

Estimating the Size and Trends of the Informal Economy in Ghana

Matthew Kofi Ocran

Research Paper 355

Bringing Rigour and Evidence to Economic Policy Making in Africa

AFRICAN ECONOMIC RESEARCH CONSORTIUM
CONSORTIUM POUR LA RECHERCHE ÉCONOMIQUE EN AFRIQUE

THIS RESEARCH STUDY was supported by a grant from the African Economic Research Consortium. The findings, opinions and recommendations are those of the author, 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
P.O. Box 52810 - City Square
Nairobi 00200, Kenya

ISBN 978-9966-61-048-5

© 2018, African Economic Research Consortium.

Contents

List of tables

List of figures

Abstract

1.	Introduction	1
2.	The informal economy in Ghana	3
3.	Literature review	12
4.	Methodology	16
5.	Conclusion and policy recommendations	20
	Notes	22
	References	23

List of tables

1.	Formal sector employment, 1960-1990 (thousands)	7
2.	Labour absorption patterns (Share of total employment), 1987 – 2008	7
3.	ADF test results	18
4.	Results of OLS Estimations	19
5.	Estimates of the informal economy in Ghana, 1960 - 2007	26
Box 1. Some of the informal organizations in Ghana		4

List of figures

1.	Cost of doing business, 2004 - 2009	5
2.	Trends in tax burden, 1960 - 2007	7
3.	Working conditions regarding employees in both public and private organisations	8
4.	Composition tax revenue in Ghana, 2000 - 2007	9
5.	Trends in currency ratio, 1960 - 2007	10
6.	Ratio of currency held by the non-bank public to the narrow money, 1960 - 2006	11
7.	Trends in the size of the informal economy in Ghana, 1960-2007	20
A1.	Currency holdings.	25
A2.	Ghana/US\$ exchange rate, 1960 - 2009	25
A3.	Tax revenue as a share of GDP.	25
A4.	Trends in 90-Treasury bill rates	25
A5.	Income levels, GDP per person	25

Abstract

The purpose of this paper is to quantitatively examine the evolution of the informal economy over the past four decades. The study used the currency demand approach as analytical framework for the assessment. The findings suggest that there has been an upward trend in the size of the informal economy as a proportion of the officially recorded GDP. For instance, the size of the informal economy as a proportion of the official GDP estimates increased steadily, from 14% in 1960 to 18% by 1977. The proportion fell thereafter and started picking up again from 1983 to a new high of 30% between 2003 and 2004. The outcome of the study has policy implications particularly for the design of effective monetary and fiscal policy and the selection of appropriate policy instruments.

1. Introduction

Background and problem statement

The economy of Ghana, which had serious growth challenges in the greater part of the 1970s because of political instability and low commodity price, gained a new growth momentum from 1984 following the implementation of far-reaching economic reforms. International financial institutions, including the World Bank and the International Monetary Fund, supported the economic reforms. For example between 1984 and 2004 the country recorded real Gross Domestic Product (GDP) growth of 4.5% per year. Over the years it has been the expectation that Ghana's economy would take off to a higher growth equilibrium in excess of 8%, a level comparable to that seen in Asian countries such as Thailand and Malaysia in the 1980s and 1990s.

Indications are that over the period of relatively strong growth, formal sector employment shrunk significantly while the informal sector employment saw increases. For example, total formal employment that stood at 333,000 in 1960 had shrunk to 229,000 by 1991 (Gockel, 1998). Interestingly, private sector formal employment, which constituted 45% of total formal sector employment, accounted for only 17% by 1991. Given that the economically active population grew over a period when formal employment was on decline, it stands to reason that the informal sector absorbed some of the labour displaced in the formal sector. As a result of the incomplete coverage of national accounts statistics, particularly with respect to the informal sector, it can be argued that GDP figures for the country are biased downwards. For example, data files of the Internal Revenue Service and the Social Security and National Insurance Trust suggest that there are a little more than one million income taxpayers in Ghana. This represents 5.5% of the economically active population of the country; indications are that almost all these are from the formal sector. World Bank (n.d) puts the total number of registered businesses in Ghana at 17,500 — a figure that grossly underestimates the number of businesses in the country given the proliferation of Small and Medium Scale Enterprises across over the country.

In light of the discussions above, two research questions come to the fore. First, what is the size of the informal economy in Ghana? Secondly, what are the trends in the size of the informal economy, particularly over the period of steady GDP growth?

Objectives

The primary concern of the proposed research effort is, therefore, to examine the evolution of the second economy in Ghana. However, the specific objectives are as follows;

- (1) To provide descriptive analyses of evolution of the second economy over the past three decades.
- (2) To estimate the size and trends of the second economy in Ghana between 1960 and 2008
- (3) To estimate the extent to which the official national accounts data understate actual or real production of goods and services.

Relevance of the study

A government's lack of appreciation of the unrecorded economy hinders it from instituting the appropriate macroeconomic policies for optimal economic performance (Thomas, 1999). This is more so since macroeconomic policies are based on national accounts estimates, meaning the omission of some economic activities could lead to wrong policy analysis. Given that estimates in the growth rate of gross domestic product (GDP), consumption, investment and savings among others are biased, it is not difficult to see that the use of standard monetary and fiscal policy instruments will be less effective.

Despite the importance of a good understanding of the size and trends of second economy not as much has been done in study of the subject. What has been done, though, is work in the area of certain sectors of the informal economy, such as the informal financial sector, but again these studies largely consider the nature and characteristics of the sectors. Papers on the informal economy in Ghana also dwell on characterization of the sector but fail to quantify the size let alone estimate the trends. It is this gap in the literature that the present study attempts to fill. It is, therefore, hoped that the outcome of the present study would provide further insights into the trends and size of the informal economy over the years to help figure out the degree of underestimation in the GDP generated over the years. Awareness on the part of policy makers that the formal sector of the economy only forms a small part of the total economy is a necessary pre-condition for the development of appropriate monetary and fiscal policy to meaningfully stimulate broad economic growth.

The rest of the paper is structured as follows. Section Two presents an overview of the informal economy and attempts to characterise the sector. Also presented are selected stylised facts that provide some insights into the evolution of the sector albeit in a descriptive manner. A brief summary of the proximate literature is the subject of Section Three. The theoretical foundation for the estimation is given in Section Four. Also discussed in section four are the relevant data issues considered in the analysis. Section Five presents the concluding remarks and policy implications from the work.

2. The informal economy in Ghana

In this section, the paper defines and outlines characteristics of the informal economy. Drawing on primary data collected over the years on the labour force absorption rates, we make some inferences regarding trends in employment, both in formal and informal sectors of the economy. Though some of the data are quite dated, they provide a useful insight into trends in the employment role played by the informal sector. Also discussed in this section are trends in notes and coins with the non-banking public with respect to a selected number of monetary aggregates.

Definition of the informal economy

The initial challenge that has to be addressed in measuring the part of a country's GDP that is not accounted for in official GDP estimates is its definition. Informal economy is broadly defined, resulting in its having several synonyms². The definition adopted for a particular study is chosen to fit the interest and methodology of the measurement chosen. . Chiumya (2007), quoting Tanzi (1982), makes an interesting observation. Chiumya (2007) argues that a careful review of the literature indicates that for authors who are interested in tax evasion the informal economy may be concerned with all income that goes unreported to the tax authorities. The activities generating these incomes may be either legal or illegal. On the other hand, for papers interested in the validity of the national account figures the emphasis is on the relationship between the measured size of the economy and the true size of the economy (Tanzi, 1982). Given the objectives of this paper, the definition of the informal economy used here is associated with the latter.

One other important feature of the various definitions is that despite the varying interests regarding the study of the informal economy, it can be asserted that the existence of the phenomenon represents a sub-optimal allocation of resources. And that a large and growing informal economy suggests a shrinking potential tax base while at the same time pushing up public services consumed by both the first (official) and second economies.

In the present study, the informal economy is defined as small and large scale sectors, largely unorganized but economically productive which are usually slow to adapt to modern corporate practices. For most of these businesses there is little or no difference between the businesses and the personalities involved. The sector includes a large number of self-employed people who are engaged in agriculture and non-agriculture activities. Indeed, the agricultural sector, which is characterized by small scale holdings, is essentially part of the informal economy.

Characterization of the informal economy in Ghana

The informal economy in Ghana comprises essentially the rural agricultural sector, small-scale gold and diamond mining activities (locally known as galamasey), small time garage operators and their repair shops. The non-agricultural informal operators are mostly located in the major urban centres in the country. Other notable operators in the informal sector include shoe-manufacturing businesses, which adapt simple technologies to the design and production of footwear which sometimes happens to be imitations of popular foreign brands mostly Italian.

The informal sector also includes private lotto operators (known in local parlance as banker-to-banker operators), private arms manufacturers in the Volta region of Ghana and a wide category of

petty traders, including street vendors, hawkers as well as market traders who sell anything from groceries to building hardware. Occupational groups engaged in commuter services in the major cities of the country (trotro), private taxi services and small time loan and saving scheme operators (susu) etc. The retail sector in the country is dominated by the informal sector; this phenomenon of an emasculated formal retail sector of the economy is a further demonstration of the extent and depth of the informal or informal economy in the country.

Box 1. Some of the informal organizations in Ghana

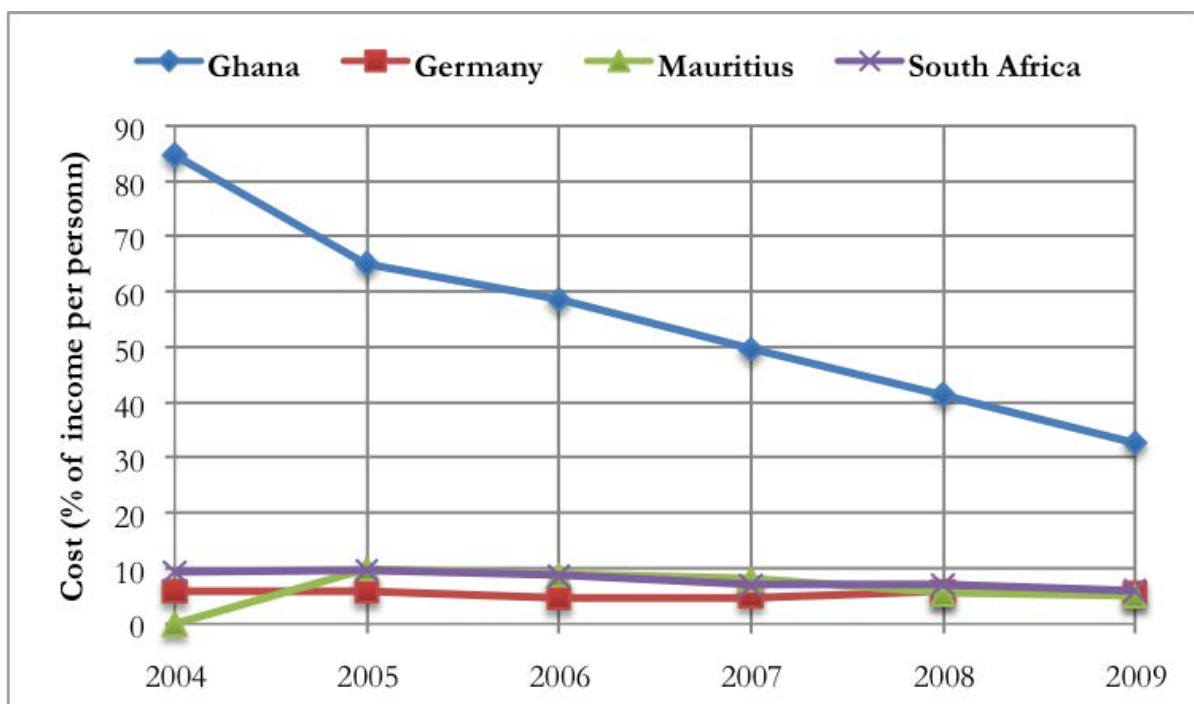
1. Ghana Private Road Transport Union (GPRTU)
2. Ghana Cooperative Transport Society (GCTS)
3. Progressive Transport Owners Association (PROTOA)
4. Ghana National Chemical Sellers Association
5. Ghana National Tailors and Dressmakers Association
6. Musician Union of Ghana
7. Phonogram Producers Association
8. Ghana Tape Recorders Association
9. National Drinking Bar Operators Association
10. National Garage Owners Association
11. Greater Accra Second Hand Spare Parts Dealers Association
12. Refrigeration and Air-Conditioning Workshop Owners Association
13. Chop Bar Keepers and Cooked Food Sellers Association
14. Hair Dressers Association of Ghana
15. Susu Collectors Association
16. Traditional Healers, Fetish Priests, Mallams and Drug Peddlers Association
17. Sandcrete Block Manufacturers Association
18. Ghana Gold and Silver Smiths Association
19. Second Hand Clothes Dealers Association
20. Radio and Television Repairers Association
21. Ghana Cooperative Distillers Association Ltd
22. Corn mill Owners Association
23. Licensed Diamond Winners Association
24. Ghana Association of Private Sports Papers
25. Ashiaman Livestock Breeding and Traders Association
26. Butchers Association
27. Ghana Livestock and Meat Marketing Association
28. Video Operators Association
29. Ghana Private Schools Association
30. Day Care Centres Association
31. Akpeteshie* Distillers Association
32. Second Hand Car Dealers Association
33. Ghana Union Traders Association (GUTA)

Source: Aryee, 2007.

