economies, University of Oxford, Oxford.
- Gelb, S. 2001. "Socio-political risk, confidence and firm investment in South Africa". The EDGE Institute, Johannesburg. Mimeo.
- Ghosal, V. and P. Loungani. 1996. "Product market competition and the impact of price uncertainty on investment: Some evidence from US manufacturing industries". *The Journal of Industrial Economics*, 44(2): 217–28.
- Goel, R. and R. Ram. 2001. "Irreversibility of R&D investment and the adverse effect of uncertainty: Evidence from OECD countries". *Economics Letters*, 71: 287–91.
- Hartman, R. 1972. "The effects of price and cost uncertainty on investment". *Journal of Economic Theory*, 5: 258–66.
- Hayashi, F. 1982. "Tobin's Marginal q and Average q: A Neoclassical Interpretation". *Econometrica*, 50(1): 213-224.

Other recent publications in the AERC Research Papers Series:

- Trade Reform and Efficiency in Cameroon's Manufacturing Industries*, by Ousmanou Njikam, Research Paper 133.
- Efficiency of Microenterprises in the Nigerian Economy*, by Igbekele A. Ajibefun and Adebisi G. Daramola, Research Paper 134.
- The Impact of Foreign Aid on Public Expenditure: The Case of Kenya*, by James Njeru, Research Paper 135.
- The Effects of Trade Liberalization on Productive Efficiency: Some Evidence from the Electoral Industry in Cameroon*, by Ousmanou Njikam, Research Paper 136.
- How Tied Aid Affects the Cost of Aid-Funded Projects in Ghana*, by Barfour Osei, Research Paper 137.
- Exchange Rate Regimes and Inflation in Tanzania*, by Longinus Rutasitara, Research Paper 138.
- Private Returns to Higher Education in Nigeria*, by O.B. Okuwa, Research Paper 139.
- Uganda's Equilibrium Real Exchange Rate and Its Implications for Non-Traditional Export Performance*, by Michael Atingi-Ego and Rachel Kaggwa Sebudde, Research Paper 140.
- Dynamic Inter-Links among the Exchange Rate, Price Level and Terms of Trade in a Managed Floating Exchange Rate System: The Case of Ghana*, by Vijay K. Bhasin, Research Paper 141.
- Financial Deepening, Economic Growth and Development: Evidence from Selected Sub-Saharan African Countries*, by John E. Udo Ndebbio, Research Paper 142.
- The Determinants of Inflation in South Africa: An Econometric Analysis*, by Oludele A. Akinboade, Franz K. Siebrits and Elizabeth W. Niedermeier, Research Paper 143.
- The Cost of Aid Tying to Ghana*, by Barfour Osei, Research Paper 144.
- A Positive and Normative Analysis of Bank Supervision in Nigeria*, by A. Soyibo, S.O. Alashi and M.K. Ahmad, Research Paper 145.
- The Determinants of the Real Exchange Rate in Zambia*, by Kombe O. Mungule, Research Paper 146.
- An Evaluation of the Viability of a Single Monetary Zone in ECOWAS*, by Olawale Ogunkola, Research Paper 147.
- Analysis of the Cost of Infrastructure Failures in a Developing Economy: The Case of Electricity Sector in Nigeria*, by Adeola Adenikinju, Research Paper 148.
- Corporate Governance Mechanisms and Firm Financial Performance in Nigeria*, by Ahmadu Sanda, Aminu S. Mikailu and Tukur Garba, Research Paper 149.
- Female Labour Force Participation in Ghana: The Effects of Education*, by Harry A. Sackey, Research Paper 150.
- The Integration of Nigeria's Rural and Urban Foodstuffs Market*, by Rosemary Okoh and P.C. Egbon, Research Paper 151.
- Determinants of Technical Efficiency Differentials amongst Small- and Medium-Scale Farmers in Uganda: A Case of Tobacco Growers*, by Marios Obwona, Research Paper 152.
- Land Conservation in Kenya: The Role of Property Rights*, by Jane Kabubo-Mariara, Research Paper 153.
- Technical Efficiency Differentials in Rice Production Technologies in Nigeria*, by Olorunfemi Ogunde, and Victor Okoruwa, Research Paper 154.
- The Determinants of Health Care Demand in Uganda: The Case Study of Lira District, Northern Uganda*, by Jonathan Odwee, Francis Okurut and Asaf Adebua, Research Paper 155.
- Incidence and Determinants of Child Labour in Nigeria: Implications for Poverty Alleviation*, by Benjamin C. Okpukpara and Ngozi Odurukwe, Research Paper 156.
- Female Participation in the Labour Market: The Case of the Informal Sector in Kenya*, by Rosemary Atieno, Research Paper 157.
- The Impact of Migrant Remittances on Household Welfare in Ghana*, by Peter Quartey, Research Paper 158.
- Food Production in Zambia: The Impact of Selected Structural Adjustment Policies*, by Muacinga C.H. Simatele, Research Paper 159.
