

Estimating the Size and Trends of the Informal Economy in Ghana

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AERC Research Paper 355
African Economic Research Consortium, Nairobi
November 2018

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

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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

continued next page

Box 1 Continued

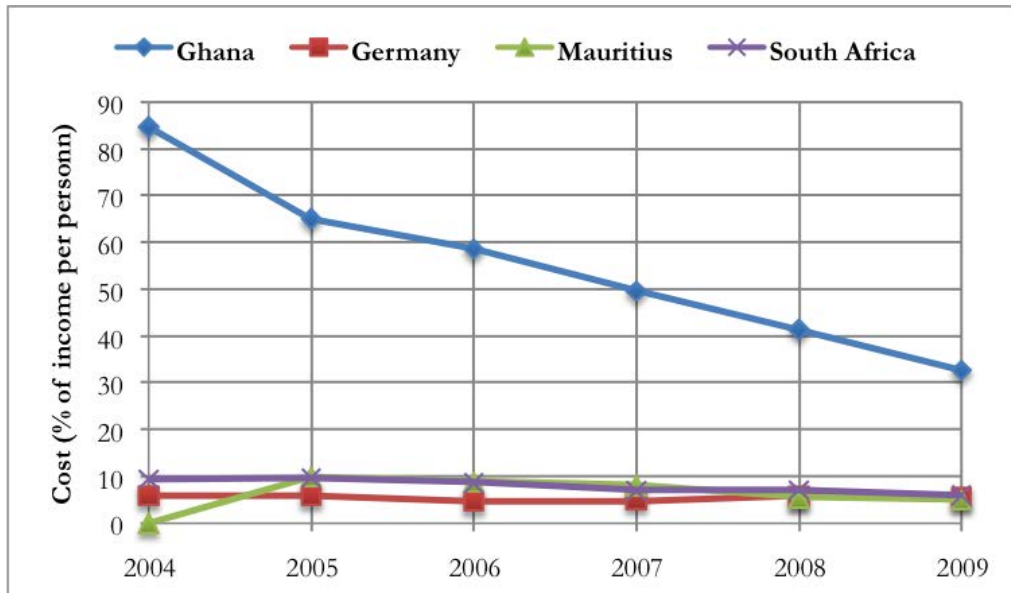
21. Ghana Cooperative Distillers Association Ltd
22. Corn mill Owners Association
23. Licensed Diamond Winners Association
24. Ghana Association of Private Sports Papers
25. Ashiaman Livestock Breeding and Traders Association
26. Butchers Association
27. Ghana Livestock and Meat Marketing Association
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 person, it is still very high when compared with the costs in Mauritius, South Africa and Germany (see Figure 1).

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.

Figure 1. Cost of doing business, 2004 - 2009

Source: The World Bank (2010).

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 loss 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

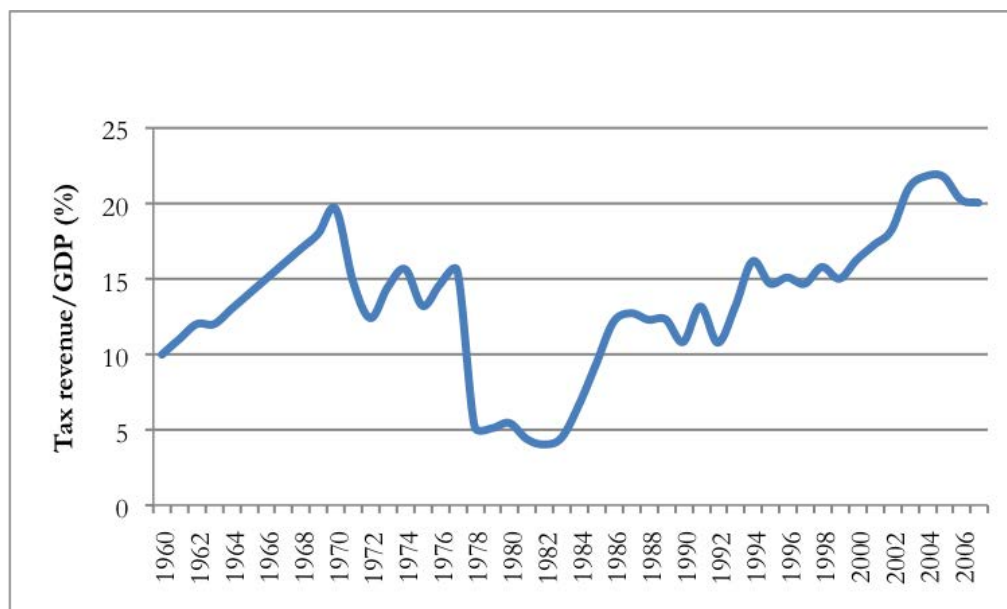
Main Employer	1987	1995	2000	2008
Government	14	7	6	28
Private formal	7	5	8	19
Private informal/Self employed	71	69	86	48
Others	8	20	0	6
Total	100	100	100	100