Causes of the informal economy

Three main reasons are advanced in the literature to explain the existence and growth of the informal economy. These are perceived tax burden, restrictive business regulatory environment and lack of service delivery by government in business support (Chiumya, 2007; De Soto, 1989). The World Bank's Cost of Doing Business Survey provides valuable insights into Ghana's economy. For example, measured as percentage of income per capita, the cost of starting a new business in the formal economy comes out as high. While the cost has fallen over the years, from a high of 85% of GDP per person to a low of 33% of GDP per person, it is still very high when compared with the costs in Mauritius, South Africa and Germany (see Figure 1).

Figure 1. Cost of doing business, 2004 - 2009



Source: The World Bank (2010).

However, empirical evidence suggests that large tax burden and social security contributions are the most important factors that drive most businesses into the informal economy (Schneider, 2004 and 2005). Sookram et al (2008) identify reasons that facilitate the growth of the informal economy in Trinidad and Tobago. Sookram et al (2008) suggest that households tend to move into the informal economy because they believe that they live in a regime of high taxes and low incomes and tax evasion would not be detected. It is further argued that the perception of risk of detection is also underscored by the income and government bureaucracy in the formal sector.

Other studies such as Pretap and Quintin (2006) assert that the size of the informal economy is strongly associated with the level of economic development, the tax burden and the rule of law. In their study, Dabla-Noris et al (2008) identified factors explaining the growth of the informal economy. Among these factors are the quality of legal framework, regulatory environment and financial constraints. However, the impact of the identified factors was moderated in the presence of a well-functioning legal system. The study also argued that smaller firms were more likely to be operating in the informal economy as compared with bigger businesses.

In Ghana, a large number of factors are identified as explaining the seemingly large informal economy. In an undated study by the World Bank, nine reasons were put together as the main determinants of the informal economy in the country. While some of the reasons are related to what has been identified in other countries others are yet to be empirically tested. The factors identified are:

- (1) Non-deterrent penalties.
- (2) High rate of returns on illegal and underground operations.
- (3) Low confidence in the monetary system. The demonetization undertaken in the early 1980s and the associated lost of huge cash balances in the banking system continue to plague the economy as some businesses continue to conduct heavy cash transactions outside the banking system. Again, the relatively high inflation rates in the past (Ocran, 2007) has engendered a high transaction motive for demanding cash.
- (4) High level of illiteracy and skills deficit particularly on the part of farmers and small scale operators makes it difficult for them to keep their books. Thus, the illiterate find it convenient to operate in the informal economy. This situation is further aggravated by the fact that in most occasions the skills required to operate in the formal economy are not provided in the formal schooling system. It has even been argued that most school dropouts end up in the second economy often hawking, street vending or in occupational groups such as private unregistered taxis, urban commuter services, way-side carpentry, shoe-making etc.
- (5) Poverty: Sometimes people are driven to the informal economy out of poverty and not because they want to evade taxes. Thus, the low level of capital requirement in the informal economy attracts people who seek some measure of income for survival.
- (6) The labour-intensive nature of most informal economy activities and the relative simple technologies in use makes the sector attractive for a labour intensive economies such as that in Ghana
- (7) Pursuit by the system: It is said that the revenue agencies do not pursue the sector vigorously as they do not yet understand its immense revenue potential.
- (8) Limited capacity of the formal sector to employ makes the informal economy an attractive avenue for making some income for survival
- (9) Ease of entry and exit: The weak regulatory framework and the low capital demands make it possible for people to move in and out of the sector with great ease.

In summary, while there are a myriad of factors that drive the informal economy, taxation is a common thread that runs through all the papers that purport to ascertain the factors that determine the size of the informal economy. It may also be concluded that, the prohibitive cost associated with registering a business in Ghana partly explains why entrepreneurs or start-ups decide to remain in the informal sector of the economy.

Evidence from labour absorption rates

While it is evident that the labour force absorption rate in the formal sector of the economy has been declining steadily between 1960 and 1990, the informal sector appears to be providing an avenue for a vast majority of the labour force (see Table 1). A review of reports of the Ghana Living Standards Survey also suggest that formal sector employment has declined considerably from 21% in 1987 to 14% by 2000. On the contrary, employment in the informal economy has increased over the same period to provide opportunities for those who fail to make it into the the formal labour market.

Table 1. Formal sector employment, 1960-1990 (thousands)

Period	Private Sector	Public Sector	All Sectors	Period change
1960	149	184	333.00	
1965	118	278	396.00	19%
1970	110	288	398.00	1%
1975	137	318	455.00	14%
1980	46	291	337.00	-26%
1985	67	397	464.00	38%
1990	40	189	229.00	-51%

Source: Canagarajah and Mazumdar (1997), pp8.

Table 2. Labour absorption patterns (Share of total employment), 1987 – 2008

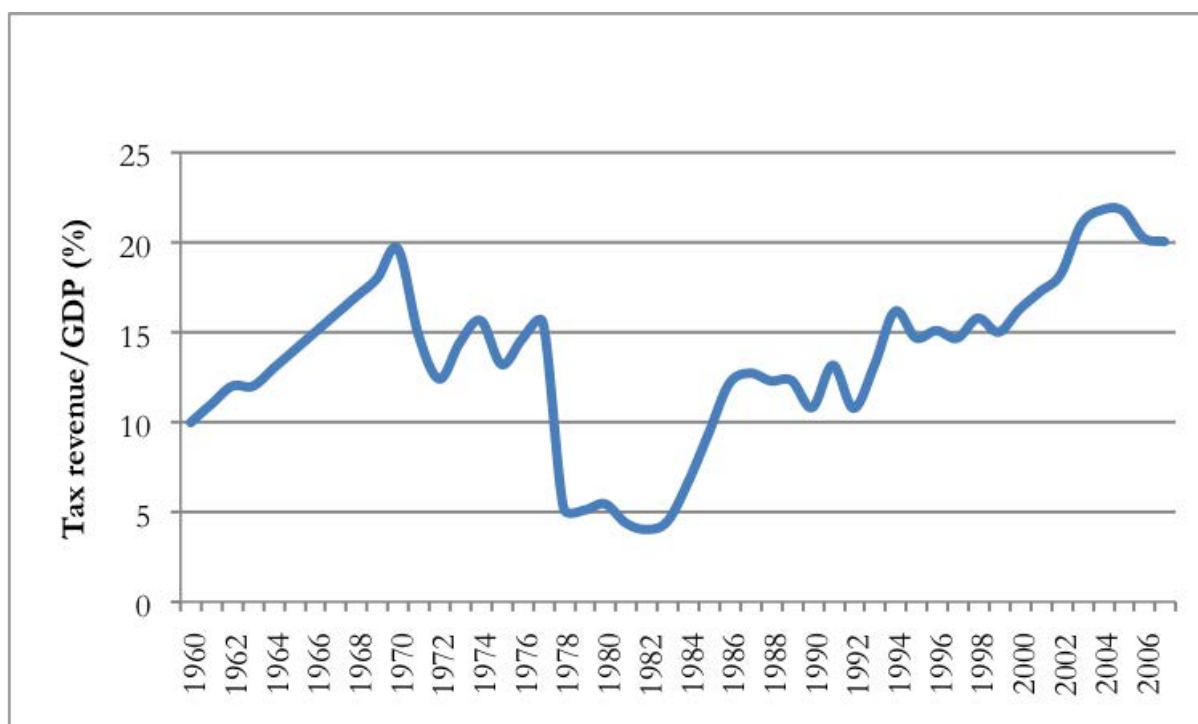
Main Employer	1987	1995	2000	2008
Government	14	7	6	28
Private formal	7	5	8	19
Private informal/Self employed	71	69	86	48
Others	8	20	0	6
Total	100	100	100	100

Source: Ghana Statistical Service, Ghana Living Standards Survey, Reports for Round 1- 5.

* Include civil service, other public service and parastatals.

Evidence from tax burden and compliance

This part of the study attempts to provide descriptive evidence to explain, albeit in an indicative manner, the role of the tax burden in explaining the upward trend in the informal economy as well as the scale of tax avoidance. A cursory look at Figure 2 suggests an upward trend in the size of the tax burden in Ghana over the four decades under consideration. From just around 10% of GDP, tax revenues peaked at 20% in 1970 and steadily fell to a low of 5% in the early 1980s, when the economy was in a prolonged recession because of structural bottlenecks. An upward trend in the size of the tax revenues as a share of GDP began from the middle of the 1980s, increasing steadily to an all time peak of 22% in 2005.

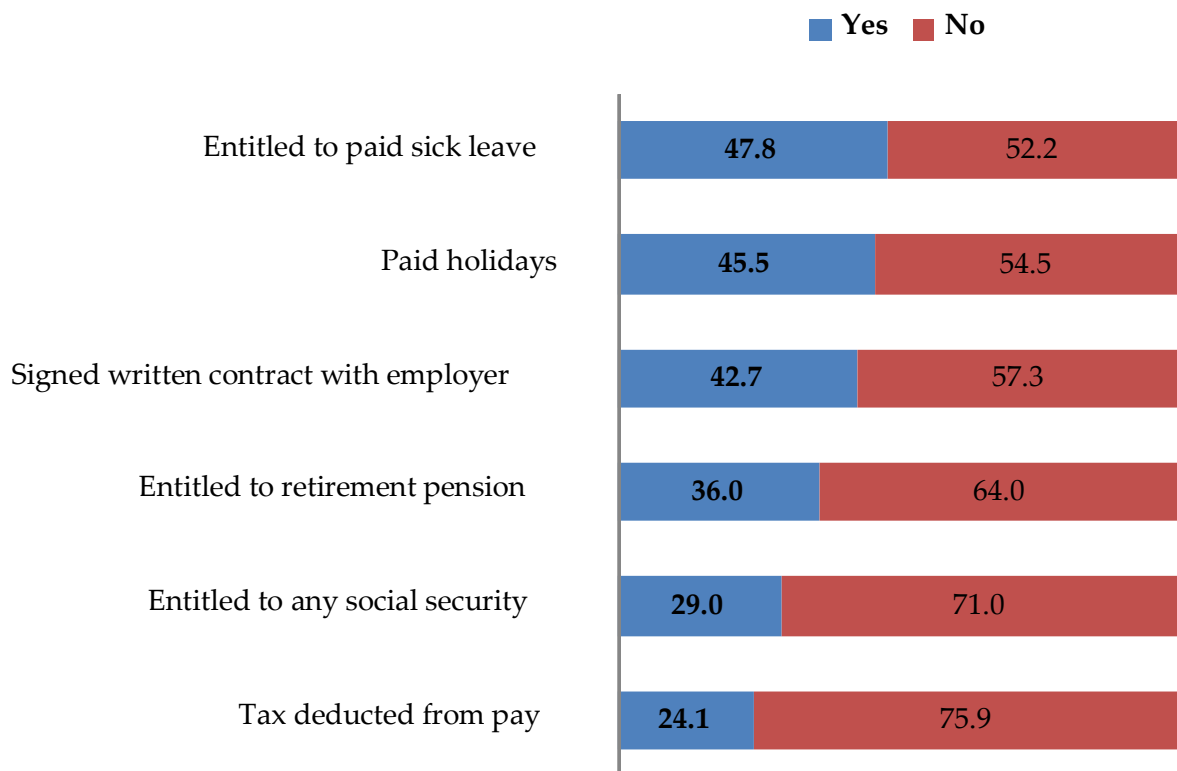
Figure 2. Trends in tax burden, 1960 - 2007

While there is paucity of data on the exact size of the tax-paying population as a proportion of the employed in Ghana, anecdotal evidence from various sources suggests that only a fraction of the working population pay taxes on their incomes. For example, the national treasury in the 2007 Budget statement expresses its worry with the following statement:

“... One of the major challenges facing Ghana is how to broaden the tax net. Out of a pool of 5 million potential taxpayers, only 1 million are paying income taxes. Apart from employees on the Government payroll, only about 350,000 employees in the private formal sector pay taxes. ... the fact that the vast majority of Ghanaians are in the informal sector makes revenue generation a daunting task. (Republic of Ghana 2006: 296).