- Poverty, Inequality and Welfare Effects of Trade Liberalization in Côte d'Ivoire: A Computable General Equilibrium Model Analysis*, by Bédia F. Aka, Research Paper 160.
- The Distribution of Expenditure Tax Burden before and after Tax Reform: The Case of Cameroon*, by Tabi Atemnkeng Johannes, Atabongawung Joseph Nju and Afeani Azia Theresia, Research Paper 161.
- Macroeconomic and Distributional Consequences of Energy Supply Shocks in Nigeria*, by Adeola F. Adenikinju and Niyi Falobi, Research Paper 162.
- Analysis of Factors Affecting the Technical Efficiency of Arabica Coffee Producers in Cameroon*, by Amadou Nchare, Research Paper 163.
- Fiscal Policy and Poverty Alleviation: Some Policy Options for Nigeria*, by Benneth O. Obi, Research Paper 164.
- FDI and Economic Growth: Evidence from Nigeria*, by Adeolu B. Ayanwale, Research Paper 165.
- An Econometric Analysis of Capital Flight from Nigeria: A Portfolio Approach*, by Akanni Lawanson,

- Extent and Determinants of Child Labour in Uganda*, by Tom Mwebaze, Research Paper 167.
- Oil Wealth and Economic Growth in Oil Exporting African Countries*, by Olomola Philip Akanni, Research Paper 168.
- Implications of Rainfall Shocks for Household Income and Consumption in Uganda*, by John Bosco Asimwe, Research Paper 169.
- Relative Price Variability and Inflation: Evidence from the Agricultural Sector in Nigeria*, by Obasi O. Ukoha, Research Paper 170.
- A Modelling of Ghana's Inflation: 1960–2003*, by Mathew Kofi Ocran, Research Paper 171.
- The Determinants of School and Attainment in Ghana: A Gender Perspective*, by Harry A. Sackey, Research Paper 172.
- Private Returns to Education in Ghana: Implications for Investments in Schooling and Migration*, by Harry A. Sackey, Research Paper 173.
- Oil Wealth and Economic Growth in Oil Exporting African Countries*, by Olomola Philip Akanni, Research Paper 174.
- Private Investment Behaviour and Trade Policy Practice in Nigeria*, by Dipo T. Busari and Phillip C. Omoke, Research Paper 175.
- Determinants of the Capital Structure of Ghanaian Firms*, by Joshua Abor, Research Paper 176.
- Privatization and Enterprise Performance in Nigeria: Case Study of Some Privatized Enterprises*, by Afeikhena Jerome, Research Paper 177.
- Sources of Technical Efficiency among Smallholder Maize Farmers in Southern Malawi*, by Ephraim W. Chirwa, Research Paper 178.
- Technical Efficiency of Farmers Growing Rice in Northern Ghana*, by Seidu Al-hassan, Research Paper 179.
- Empirical Analysis of Tariff Line-Level Trade, Tariff Revenue and Welfare Effects of Reciprocity under an Economic Partnership Agreement with the EU: Evidence from Malawi and Tanzania*, by Evious K. Zgou and Josaphat P. Kweka, Research Paper 180.
- Effect of Import Liberalization on Tariff Revenue in Ghana*, by William Gabriel Brafu-Insaidoo and Camara Kwasi Obeng, Research Paper 181.
- Distribution Impact of Public Spending in Cameroon: The Case of Health Care*, by Bernadette Dia Kamgnia, Research Paper 182.
- Social Welfare and Demand for Health Care in the Urban Areas of Côte d'Ivoire*, by Arsène Kouadio, Vincent Monsan and Mamadou Gbongue, Research Paper 183.
- Modelling the Inflation Process in Nigeria*, by Olusanya E. Olubusoye and Rasheed Oyaromade, Research Paper 184.
- Determinants of Expected Poverty Among Rural Households in Nigeria*, by O.A. Oni and S.A. Yusuf, Research Paper 185.
- Exchange Rate Volatility and Non-Traditional Exports Performance: Zambia, 1965–1999*, by Anthony Musonda, Research Paper 186.
- Macroeconomic Fluctuations in the West African Monetary Union: A Dynamic Structural Factor Model Approach*, by Romain Houssa, Research Paper 187.
- Price Reactions to Dividend Announcements on the Nigerian Stock Market*, by Olatundun Janet Adelegan, Research Paper 188.
- Does Corporate Leadership Matter? Evidence from Nigeria*, by Olatundun Janet Adelegan, Research Paper 189.
- Determinants of Child Labour and Schooling in the Native Cocoa Households of Côte d'Ivoire*, by Guy Blaise Nkamleu, Research Paper 190.
- Poverty and the Anthropometric Status of Children: A Comparative Analysis of Rural and Urban Household in Togo*, by Kodjo Abalo, Research Paper 191.