In order to underscore the gross underestimation of national accounts as a result of the existence of a huge undocumented economy, we examine several questions in the 2006 Ghana Living Standards Survey that probe the level of tax compliance and the degree of formality in wage employment.

Figure 3. Working conditions regarding employees in both public and private organizations



Source: Data for chart was obtained from GSS (2008)

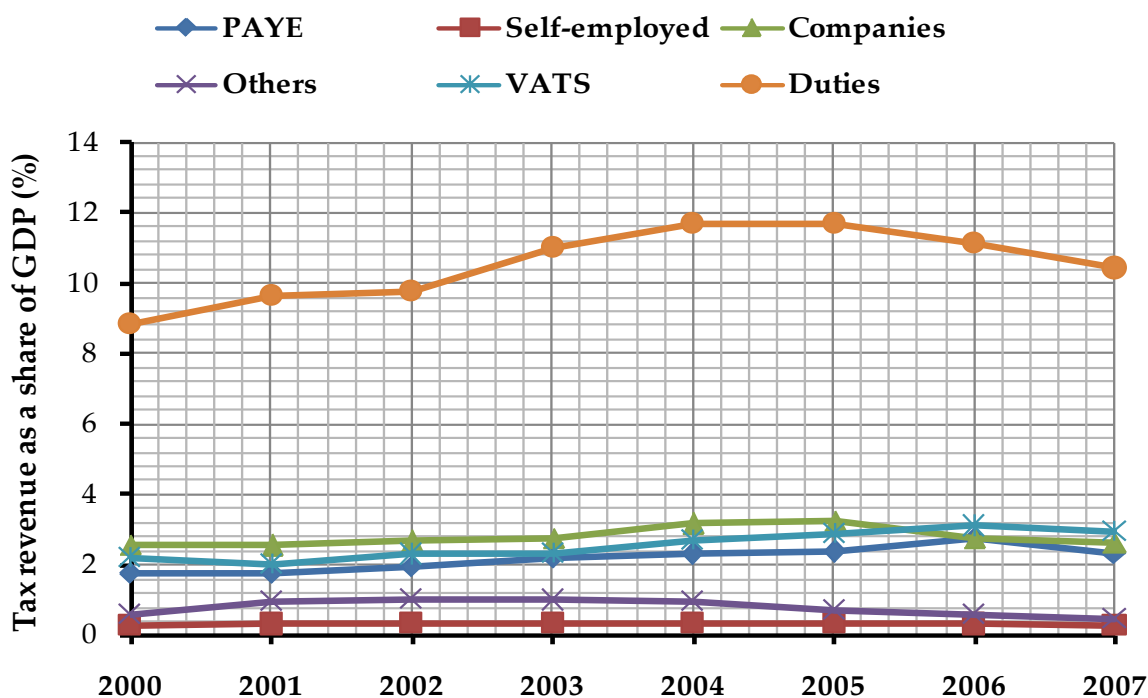
The findings suggest that only one out of four in wage employment complies with the Pay As You Earn (PAYE) tax requirement. Thus, 76% of workers do not pay tax on their earnings (see Figure 3). The survey also shows that 29% of workers are not offered social security. As a further demonstration of the size of the informal economy, the study indicates 57.3% of those employed have no signed written contracts with their employers. These findings demonstrate the pervasiveness of the informal economy.

Composition of taxpayers

The structure of the tax revenues can also provide some insights into the extent of informality. Consequently, we review the tax revenue structure between 2000 and 2007. The analysis suggests that taxes as percentage of GDP stood at 15.5% in 1977 before dropping sharply to 5.2% by the end of 1978. The figure remained less than 10% until 1986 (Owusu-Afriyie and Ocran, 2009). The proportion has grown progressively to around 20% since 2000. While personal income tax doubled from a paltry 1.3% of GDP in the 1970s to 3.2% in 2004, it is still very low. A closer review of the composition of tax receipts for the past eight years reveals an interesting pattern.

For example, while a large segment of the labour market is characterized as self-employed (i.e., about 5 million), their contribution to the national treasury in the form of tax as a share of GDP amounts to 0.5% while the about one million taxpayers in the formal sector contributes about 3% of GDP. Thus, despite the fact that the self-employed make almost 80% of the employed, they contribute less than one-fifth of the amount paid by those in formal employment (see Figure 4). These figures compare poorly with other African countries such as South Africa, where personal income tax contribution to total revenue is twice the level in Ghana (SARS, 2006).

Figure 4. Composition of tax revenue in Ghana, 2000-2007



Source: Data for chart was obtained from data files of the Revenue Agencies Governing Board, Accra.

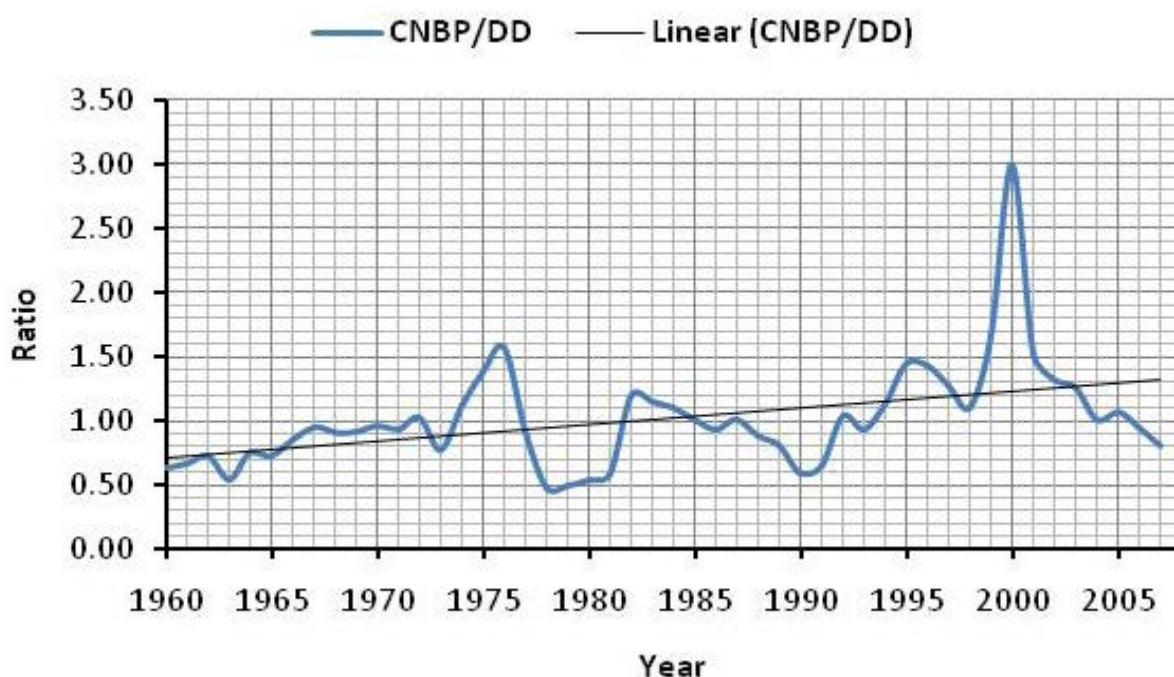
Evidence from narrow money

The historically high inflation rate experienced in Ghana over the past three decades particularly during the period 1970-1990, reinforced a high transaction motive for holding money. Over and above the question of high inflation expectation, the political instability associated with the two decades preceding the 1990s together helped to erode the population's confidence in the monetary system, particularly businesses in the informal sector and the self-employed. For example, to deal with the high inflation in the early 1980s, the military government then pursued a demonetization programme that disproportionately affected people with huge cash balances in the banking system. These experiences adversely affected

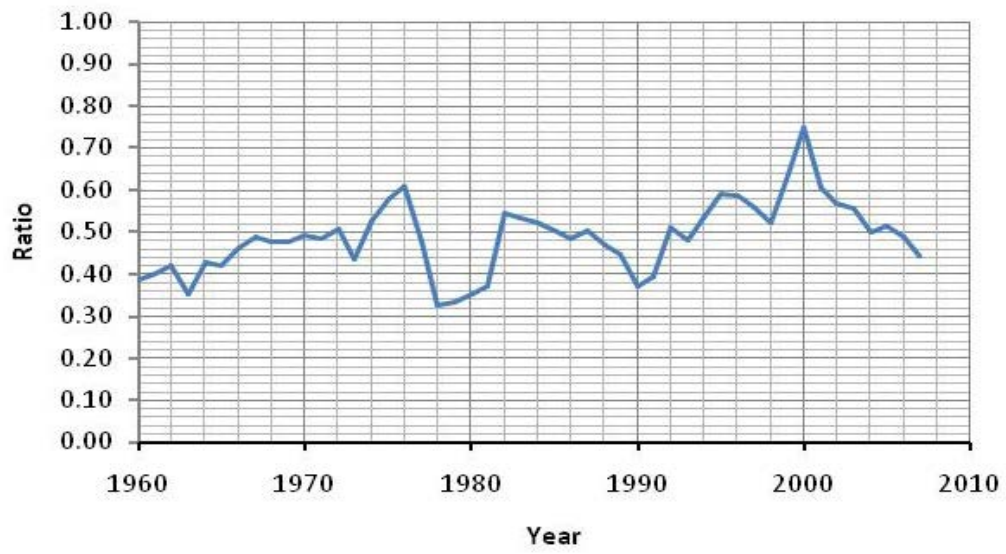
the confidence in the monetary system, leading to the habit of conducting heavy cash transactions by businesses outside the formal banking system. As a further attempt to shed light on the evolution of the informal economy we assess trends in selected monetary aggregates especially cash holdings with respect to other aggregates or components of money supply since the 1960s.

A cursory look at the ratio of currency with the non-bank public (CNBP) to demand deposit (DD) clearly shows an upward sloping trend (Figure 5). However, the period 1970-1990 saw a high degree of instability. Nonetheless, 2000 recorded a phenomenal spike. It may be argued that the crash of the cedi/dollar exchange rate and the relatively high inflation, recorded in that year may have caused currency substitution among others and a high transaction motive for holding money. Given that the increases in the ratio of CNBP/DD occurred over a period of financial innovations such as the introduction of automated teller machines (ATM), it stands to reason that increases in the size of the informal economy probably account in part for the upward trend.

Figure 5. Trends in currency ratio, 1960-2007



When the amount of currency held by the non-banking public is considered as a proportion of narrow money in the economy again, we see a somewhat upward trend with a notable spike in 2000. Incidentally, like the earlier argument, the spikes coincide with serious challenges with inflation among others (See figure 6). To underscore the earlier assertion of the increased used holdings of notes and coins, the ratio of currency to narrow money always shows an upward trend. In most developing economies this ratio tends to fall with time, largely as a result of financial innovations among others. Because of the peculiar situation of Ghana, given the growth in the informal economy we are rather seeing an upward trend.

Figure 6. Ratio of currency held by the non-bank public to the narrow money, 1960 - 2006

3. Literature review

The literature related to the estimation of the size of the informal economy may be classified under three broad approaches: direct, indirect and model. It is also important to note that under each of the broad categories a number of methodologies can be identified. Nonetheless, a careful consideration of the literature suggests that the indirect approaches are by far the dominant for estimating the size of the informal economy. The rest of this section provides summaries of the salient features of the various methodologies.

Direct approach

The direct approach uses surveys of populations or samples with the help of structured questionnaires. The surveys are based on voluntary responses or tax auditing and other compliance methods. The surveys usually provide point estimates hence they are useful in estimating changes in the size of the informal economy. It is also argued in the literature that since surveys are by nature unable to cover all sections of a given population, and more importantly because of the voluntary nature of the response elicitation procedure, the outcomes may only provide lower bounds of the possible size of a given informal economy. The perceived weakness notwithstanding, it is believed that surveys that seek to estimate the unrecorded economic activities tend to provide certain nuances and insights that one cannot possibly obtain from indirect estimation procedures. For example, such surveys can provide a rich amount of data on the structure and composition of the labour force in the informal economy (Schneider and Enste, 2003).

Indirect approach

The indirect approaches are usually referred to as indicator approaches. These approaches are mostly macroeconomic in character and tend to use indicators that contain information about how the unrecorded economy evolves over time. The primary assumption is that the indicators have “traces” of the development of the informal economy that can be used in estimation. Four main methods are described under the indirect approach.

Discrepancy methods

This set of methods uses the discrepancies in labour and national account statistics in estimating the size of the informal economy. For example, in national accounting the income measure of Gross National Product (GNP) is expected to be equal to the expenditure measure of GNP if the independent estimate of the expenditure side of national accounts is available, however, this is usually not the case. The discrepancy between the two measures is assumed to represent the size of the informal economy. Critics of this approach have argued that the estimates derived from the discrepancy between expenditure and income measures of GNP is crude and of little reliability (Schneider, 1986). One of the reasons given to discredit the approach is that factors such as measurement errors may account for the discrepancies.

The discrepancy between official and actual labour force also constitutes another approach. The basis for this approach is that a fall in the labour participation rate in the official economy can

be seen as an indication of increased activities in the informal economy because the relationship is assumed to be important over time. A decreasing official labour participation rate is considered as an indication of increasing level of unrecorded economic activities *ceteris paribus*. The disadvantage of this approach is that other reasons could account for the differences in the labour participation rate. Again, it is also possible for people to be engaged in both sub-economies (informal and formal) at the same time. Therefore, the difference between the officially measured and actual labour force participation rate may give a poor estimate of the informal economy.

Physical input method (indicator method)

The physical input method assumes that electricity consumption is the single best physical indicator of overall economic activity. The proponents (Kaufman and Kaliberda, 1996) of the physical input method argue that the difference between official GDP growth and growth in electricity consumption is accounted for by growth in the informal economy. One of the perceived weaknesses of this approach is the point that electricity supply in most developing countries is rationed. Again, it is also argued that a good proportion of the informal economy does not necessarily use electricity in its activities, therefore, the estimates generated by the method may be a gross underestimation of the size of the informal economy.

Monetary approaches

The other general assumptions underlying the monetary approaches is that the demand for cash in the official economy is a stable function of observed macroeconomic variables (i.e., price level, real incomes and interest rates) and most importantly, the fact that the demand for cash is a stable function of tax rates and other variables that influence the size and growth of the informal economy. One of the criticisms is that cash is not used in paying for all transactions in the informal economy. However, Isachsen and Strom (1985) suggest that cash is used to pay for a substantial part (i.e., 80%) of the volume of transactions in Norway. In a developing country like Ghana with a poorly developed financial system, it is envisaged that the use of cash may be higher.

Gutmann method

The Gutmann method is based on four main assumptions, namely; (1) high taxes and the business regulatory framework are the main causes of the emergence of an informal economy; (2) only cash is used in the conduct of business transactions in the informal economy; (3) the ratio of cash to demand deposits (currency ratio, C/D), is solely driven by changes in taxes and the regulatory framework, and (4) there was a given point in time where no informal economy existed. Consequently, it is assumed that the currency ratio of that period should have remained unchanged and that any change is only due to changes in the level of tax and regulations. Thus any increases in the currency ratio can be directly attributed to the additional cash being used in the informal economy activity. Most importantly, the Gutmann method also assumes that the income-velocity of circulation, v , is the same for both the official and second economies. Therefore the size of the informal economy is v multiplied by the extra cash (Guttmann, 1977). One major critique of this method is that the approach fails to control for financial innovations in a given economy as these can alter the ratio of currency in circulation to demand deposits (Shabsigh, 1994).

Feige method (transaction method)

The other monetary approach was developed by Feige (1979). The analytical framework is based on the Irving Fisher's standard equation of exchange related to the quantity theory of money. The

approach — often described as the transactions approach — unlike the Gutmann method, argues that in addition to cash holdings the players in the informal economy also use other financial instruments such as cheques and bills in conducting their transactions. Using the total volume of transactions and income in the economy Feige (1979) proposes an equation for estimating the size of the informal economy. Given that total transactions in the economy include intermediate and second hand goods while GDP only covers final goods and services, the assumption is that the difference between the GDP figures and the total volume of transactions can be attributed to the informal economy. Like the Gutmann method, Feige's is also based on the assumption of constant currency ratios even over the long term but, more importantly, the difficulty in getting figures on the total volume of transactions make the implementation of the approach quite a challenge. One of the many studies that use this approach is Hill and Kabir (2000), who estimate the size of the underground economy in Canada using a variation of the Feige model. The paper controls for financial innovation and demonstrates how recent innovation in the financial sector has affected the holding of currency in Canada.

The Tanzi method

Tanzi's approach, which is a currency demand model, is the most popular method in the literature for estimating the informal economy. The method draws heavily on Cagan (1958) who examines the demand for money. Tanzi (1982) modifies the demand for money equation by emphasising the relationship between tax evasion and currency use. The thrust of the approach is the assumption that the currency ratio is affected largely by both legal and illegal factors. The second assumption is that the velocity of money in both the official and second economies is the same. The model also assumes that the informal economy's existence is as a result of the high tax burden. The informal economy is generated by first estimating the currency equation with the tax variables and then estimating the same equation while imposing a zero tax rate. The difference between the two equations represents the currency in circulation in the informal economy. The size of the informal economy is obtained by multiplying the velocity of currency in the informal economy (which is the same as that in the official economy) with the volume of currency in the informal economy. Like the other methods under the monetary approaches, the currency method has attracted a number of criticisms.

Some of the identified weaknesses associated with the currency approach are the assumption that the velocity of currency in the informal economy is the same as that in the official economy. Again, others find it difficult to accept that only the tax variable is deemed to drive the informal economy. On this score, Schneider (1994) cites a number of studies to support the argument that the tax variable is by far the most important variable that determines the size of the informal economy. Bhattacharyya (1999) all also addresses the criticism of the Tanzi approach. The criticism regarding the currency demand method notwithstanding, there has not been any better way of estimating the informal economy empirically. What has happened, though, is the emergence of various variants of the Tanzi method (Chiumya, 2007). The Tanzi approach is deemed superior to Gutmann's because constancy in the currency deposit ratio and a base year is not assumed (Faal, 2003).

Model approach

A drawback of the indirect approaches is the absence of a formal model "theory" (Thomas, 1999). In a bid to address that weakness, the model approach was proposed; it is based on the assumption that the informal economy can be seen as an "unobservable variable" which is influenced by a variety of causes (tax burden, regulation and high transaction costs est.). These models use structural equations to represent the link between the observed indicators and their causes. Joreskog and Goldberger (1975) designed the Multiple Indicators Multiple Causes (MIMIC) model. Some of the recent studies that use the MIMIC model are, Dell Ano and Solomon (2008) for the US, Brambila (2008) for Mexico and for Spain, Alanon and Gomez-Antonio (2006). The model has not been used thus far in developing countries because

of the paucity of data. Indeed, even where the data is available they are usually unreliable. Schneider (2004) also points out a number of shortcomings in these models. For example, he argues that the estimated coefficients are not stable with respect to changes in sample size and alternative specifications.

The literature on Ghana

There have been a few studies on the informal economy in Ghana. These papers have largely been concerned with only the characterization of the informal economy (see Aryee, 2007; Gockel, 1998). While these studies assert that, indeed, the informal economy is quite sizeable, they are mostly short on empirical estimations that attempt to identify the size and trends. In most instances, the arguments are anecdotal. The only empirical study thus far is the work of Schneider (2005) which estimates the informal economy of 105 developed and developing countries, including Ghana. In the said study, the author comes up with a point estimate for 1999/2000 so one is unable to ascertain trends in the size of the informal economy over the years.

The present paper attempts to fill this gap in the literature. In order to make it possible to compare the outcome with studies on other countries in Africa, we adopt the Tanzi approach (Bagachwa and Naho, 1995; Schneider, 2005; Saunders and Loots, 2005; Chiumya, 2007).

4. Methodology

Analytical framework

Considering the strengths and weaknesses of the various approaches discussed in the previous section, we adopt the currency demand approach for three reasons. First, it can be assumed that a greater proportion of the economic agents in the informal economy use cash for almost all their financial transactions. Secondly, since the currency demand approach is the method that has been mostly used in the literature, a meaningful comparison of the informal economy of Ghana with other African countries³ can therefore be made using the currency demand approach. Lastly, data availability supports the choice of the currency demand approach for the proposed study. The analytical framework draws on previous studies (i.e., Tanzi, 1982; Isachsen et al, 1982; May, 1985; Maliyamkono and Bagachwa, 1990; Bagachwa and Naho, 1995; Saunders and Loots, 2005). Following the studies we use the standard ordinary least square approach, the strength here being that the estimator allows for a step-wise analysis of the explanatory variables.

The general model for estimating the size of the informal economy is essentially an augmented demand for money equation; it is written formally as;

$$y = f(x_d, x_p, v) \tag{1}$$

Where, y denotes the proportion of currency in circulation outside the banking sector in relation to money supply in the economy; x_d represents a vector of variables that explains changes in demand for currency; x_p denotes a vector of variables that constitute proxies for variables that stimulate the level of activity in the informal economy; and v , the stochastic disturbance term. It is understood that when the variables that drive the informal economy assume their lowest possible historical values, the regression equation produces indicative estimates of the demand for currency by the formal economy. It is, therefore, possible to measure the currency holdings with or without the informal economy. The difference between the two scenarios provides an estimate of the currency holdings in the informal economy. When this is multiplied by income velocity of money, the size of the informal economy can be inferred.

The model

The chosen model, which is a variant of Tanzi's model, makes two key assumptions. Firstly, we assume that transactions in the informal economy are conducted with cash. Secondly, the velocity of money in the informal economy is the same as that in the formal economy. The theoretical framework that underpins the demand for money equation in the present paper draws on Keynes's liquidity preference theory. Consequently, the model includes variables that account for the three motives of holding money; these variables are then augmented by another set of variables that stimulate the growth of the informal economy. The demand for currency for Ghana may be written as;

$$\ln \frac{CU}{DD} = \alpha_0 + \alpha_1 \ln Y + \alpha_2 \ln I_t + \alpha_3 \ln E + \alpha_4 \ln T_t + \alpha_5 \ln B \text{Dummy} + \alpha_6 T_t + \varepsilon_t \quad (2)$$

Where, Cu/DD = ratio of currency holdings by the non-bank public to demand deposit; Y = income; I = interest rate; E = cedi/US dollar exchange rate; B = a dummy for quality of the business regulatory environment; T = tax burden trend; and ε = the error term.

The a priori assumptions governing the relationship between the dependent and the independent variables are as follows: relationship between currency holdings and income demand is assumed to be a positive one, thus currency holdings increases with increases in income. An increase in nominal interest rates is expected to lead to portfolio adjustment in favour of other financial assets such as saving accounts, hence currency holdings is inversely related to nominal interest rates. Depreciation of the cedi is also expected to influence real currency holdings positively. The fear of capital losses due to depreciations will cause the public to substitute their financial assets denominated in domestic currency for more stable foreign denominated ones such as the US dollar.

We also include a dummy variable, B to account for changes in the business regulatory environment that reduces regulatory arbitrage by economic agents in the informal economy. It is assumed that unfavourable business regulatory environment increases the transaction cost of formalizing one's economic activity hence people resort to the informal economy sometimes just to reduce the cost of conducting their operations. The assumption here is that dictatorial governments stifle business activity while democratic governments ease regulations to facilitate formalization. Consequently, a dummy variable that assumes the value of one and nought, is used to account for democratic and dictatorial regimes, respectively. The time trend variable is included to account for modernization of the economy as well as financial innovations particularly in the banking sector; these developments are assumed to support the formalization of the informal economy.