- Measuring Bank Efficiency in Developing Countries: The Case of the West African Economic and Monetary Union (WAEMU)*, by Sandrine Kablan, Research Paper 192.
- Economic Liberalization, Monetary and Money Demand in Rwanda: 1980–2005*, by Musoni J. Rutayisire, Research Paper 193.
- Determinants of Employment in the Formal and Informal Sectors of the Urban Areas of Kenya*, by Wambui R. Wamuthenya, Research Paper 194.

- An Empirical Analysis of the Determinants of Food Imports in Congo*, by Léonard Nkouka Safoulanitou and Mathias Marie Adrien Ndinga, Research Paper 195.
- Determinants of a Firm's Level of Exports: Evidence from Manufacturing Firms in Uganda*, by Aggrey Niringiye and Richard Tuyiragize, Research Paper 196.
- Supply Response, Risk and Institutional Change in Nigerian Agriculture*, by Joshua Olusegun Ajetomobi, Research Paper 197.
- Multidimensional Spatial Poverty Comparisons in Cameroon*, by Aloysius Mom Njong, Research Paper 198.
- Earnings and Employment Sector Choice in Kenya*, by Robert Kivuti Nyaga, Research Paper 199.
- Convergence and Economic Integration in Africa: the Case of the Franc Zone Countries*, by Latif A.G. Dramani, Research Paper 200.
- Analysis of Health Care Utilization in Côte d'Ivoire*, by Alimatou Cisse, Research Paper 201.
- Financial Sector Liberalization and Productivity Change in Uganda's Commercial Banking Sector*, by Kenneth Alpha Egesa, Research Paper 202.
- Competition and performance in Uganda's Banking System*, by Adam Mugume, Research Paper 203.
- Parallel Market Exchange Premiums and Customs and Excise Revenue in Nigeria*, by Olumide S. Ayodele and Frances N. Obafemi, Research Paper 204.
- Fiscal Reforms and Income Inequality in Senegal and Burkina Faso: A Comparative Study*, by Mbaye Diene, Research Paper 205.
- Factors Influencing Technical Efficiencies among Selected Wheat Farmers in Uasin Gishu District, Kenya*, by James Njeru, Research Paper 206.
- Exact Configuration of Poverty, Inequality and Polarization Trends in the Distribution of well-being in Cameroon*, by Francis Menjo Baye, Research Paper 207.
- Child Labour and Poverty Linkages: A Micro Analysis from Rural Malawian Data*, by Levison S. Chiwaula, Research Paper 208.
- The Determinants of Private Investment in Benin: A Panel Data Analysis*, by Sosthène Ulrich Gnansounou, Research Paper 209.
- Contingent Valuation in Community-Based Project Planning: The Case of Lake Bamendjim Fishery Restocking in Cameroon*, by William M. Fonta et al., Research Paper 210.
- Multidimensional Poverty in Cameroon: Determinants and Spatial Distribution*, by Paul Ningaye et al., Research Paper 211.
- What Drives Private Saving in Nigeria*, by Tochukwu E. Nwachukwu and Peter Odigie, Research Paper 212.
- Board Independence and Firm Financial Performance: Evidence from Nigeria*, by Ahmadu U. Sanda et al., Research Paper 213.
- Quality and Demand for Health Care in Rural Uganda: Evidence from 2002/03 Household Survey*, by Darlison Kaija and Paul Okiira Okwi, Research Paper 214.
- Capital Flight and its Determinants in the Franc Zone*, by Ameth Saloum Ndiaye, Research Paper 215.
- The Efficacy of Foreign Exchange Market Intervention in Malawi*, by Kisukyabo Simwaka and Leslie Mkandawire, Research Paper 216.
- The Determinants of Child Schooling in Nigeria*, by Olanrewaju Olaniyan, Research Paper 217.
- Influence of the Fiscal System on Income Distribution in Regions and Small Areas: Microsimulated CGE Model for Côte d'Ivoire*, by Bédia F. Aka and Souleymane S. Diallo, Research Paper 218.
- Asset Price Developments in an Emerging Stock Market: The Case of Mauritius*, by Sunil K. Bundoo, Research Paper 219.
- Intrahousehold Resource Allocation in Kenya*, by Miriam Omolo, Research Paper 220.
- Volatility of Resource Inflows and Domestic Investment in Cameroon*, by Sunday A. Khan, Research Paper 221.
- Efficiency Wage, Rent-sharing Theories and Wage Determination in the Manufacturing Sector in Nigeria*, by Ben E. Aigbokhan, Research Paper 222.
- Government Wage Review Policy and Public-Private Sector Wage Differential in Nigeria*, by Alarudeen Aminu, Research Paper 223.
- Rural Non-Farm Incomes and Poverty Reduction in Nigeria*, by Awoyemi Taiwo Timothy, Research Paper 224.
- What Do We Know After 15 Years of Using the United Nations Development Programme Human Development Index? By Jean Claude Saha*, Research Paper 225.