An important assumption in the modelling effort is that the variables, E ; B , T and $Trend$ account for the currency holdings required to run the informal economy. In order to lessen the tax burden as a result of increases in tax levels, the public may take some of their economic activities into the informal economy. Given that the informal economy is largely cash based' tax rate increases will lead to increase in real currency holdings.

The velocity of money, V , in this study is defined as the ratio of income, Y , to quantity of narrowly defined money supply, M . One other assumption here is that demand for money in Ghana is stable. While one is not sure whether the demand for money in the sample period chosen is stable, Andoh and Chappell (2002), while estimating the demand for money in Ghana for the period 1962-1996, conclude that there appear to be some evidence of instability in the demand for money equation due to the economic reforms pursued in the early 1980s. We, therefore, attempt to control for this with a dummy to account for type-of-government/business regulatory environment. The assumption here is that while the pre-structural adjustment period (i.e, before 1983) was characterized by restrictive business regulatory framework, the post-reform period (i.e., after 1983) saw a gradual improvement of the business regulatory environment through a number of legislative reforms and administrative procedures. Therefore, we assign the dummy a value of 0 in the pre-reform period and 1 in the second period. This approach was adopted because of the absence of a meaningful series spanning the data period that reliably captures the state of business regulatory environment.

Data issues

Time series data of annual frequency covering the period 1960-2007 were used. The data on currency holdings (cu), defined as notes and coins with the non-banking public, was obtained from data files of

the Bank of Ghana. Following earlier studies, the currency holdings was measured as a ratio of narrow money. Two other definitions of currency holdings were also considered: real currency holdings – currency holdings deflated by the price level; and currency defined as a ratio of notes and coins to the demand deposits (*dd*).

The exchange rate (*e*), is given as the bilateral nominal cedi/US dollar exchange rate. The 90-day Treasury bill rediscount rate was used as a proxy for interest rate, (*r*). The real income variable is used is the GDP per person (*y*) in constant US dollars. The consumer price index (*p*) represents the price level in the estimations. The money supply variable is narrowly defined money supply (*m*). The tax variable is defined as, tax revenues as a share of GDP. All the variables entered the models in logarithmic forms.

Descriptive statistics

The three currency holding definitions – real currency holdings (ratio of currency to price level), ratio of currency to demand deposit, ratio of currency to narrow money – by and large appear to move together. However, before 1983, the three series followed different time paths. Since the early 1980s, there has been a steady rise in currency holdings, (see Figure A1). While currency as a ratio of narrow money has seen a modest growth, real currency holdings has recorded a relatively steep rise. The depreciation of the cedi in terms of the cedi/US\$ exchange rate has been quite steep in the past two decades. For example, the exchange rate more than doubled over the period 2000-2010 (Figure A2).

Tax revenue as a share of GDP rose steadily from the 1960s and peaked in 1970. It then began to fall until it reached an all time low of just around 5% of GDP in 1979. Tax revenue began a new ascent and reached a new peak of 22% of GDP (Figure A3). The 90-day Treasury bill rediscount rate has moved from less than 10% in much of the 1960s and 1970s to over 40% in 1999. The discount rate began a continual decline to a little above 10% by the 2008 (Figure A4). Income levels in Ghana, like most of the macroeconomic indicators, saw deterioration in the mid-1960s to the early 1980s. Since then, there has been a robust recovery; thus, GDP per person in constant US dollars has been characterized by an upward trend since 1983 (Figure A5). GDP per person in constant US dollars fell steadily from the mid-1970s to the early 1980s. From 1983, GDP person began to rise.

Unit root tests

We also sought to ascertain the stationarity or otherwise of the series. These were examined with the aid of the Augmented Dickey Fuller (ADF) unit root tests (see Table 3). Given the obvious trends in the various series, we tested the hypothesis that each series was a random walk with or without a drift.

Table 3. ADF test results

Variable	Level	First difference
$\ln(\text{cu}/p)$	-2.620	-6.848***
$\ln(\text{cu}/dd)$	-3.404	-3.099*
$\ln(\text{cu}/m)$	-2.560	-3.208*
$\ln e$	-2.067	-3.700**
$\ln r$	-0.597	-6.169**
$\ln t$	-1.646	-6.072***
$\ln y$	-0.014	-5.101***

Note: Critical values; 1% level of significance (***), -4.196; 5% (**), -3.520; 10 percent, -3.192(*).

The test shows that stationarity is attained after first differencing the data series by one.

Empirical results

Drawing on data covering the period 1960-2007, Equation 2 was estimated using the ordinary least squares (OLS) method. With the aid of the general framework provided in Equation 2, we explored the efficacy of various definitions/proxies for the dependent variable, currency holdings with the non-bank public. First, we explored the suitability of currency to demand deposit ratio, and then ran a number of regressions. These outcomes were then compared with estimates from two other models that had real currency holdings (currency holdings deflated by the CPI) and currency holdings as a ratio of narrowly defined money supply. The results of the estimations are presented in Table 4. A cursory look at the regression results suggests that the model with currency to narrow money ratio as a dependent variable outperforms the other two models. Model three, the selected model, suggests that the tax burden and technological change are the most important drivers of demand for currency.

The robustness of the estimated models was ascertained using a number of diagnostic tests. For example, the DW test results suggest an absence of first order autocorrelation in each of the reported models. We also examined the suitability of the model specification using Ramsay's RESET test. The results indicated that models 1 and 2 are mis-specified, as the null hypothesis that the models had no omitted variables were rejected. Using the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity, we could not reject the hypothesis that there was constant variance in the fitted variables of currency to narrow money ratio (the dependent variable for Model 3). We also checked for the presence of ARCH effects with the LM test for autoregressive conditional heteroskedasticity, and this time round no ARCH effects were identified in the models.

In sum, Model 3 had a more superior diagnostics compared with the two other competing models. Consequently, Model 3 was estimating the size of the informal economy in Ghana from 1960 to 2007. The Chow Breakpoint test was used to assess the stability of the model using 1972 and 1981 as breakpoints because of economic difficulties and instability in those years but the outcomes were not significant.

Table 4. Results of OLS estimations

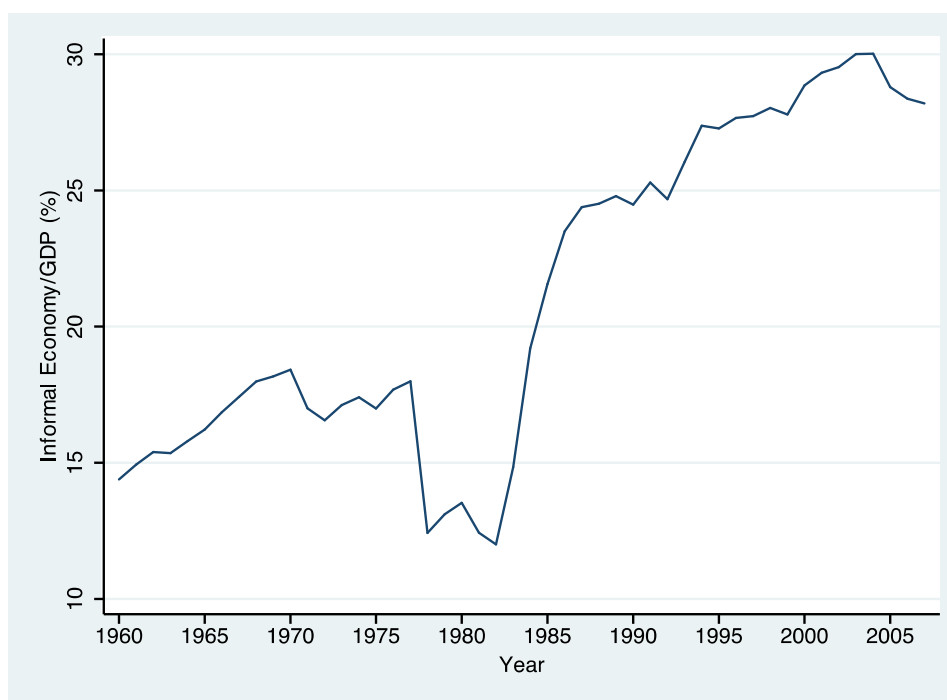
Variables	Model 1 DL [Cu/P]	Model 2 DL [Cu/DD]	Model 3 DL [Cu/M]
Constant	0.350 0.391 [0.90]	1.146 0.582 [-1.97]	-0.438 0.302 [1.45]
Cedi/US\$ Exchange rate	-0.029 0.466 [-0.06]	-2.951 0.694 [4.25]	0.539 0.360 [1.49]
Tax revenue	-0.659 0.642 [-1.03]	-2.828*** 0.956 [-2.96]	1.413*** 0.497 [2.84]
Interest rate	0.135 0.362 [0.37]	-0.479 0.539 [-0.89]	-0.369 0.280 [-1.32]
Income	-9.627 11.001 [-0.87]	13.927 16.39 [-0.85]	-8.289 8.525 [-0.97]
Dummy	-0.144 0.382 [-0.38]	-0.689 0.569 [-1.21]	-0.093 0.295 [-0.32]
Trend	0.016 0.025 [0.65]	-0.003 0.036 [-0.08]	-0.069*** 0.019 [-3.60]
Adj. R ²	-0.18	0.74	0.87
Root MSE	0.21	0.32	0.17
F (6,10)	0.59	8.54***	8.62***
DW (7, 17)	2.13	1.55	1.52
Breusch-Pagan / Cook-Weisber test $\chi^2(1)$	6.68*	2.38	0.25
LM Test for ARCH	0.09	2.45	1.47
Ramsay RESET test	3.13*	9.66**	2.20

Estimation of the informal economy

The technique used in generating the size of the informal economy is as suggested by Tanzi (1983). We first obtain an estimate of the total real currency holdings (TC) as predicted by Equation 2. The predicted currency holding in the informal economy (TCS) is then obtained by dropping the variables that stimulate currency holdings in the informal economy, i.e., tax rate and the exchange rate. The difference (TC-TCS) constitutes the currency holdings in the informal economy. When the transaction velocity of money multiplies by V ($V=GDP/M$), we obtain an estimation of the size of the informal economy.

The preliminary estimates suggest that the informal economy as a ratio of the official GDP has been variable over the study period. What is obvious though is that the size of the informal economy in Ghana as a ratio of the official GDP has doubled from the levels seen in the 1960s. For example, from 14% of official GDP, it increased slowly to 18% in 1968. For the next 10 years, it remained fairly stable. The size of the informal economy dropped to a low of 12% of GDP by 1978. The figure again increased gradually until it hit a high of 19% by 1984. Since then it has been on the rise. The informal economy reached an all time high of 30% in 2003 and by 2007 it had reduced marginally to 28% (See Appendix Table 5 and Figure 7).

Figure 7. Trends in the size of the informal economy in Ghana, 1960-2007



The figure obtained by this study for the period 1999/2000 differs from that obtained by Schneider (2002). In Schneider (2005), the author had a point estimate of 34% for 1999/2000. However, Schneider (2005) used Gross National Product in estimating the ratio. Generally, the estimates obtained from this study are considerably lower than those obtained by Bagachwa and Naho (1995) for Tanzania. Thus, while the informal economy varied from 18% to 24% between 1968 and 1990, the figure for Tanzania was varied from 16% to 32%. However, what is true for the two countries is that the informal economy has been increasing in size since the 1960s. On the contrary, in the case of South Africa, though the informal economy continues to absorb an increasing number of the labour force, the size of the informal economy as a percentage of the official economy has been decreasing steadily. For the period 1968-2005, Saunders and Loots (2005) suggest that the size ranged from 12% in 1967 to 7.2% by 2002.

5. Conclusion and policy recommendations

The paper sought to estimate the trends in the size of the informal economy in Ghana from the 1960s to 2007 with the aid of annual data using a variant of the Tanzi currency demand approach as the analytical framework. We observe that the size of the informal economy in Ghana has been increasing over the past four decades. Indeed, the size has doubled from the 14% of GDP in 1960 to 30% by 2004. Thus, there has been an upward trend.

While the present study has some limitations due to the paucity of data on parameters such as the business regulatory environment, the results can be considered as indicative of the size and trends of the informal economy in Ghana. For additional validation, more focused studies at the micro-level that consider individual sectors of the economy or industry-by-industry may be extremely beneficial for policy making. Nonetheless, some policy issues may be considered here. For example, there is a need for de-emphasising the link between tax revenues and the informal economy. While this paper suggests a positive relationship between the informal economy and the tax burden, a more nuanced interpretation is required.

Even though various measures have been instituted over the years to bring the informal economy into the tax base, the outcomes have been less than satisfactory. Given the large size of the informal economy, the use of presumptive tax schemes may be simple to collect, less costly administratively and less burdensome to implement. Presently, the country has a large number of organizations in the informal economy that are activity-based, such as Ghana Private Road Transport Union. These activity-based organizations need to be encouraged and supported. Beyond the desire of bringing them into the tax net, efforts may also be made to provide infrastructural and technical support to these organizations, all in a bid to draw them into the formal economy.

Notes

1. Department of Economics, University of the Western Cape, Cape Town, South Africa.
2. Some of the terms synonymous with the second economy are; the parallel economy, underground economy, black economy, shadow economy, hidden economy, informal economy, unrecorded economy, unmeasured economy, unofficial economy, illegal Economy, clandestine economy, second economy, irregular economy, submerged economy, and subterranean economy
3. For South Africa: Hartzenburg and Leimann (1992); Bagachwa and Naho (1995)

References

- Aryee, J.R.A. 2007. "Building Tax Compliance through Reciprocity with Government." Paper presented at the Foreign Investment Advisory Service (FIAS) of the World Bank Group Regional Conference on the theme "Enterprise Formalization in Africa" held at the Alisa Hotel, Accra on 10-11 January 2007.
- Alañón, A. and M. Gómez-Antonio. 2005. "Estimating the size of the shadow economy in Spain: A structural model with latent variables." *Applied Economics*, 37(9): 1011–1025.
- Bagachwa, M.S.D. and A. Naho. 1995. "Estimating the Second Economy in Tanzania". *World Development*, 23(8): 1387–1399.
- Bhattacharyya, D.K. 1999. "On the Economic Rationale of Estimating the Second Economy." *Economy Journal*, 109 (456): 348–59.
- Brambila, M.J. 2008. "Modeling the informal economy in Mexico: A structural equation approach." MPRA Paper 8504.
- Cagan, P. 1958. "The Demand for Currency Relative to Total Money Supply." National Bureau of Economic Research, Occasional Paper 62, New York: National Bureau of Economic Research.
- Canagarajah, S. and D. Mazumdar. 1997. "Employment, labour Market and Poverty in Ghana: A Study of Changes During Economic Decline and Recovery." World Bank: Washington DC
- Chiumya, C. 2007. "The Parallel Economy in Malawi: Size, Effect on Tax Revenue and Policy Options." MPRA Paper No. 9860.
- Dabla-Norris, E., M. Gradstein, and G. Inchauste. 2008. "What causes firms to hide output? The determinants of informality." *Journal of Development Economics*, 85: (1-2):1–27
- Dell'Ano, R. and O.H. Solomon. 2008. "Shadow economy and the unemployment rate in USA: Is there a structural relationship? An empirical analysis." *Applied Economics*, 40(19): 2537–2555.
- De Soto, H. 1989. *The Other Path*. New York: Harper and Row.
- Faal, E. 2003. "Currency Demand, the Underground Economy and Tax Evasion: The Case of Guyana." IMF Working Paper WP/03/7.
- Feige, E. 1979. "How big is the irregular economy?" *Challenge*, 22 (5): 5–13.
- Gockel, A.F. 1998. "Urban informal sector in Ghana: Features and implications for unionisation." Paper presented within the framework of the GTUC/ICFTU-AFRO New Project Approach to Structural Adjustment in Africa, October.
- Gutmann, P.M. 1977. "Subterranean Economy." *Financial Analysis Journal*, 33 (6): 26–27, 34.
- Hartzenburg, G.M. and A. Leiman. 1992. "The Informal Economy and its Growth Potential." in E. Adebian and B. Standish, eds. *Economic Growth in South Africa*. Oxford: Oxford University Press.
- Hill, R. and M. Kabir. 2000. "Currency Demand and the Growth of the Underground Economy in Canada, 1991–1995." *Applied Economics*, 2000, 32, 183–192.
- GSS. 1998. *Ghana Living Standards Survey, Round 2 Report*. Ghana Statistical Service, Accra, Ghana.
- GSS. 2003. *Ghana Living Standards Survey, Round 3 Report*. Ghana Statistical Service, Accra, Ghana.
- GSS. 2005. *Ghana Living Standards Survey, Round 4 Report*. Ghana Statistical Service, Accra, Ghana.
- Isachsen, A.J., J.T. Kloveland and S. Strum. 1982. "The Hidden Economy in Norway." In V. Tanzi, ed. *The Underground Economy in the United States and Abroad*, Lexington, MA: Lexington Books.
- Isachsen, A.J., J.T. Kloveland and S. Strum. 1985. "The Size and Growth of the Hidden Economy in Norway." *Review of Income Wealth*, 31(1): 21–38.
- Jöreskog, K., and A.S. Goldberger. 1975. "Estimation of a model with multiple indicators and multiple causes of a single latent variable." *Journal of the American Statistical Association*, 70(351): 631–639.
- Kaufman, D. and A. Kaliberda. 1996. "Integrating the Unofficial Economy into the Dynamics of Post Socialist Economies: A Framework of Analyses and Evidence." World Bank Policy Research Working Paper 1691.
- Maliyamkono, T.L. and M.S.D. Bagachwa. 1990. *The Second Economy in Tanzania*. London and Athens, OH: James Currey and Ohio University Press.
- May, E. 1985. "Exchange Controls and Parallel Market Economies in Sub-Saharan Africa: Focus on Ghana." World Bank Staff Working Papers, No. 711, Washington, DC: The World Bank.

- Ocran, M.K. 2007. "A Modeling of Ghana's Inflation Experience, 1960-2003." *Studies in Economics and Econometrics*, 33 (1): 110-129.
- Owusu-Afriyie, E. and M. Ocran. 2009. "An Assessment of Impact of Tax Reforms in Ghana." Unpublished research paper, Bank of Ghana/Department of Economics, University of Fort Hare, South Africa
- Pretap, S. and E. Quintin. 2006. "The Informal Sector in Developing Countries: Outputs, Assets and Employment." WIDER Research Paper No. 2006/130.
- Schneider, F. 1986. "Estimating the Size of the Danish Shadow Economy using the Currency Demand Approach: An Attempt." *Scandinavian Journal of Economics*, 88(4): 643-668.
- Schneider, F. and D.H. Enste. 2003. "Shadow Economies: Size, Causes and Consequences", *Journal of Economic Literature*, 38(1): 77-114.
- Schneider, F. 2002. "Size and Measurement of the Informal Sector in 110 Countries around the World." Paper presented at a workshop of Australian National Tax Centre, ANU, Canberra, Australia.
- Schneider, F. 2004. "The Size of Shadow Economies in the World." Discussion Paper No. 1431. Bonn, Institute for the Study of Labor (IZA).
- Schneider, F. 2005. Shadow economies around the world: What do we really know?" *European Journal of Political Economy*, 23(1): 598-642.
- Schneider, F. 1994. "Measuring the Size and Development of the Second Economy: The Causes be Found and the Obstacles be Overcome?" In H. Brandstaetter and W. Guth, eds. *Essays on Economic Psychology*, Berlin: Springer.
- Schneider, F. 1997. "The Shadow Economies of Western Europe." *Journal of Institute of Economic Affairs*, 17(3): 42-44.
- Sookram, S., P.K. Watson and F. Schneider. 2008. "Characteristics of households in the formal sector of an emerging economy." *Journal of Applied Economics*, 99(1): 1-15.
- Shabsigh, G. 1995. "The Underground Economy: Estimation and Economic Policy Implication." Working Paper Number 95/101, International Monetary Fund.
- Saunders, S and E. Loots. 2005. "Measuring the informal economy in South Africa." *South African Journal of Economics*, 8 (1): 92-101.
- Tanzi, V. 1982. *The Underground Economy in the United States and Abroad*, Lexington, MA: Lexington Books.1982.
- Thomas, J.J. 1999. "Quantifying the Black Economy: 'Measurement without Theory' Yet Again?" *Economic Journal*, 109(456): 381-89.

Figure A1. Currency holdings

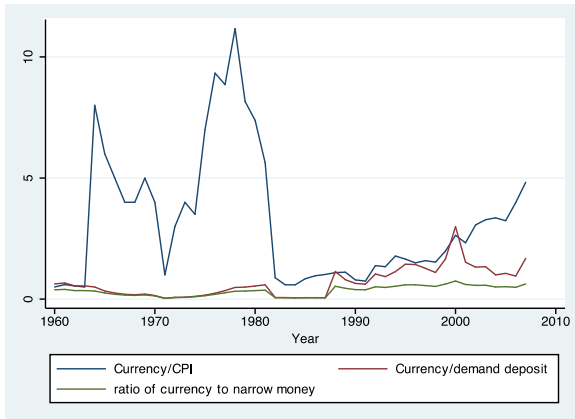


Figure A2. Ghana/US\$ exchange rate, 1960-2009

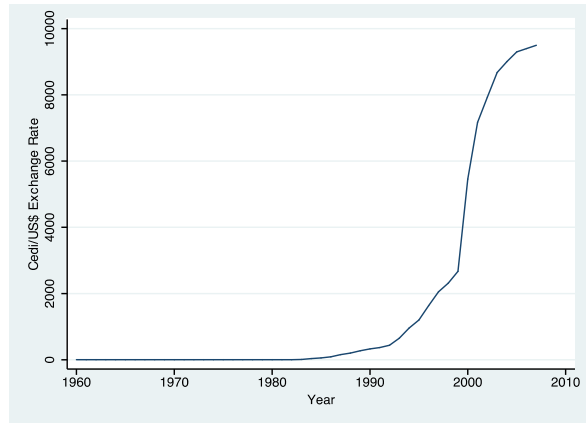


Figure A3. Tax revenue as a share of GDP.

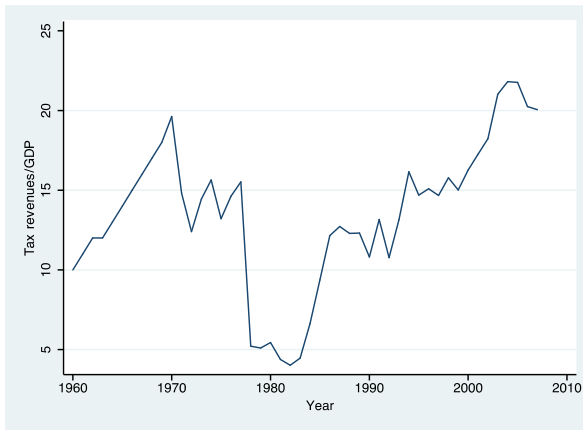


Figure A4. Trends in 90-day Treasury bill rates

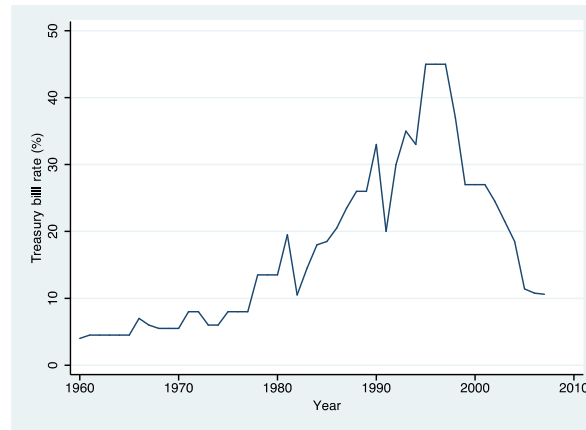


Figure A5. Income levels, GDP per person

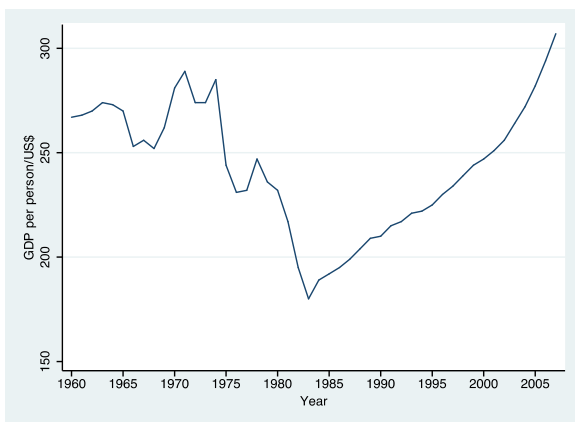


Table 5. Estimates of the informal economy in Ghana, 1960 - 2007

Year	Velocity	GDPSE	GDP	GDPSE/GDP
1960	6.692	8.469	58.861	14%
1961	6.200	8.184	54.813	15%
1962	5.882	8.058	52.359	15%
1963	6.471	8.863	57.726	15%
1964	5.167	7.314	46.304	16%
1965	6.125	8.930	55.059	16%
1966	6.080	9.105	54.024	17%
1967	6.250	9.785	56.179	17%
1968	6.538	10.624	59.084	18%
1969	6.897	11.431	62.917	18%
1970	7.290	12.445	67.577	18%
1971	7.813	12.089	71.120	17%
1972	6.130	9.103	54.973	17%
1973	6.250	9.705	56.686	17%
1974	6.657	10.621	61.025	17%
1975	5.228	7.835	46.112	17%
1976	4.566	7.109	40.199	18%
1977	4.669	7.429	41.293	18%
1978	5.082	5.243	42.221	12%
1979	6.030	6.560	50.053	13%
1980	7.036	7.914	58.499	14%
1981	7.700	7.705	62.007	12%
1982	7.719	7.346	61.216	12%
1983	11.007	13.100	88.275	15%
1984	10.077	16.453	85.691	19%
1985	8.955	16.961	78.654	22%
1986	9.271	19.643	83.599	23%
1987	8.863	19.752	80.999	24%
1988	8.614	19.392	79.111	25%
1989	7.603	17.460	70.426	25%
1990	9.842	22.154	90.493	24%
1991	10.297	24.528	96.985	25%
1992	7.771	17.824	72.227	25%
1993	8.394	20.722	79.543	26%
1994	7.505	19.861	72.554	27%
1995	8.378	22.005	80.671	27%
1996	9.305	25.027	90.468	28%
1997	7.932	21.480	77.453	28%
1998	8.040	22.257	79.415	28%
1999	8.264	22.822	82.123	28%
2000	7.890	23.014	79.761	29%
2001	7.561	22.629	77.183	29%
2002	6.071	18.455	62.492	30%
2003	6.169	19.343	64.454	30%
2004	5.812	18.378	61.221	30%
2005	6.242	19.820	68.833	29%
2006	5.569	17.461	61.544	28%
2007	6.852	21.489	76.219	28%

Other recent publications in the AERC Research Papers Series:

- Determinants of Private Investment Behaviour in Ghana*, by Yaw Asante, Research Paper 100.
- An Analysis of the Implementation and Stability of Nigerian Agricultural Policies, 1970–1993*, by P. Kassey Garba, Research Paper 101.
- Poverty, Growth and Inequality in Nigeria: A Case Study*, by Ben E. Aigbokhan, Research Paper 102.
- Effect of Export Earnings Fluctuations on Capital Formation*, by Godwin Akpokodje, Research Paper 103.
- Nigeria: Towards an Optimal Macroeconomic Management of Public Capital*, by Melvin D. Ayogu, Research Paper 104.
- International Stock Market Linkages in South Africa*, by K.R. Jefferis, C.C. Okeahalam and T.T. Matome, Research Paper 105.
- An Empirical Analysis of Interest Rate Spread in Kenya*, by Rose W. Ngugi, Research Paper 106.
- The Parallel Foreign Exchange Market and Macroeconomic Performance in Ethiopia*, by Derrese Degefa, Research Paper 107.
- Market Structure, Liberalization and Performance in the Malawi Banking Industry*, by Ephraim W. Chirwa, Research Paper 108.
- Liberalization of the Foreign Exchange Market in Kenya and the Short-Term Capital Flows Problem*, by Njuguna S. Ndung'u, Research Paper 109.
- External Aid Inflows and the Real Exchange Rate in Ghana*, by Harry A. Sackey, Research Paper 110.
- Formal and Informal Institutions' Lending Policies and Access to Credit by Small-Scale Enterprises in Kenya: An Empirical Assessment*, by Rosemary Atieno, Research Paper 111.
- Financial Sector Reform, Macroeconomic Instability and the Order of Economic Liberalization: The Evidence from Nigeria*, by Sylvanus I. Ikhinda and Abayomi A. Alawode, Research Paper 112.
- The Second Economy and Tax Yield in Malawi*, by C. Chipeta, Research Paper 113.
- Promoting Export Diversification in Cameroon: Toward Which Products?* by Lydie T. Bamou, Research Paper 114.
- Asset Pricing and Information Efficiency of the Ghana Stock Market*, by Kofi A. Osei, Research Paper 115.
- An Examination of the Sources of Economic Growth in Cameroon*, by Aloysius Ajab Amin, Research Paper 116.
- Trade Liberalization and Technology Acquisition in the Manufacturing Sector: Evidence from Nigeria*, by Ayonrinde Folasade, Research Paper 117.
- Total Factor Productivity in Kenya: The Links with Trade Policy*, by Joseph Onjala, Research Paper 118.
- Kenya Airways: A Case Study of Privatization*, by Samuel Oyieke, Research Paper 119.
- Determinants of Agricultural Exports: The Case of Cameroon*, by Daniel Gbetnkon and Sunday A. Khan, Research Paper 120.
- Macroeconomic Modelling and Economic Policy Making: A Survey of Experiences in Africa*, by Charles Soludo, Research Paper 121.
- Determinants of Regional Poverty in Uganda*, by Francis Okurut, Jonathan Odwee and AsafAdebua, Research Paper 122.
- Exchange Rate Policy and the Parallel Market for Foreign Currency in Burundi*, by Janvier D. Nkurunziza, Research Paper 123.
- Structural Adjustment, Poverty and Economic Growth: An Analysis for Kenya*, by Jane Kabubo-Mariara and Tabitha W. Kiriti, Research Paper 124.
- Liberalization and Implicit Government Finances in Sierra Leone*, by Victor A.B. Davis, Research Paper 125.
- Productivity, Market Structure and Trade Liberalization in Nigeria*, by Adeola F. Adenikinju and Louis N. Chete, Research Paper 126.
- Productivity Growth in Nigerian Manufacturing and Its Correlation to Trade Policy Regimes/Indexes(1962–1985)*, by Louis N. Chete and Adeola F. Adenikinju, Research Paper 127.
- Financial Liberalization and Its Implications for the Domestic Financial System: The Case of Uganda*, by Louis A. Kasekende and Michael Atingi-Ego, Research Paper 128.

- Public Enterprise Reform in Nigeria: Evidence from the Telecommunications Industry*, by Afeikhena Jerome, Research Paper 129.
- Food Security and Child Nutrition Status among Urban Poor Households in Uganda: Implications for Poverty Alleviation*, by Sarah Nakabo-Sswanyana, Research Paper 130.
- Tax Reforms and Revenue Mobilization in Kenya*, by Moses Kinyanjui Muriithi and Eliud Dismas Moyi, Research Paper 131.
- Wage Determination and the Gender Wage Gap in Kenya: Any Evidence of Gender Discrimination?* by Jane Kabubo-Mariara, Research Paper 132.
- 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: Electrical 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 Ogundele, 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 Adjustments 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, Research Paper 166.
- 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 Asiimwe, 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 Jochua 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. Zgovu 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 MamadouGbongue, 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.
- 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 AdrienNdinga, 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 Cissé, 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 Revenue in Nigeria*, by Olumide S. Ayodele and Francis 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 UasinGishu 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 Leviston 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 Re-Stocking in Cameroon*, by William M. Fonta, Hyacinth E. Ichoku and Emmanuel Nwosu, Research Paper 210.

- Multidimensional Poverty in Cameroon: Determinants and Spatial Distribution*, by Paul Ningaye, Laurent Ndjanyou and Guy Marcel Saakou, 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, Tukur Garba and Aminu S. Mikailu, 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 Study of Mauritius* by Sunil K. Bundoo, Research Paper 219.
- Intrahousehold Resources Allocation in Kenya* by Miriam Omolo, Research Paper 220.
- Volatility of Resources Inflows and Domestic Investment in Cameroon* by Sunday A. Khan, Research Paper 221.
- Efficiency Wage, Rent-Sharing Theories and Wage Determination in 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.
- After Fifteen Year Use of the Human Development Index (HDI) of the United Nations Development Program (UNDP): What Shall We Know?* by Jean Claude Saha, Research Paper 225.
- Uncertainty and Investment Behavior in the Democratic Republic of Congo* by Xavier Bitemo Ndiwulu and Jean-Papy Manika Manzongani, Research Paper 226.
- An Analysis of Stock Market Anomalies and Momentum Strategies on the Stock Exchange of Mauritius* by Sunil K. Bundoo, Research Paper 227.
- The Effect of Price Stability on Real Sector Performance in Ghana* by Peter Quartey, Research Paper 228.
- The Impact of Property Land Rights on the Production of Paddy Rice in the Tillabéry, Niamey and Dosso Regions in Niger* by Maman Nafiou Malam Maman and Boubacar Soumana, Research Paper 229.
- An Econometric Analysis of the Monetary Policy Reaction Function in Nigeria* by Chukwuma Agu, Research Paper 230.
- Investment in Technology and Export Potential of Firms in Southwest Nigeria* by John Olatunji Adeoti, Research Paper 231.
- Analysis of Technical Efficiency Differentials among Maize Farmers in Nigeria* by Luke OyesolaOlarinde, Research Paper 232.
- Import Demand in Ghana: Structure, Behaviour and Stability* by Simon Kwadzogah Harvey and Kordzo Sedegah, Research Paper 233.
- Trade Liberalization Financing and Its Impact on Poverty and Income Distribution in Ghana* by Vijay K. Bhasin, Research Paper 234.
- An Empirical Evaluation of Trade Potential in Southern African Development Community* by Kisukyabo Simwaka, Research Paper 235.
- Government Capital Spending and Financing and Its Impact on Private Investment in Kenya: 1964-2006* by Samuel O. Oyieke, Research Paper 236.
- Determinants of Venture Capital in Africa: Cross Section Evidence* by Jonathan Adongo, Research Paper 237.

- Social Capital and Household Welfare in Cameroon: A Multidimensional Analysis* by Tabi Atemnkeng Johannes, Research Paper 238.
- Analysis of the Determinants of Foreign Direct Investment Flows to the West African and Economic Union Countries* by Yélé Maweki Batana, Research Paper 239.
- Urban Youth Labour Supply and the Employment Policy in Côte d'Ivoire* by Clément Kouadio Kouakou, Research Paper 240.
- Managerial Characteristics, Corporate Governance and Corporate Performance: The Case of Nigerian Quoted Companies* by Adenikinju Olayinka, Research Paper 241.
- Effects of Deforestation on Household Time Allocation among Rural Agricultural Activities: Evidence from Western Uganda* by Paul Okiira Okwi and Tony Muhumuza, Research Paper 242.
- The Determinants of Inflation in Sudan* by Kabbashi M. Suliman, Research Paper 243.
- Monetary Policy Rules: Lessons Learned From ECOWAS Countries* by Alain Siri, Research Paper 244.
- Zimbabwe's Experience with Trade Liberalization* by Makochekanwa Albert, Hurungo T. James and Kambarami Prosper, Research Paper 245.
- Determinants in the Composition of Investment in Equipment and Structures in Uganda* by Charles Augustine Abuka, Research Paper 246.
- Corruption at Household Level in Cameroon: Assessing Major Determinants* by Joseph-Pierre Timnou and Dorine K. Feunou, Research Paper 247.
- Growth, Income Distribution and Poverty: The Experience of Côte d'Ivoire from 1985 to 2002* by Kouadio Koffi Eric, Mamadou Gbongue and Ouattara Yaya, Research Paper 248.
- Does Bank Lending Channel Exist In Kenya? Bank Level Panel Data Analysis* by Moses Muse Sichei and Githinji Njenga, Research Paper 249.
- Governance and Economic Growth in Cameroon* by Fondo Sikod and John NdeTeke, Research Paper 250.
- Analyzing Multidimensional Poverty in Guinea: A Fuzzy Set Approach* by Fatoumata Lamarana Diallo, Research Paper 251.
- The Effects of Monetary Policy on Prices in Malawi* by Ronald Mangani, Research Paper 252.
- Total Factor Productivity of Agricultural Commodities in the Economic Community of West African States: 1961-2005* by Joshua Olusegun Ajetomobi, Research Paper 253.
- Public Spending and Poverty Reduction in Nigeria: A Benefit Incidence Analysis in Education and Health* by Uzochukwu Amakom, Research Paper 254.
- Supply Response of Rice Producers in Cameroon: Some Implications of Agricultural Trade on Rice Sub-sector Dynamics* by Ernest L. Moluaand Regina L. Ekonde, Research Paper 255.
- Effects of Trade Liberalization and Exchange Rate Changes on Prices of Carbohydrate Staples in Nigeria* by A. I. Achike, M. Mkpado and C. J. Arene, Research Paper 256.
- Underpricing of Initial Public Offerings on African Stock Markets: Ghana and Nigeria* by Kofi A. Osei, Charles K.D. Adjasiand Eme U. Fiawoyife, Research Paper 257.
- Trade Policies and Poverty in Uganda: A Computable General Equilibrium Micro Simulation Analysis* by Milton Ayoki, Research Paper 258.
- Interest Rate Pass-through and Monetary Policy Regimes in South Africa* by Meshach Jesse Aziakpono and Magdalene Kasyoka Wilson, Research Paper 259.
- Vertical Integration and Farm gate prices in the Coffee Industry in Côte d'Ivoire* by Malan B. Benoit, Research Paper 260.
- Patterns and Trends of Spatial Income Inequality and Income Polarization in Cameroon* by Aloysius Mom Njong and Rosy Pascale MeyetTchouapi, Research Paper 261.
- Private Sector Participation in the Provision of Quality Drinking Water in Urban Areas in Ghana: Are the People Willing to Pay?* By Francis Mensah Asenso-Boadi and Godwin K. Vondolia, Research Paper 262.
- Private Sector Incentives and Bank Risk Taking: A Test of Market Discipline Hypothesis in Deposit Money Banks in Nigeria* by Ezema Charles Chibundu, Research Paper 263.

- A Comparative Analysis of the Determinants of Seeking Prenatal Health Care in Urban and Rural Areas of Togo* by Ablamba Johnson, Alimalssifouand EtsriHomevoh, Research Paper 264.
- Predicting the Risk of Bank Deterioration: A Case Study of the Economic and Monetary Community of Central Africa* by Barthélemy Kouezo, Mesmin Koulet-Vickot and Benjamin Yamb, Research Paper 265.
- Analysis of LabourMarket Participation in Senegal* by Abou Kane, Research Paper 266.
- What Influences Banks' Lending in Sub-Saharan Africa?*by Mohammed Amidu, Research Paper 267.
- Central Bank Intervention and Exchange Rate Volatility in Zambia* by Jonathan Mpundu Chipili, Research Paper 268.
- Capital Flight from the Franc Zone: Exploring the Impact on Economic Growth* by Ameth Saloum Ndiaye, Research Paper 269.
- Dropping Out of School in the Course of the Year in Benin: A Micro-econometric Analysis* by Barthelemy M. Senou, Research Paper 270.
- Determinants of Private Investment Behaviour in Ugandan Manufacturing Firms* by Niringyiye Aggrey, Research Paper 271.
- Determinants of Access to Education in Cameroon* by Luc Nembot Ndeffo, Tagne Kuelah Jean René & Makoudem Téné Marienne Research Paper 272.
- Current Account Sustainability in the West African Economic and Monetary Union Countries* by Zakarya Keita, Research Paper 273.
- An Empirical Assessment of Old Age Support in sub-Saharan Africa: Evidence from Ghana* by Wumi Olayiwola, Olusanjo Oyinyole& S.L. Akinrola, Research Paper 274.
- Characteristics and Determinants of Child Labour in Cameroon* by Laurent Ndjanyou and Sébastien Djiénouassi, Research Paper 275.
- Private Sector Investment in Sierra Leone: An Analysis of the Macroeconomic Determinants* by Mohamed Jalloh, Research Paper 276.
- Technical Efficiency and Productivity of Primary Schools in Uganda* by Bruno L. Yawe, Research Paper 277.
- Comparisons of Urban and Rural Poverty Determinants in Cameroon* by Samuel Fambon, Research Paper 278.
- Impact of External Debt Accumulation and Capital Flight on Economic Growth of West African Countries,* by Akanni O. Lawanson, Research Paper 279.
- Female Education and Maternal Health Care Utilization in Uganda* by Asumani Guloba & Edward Bbaale, Research Paper 280.
- HIV/AIDS Sero-prevalence and Socio-economic Status: Evidence from Uganda* by Ibrahim Kasirye, Research Paper 281.
- Female Education, Labour Force Participation and Fertility: Evidence from Uganda* by Edward Bbaale, Research Paper 282.
- Estimating the Informal Cross-border Trade in Central Africa,* by Robert Nkendah, Chantal Beatrice Nzouessin and Njoupouognigni Moussa, Research Paper 283.
- Health and Economic Growth in Sub-Saharan African Countries* by Eric Kehinde Ogunleye, Research Paper 284.
- Effects of Collective Marketing by Farmers' Organizations on Cocoa Farmers' Price in Cameroon* by Kamden Cyrille Bergaly and Melachio Tameko Andre, Research Paper 285.
- Modelling Trade Flows between Three Southern and Eastern African Regional Trade Agreements: A Case Study,* by Sannassee R. Vinesh, Seetanah Boopen and TandrayenVerena, Research Paper 286.
- Analysis of Determinants of Public Hospitals Efficiency in Cameroon* by Nguenda Anya Saturnin, Research Paper 287.
- Threshold Effects in the Relationship between Inflation and Economic Growth: Evidence from Rwanda* by Musoni J. Rutayisire, Research Paper 288.
- Food Prices, Tariffs and Household Welfare in Tanzania: Empirical Evidence from Dar es Salaam* by Vincent Leyaro, Research Paper 289.

- Households' Incomes and Poverty Dynamics in Rural Kenya: A Panel Data Analysis*, by Milu Muyanga and Phillip Musyoka, Research Paper 287.
- The Impact of Economic Partnership Agreements between ECOWAS and the EU on Niger*, by Amadou Ousmane, Research Paper 288.
- A Re-examination of the Determinants of Child Labour in Côte d'Ivoire*, by Edouard PokouAbou, Research Paper 289.
- The Inflationary Effects of Fiscal Deficit in Sierra Leone: A Simulation Approach*, by Robert Dauda Korsu, Research Paper 290.
- Fiscal Decentralization and Social Services in Nigeria*, by Eme A. Dada, Research Paper 291.
- An Analysis of Married Women's Empowerment in Sub-Saharan Africa*, by Yélé Maweki BATANA and Pitaloumani GNAKOU ALI, Research Paper 292.
- Threshold Effects in the Relationship between Inflation and Economic Growth: Evidence from Rwanda*, by Musoni J. Rutayisire, Research Paper 293.
- Market Power in Nigerian Domestic Cocoa Supply Chain*, by Joshua Olusegun Ajetomobi, Research Paper 294.
- Bank Consolidation and Bank Risk Taking Behaviour: A Panel Study of Commercial Banks in Nigeria*, by Nwosu Emmanuel and Amadi Francis N, Research Paper 295.
- Mechanisms of Monetary Policy Transmission in the Countries of the West African Monetary Union: An Empirical Study*, by Yao Dossa TADENYO, Research Paper 296.
- Analysis of Determinants of Public Hospitals Efficiency in Cameroon*, by Nguenda Anya and Saturnin Bertrand, Research Paper 297.
- Explaining Pro-poor Growth in Cameroon*, by Boniface Ngah Epo and Francis Menjo Baye, Research Paper 298.
- Microfinance and Poverty in Cameroon: An Oaxaca-Blinder Decomposition Analysis*, by Syrie Galex SOH, Research Paper 299.
- Food Prices, Tariffs and Household Welfare in Tanzania: Empirical Evidence from Dar es Salaam*, by Vincent Leyaro, Research Paper 300.
- Out-of-pocket Payments for Health Care and Impoverishment in Nigeria*, by Awoyemi Taiwo Timothy and Adigun Grace Toyin, Research Paper 301.
- Extension of the Drinking Water Network in the District of Abidjan*, by N'KONGON Y. Jeanne, Research Paper 302.
- Analysis of Asymmetries in the Tax-Spending Nexus in Burundi: Evidence from Threshold Modelling*, by Arcade NDORICIMPA, Research Paper 303.
- The Bank Lending Channel of Monetary Policy Transmission: A Dynamic Bank-Level Panel Date Analysis on Tanzania*, by Wilfred Mbowe, Research Paper 304.
- The Determinants of Corruption in Cameroon*, by Ngoa Tabi & Henri Ondo, Research Paper 305.
- Optimal Monetary Policy Rule and Exchange Rate Volatility: A Case of Zambia*, by Oswald Kombe Mungule, Research Paper 306.
- Courts and Bribery for Infrastructure in East African Manufacturing Firms*, by Sheshangai Kaniki and Tendai Gwatidzo, Research Paper 307.
- Assessing the Links between Energy and the Macro Economy: A GCE Analysis for Ghana*, by Emmanuel Ekow Asmah, Research Paper 308.
- Analysis of Food Aid Distribution in Malawi and Ethiopia*, by Alabi Reuben Adeolu and Adams Oshobugie Ojor, Research Paper 309.
- Indirect Taxation, Income Distribution and Poverty in Cote d'Ivoire*, by GBONGUE Mamadou and BEYERA Isabelle, Research Paper 310.
- The Potential Impact on Trade of Setting up a Second Monetary Zone in West Africa*, by Sékou Falil DOUMBOUYA and Ousmane BAH, Research Paper 311.
- Macroeconomic Determinants of Primary Education in the Republic of the Congo: Analysis based on a Simultaneous Equation Model*, by Mathias Marie Adrien Ndinga and Marien Ngouabi, Research Paper 312.

- Quality of Institutions and Foreign Direct Investment (FDI) in Sub-Saharan Africa: Dynamic Approach*, by Komlan Fiodendji, Research Paper 313.
- Corporate Governance and Dividend Payout Policy: Evidence from Selected African Countries*, by Joshua Yindenaba Abor & Vera Fiador, Research Paper 314.
- Communications Impact of ECOWAS/EU Economic Partnership Agreements on Intra-ECOWAS Trade: An Empirical Analysis of Trade, Revenue and Welfare Effects*, by G.O. Onogwu & C.J. Arene, Research Paper 315.
- Socioeconomic Determinants of Use of Reproductive Health Services in Ghana*, by Patience Aseweh Abor & Gordon Abekah-Nkrumah, Research Paper 316.
- Foreign Direct Investment and Growth: Evidence from the Economic Community of West African States*, by Patricia A. Adamu & Dickson E. Oriakhi, Research Paper 317.
- Are High Value Agri-food Supply Chains Participants Better Insulated from Shocks? Evidence from Senegal*, by Sènakpon Fidele Ange Dedehouanou, Research Paper 318.
- Multi-Asset Deprivation and Pro-Poor Growth in Cameroon*, by Hans TinoAyamena Mpenya, Research Paper 319.



Mission

To strengthen local capacity for conducting independent, rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research.

www.aercafrica.org

Learn More



www.facebook.com/aercafrica



www.instagram.com/aercafrica_official/



twitter.com/aercafrica



www.linkedin.com/school/aercafrica/

Contact Us

African Economic Research Consortium
Consortium pour la Recherche Economique en Afrique
Middle East Bank Towers,
3rd Floor, Jakaya Kikwete Road
Nairobi 00200, Kenya
Tel: +254 (0) 20 273 4150
communications@aercafrica.org