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

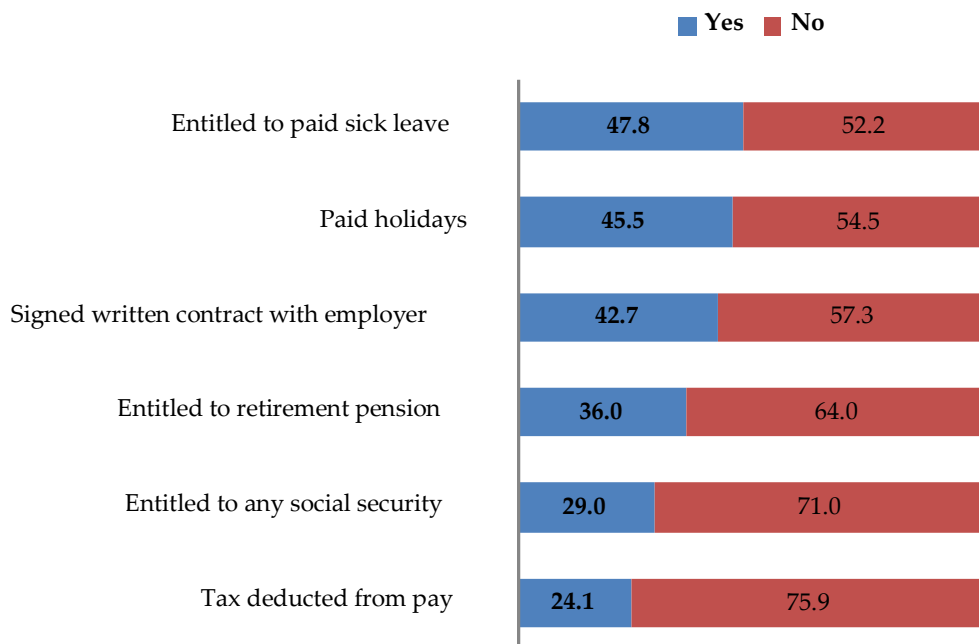
While there is paucity of data on the exact size of the tax-paying population as a proportion of the employed in Ghana, anecdotal evidence from various sources suggests that only a fraction of the working population pay taxes on their incomes. For example,

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



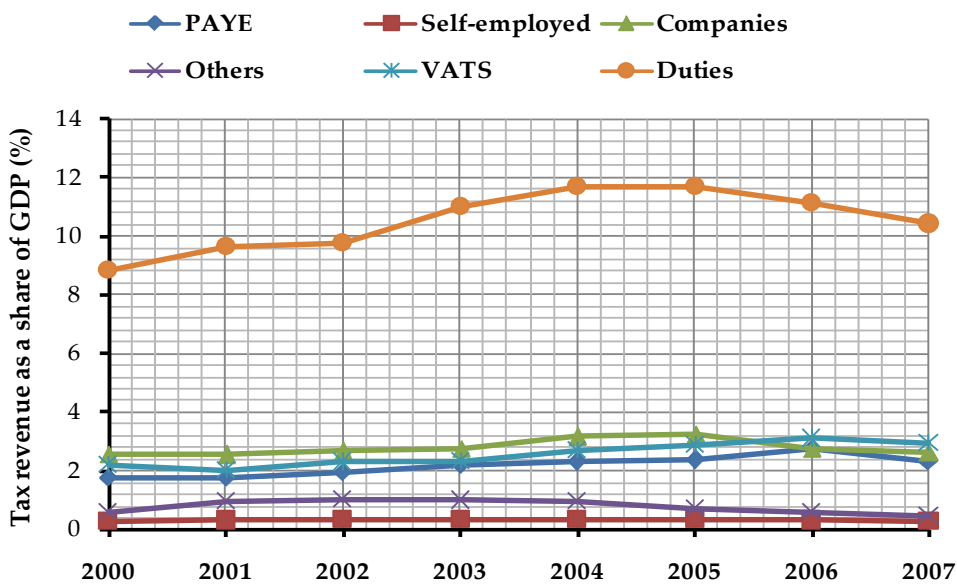
Source: Data for chart was obtained from GSS (2008)

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.

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.

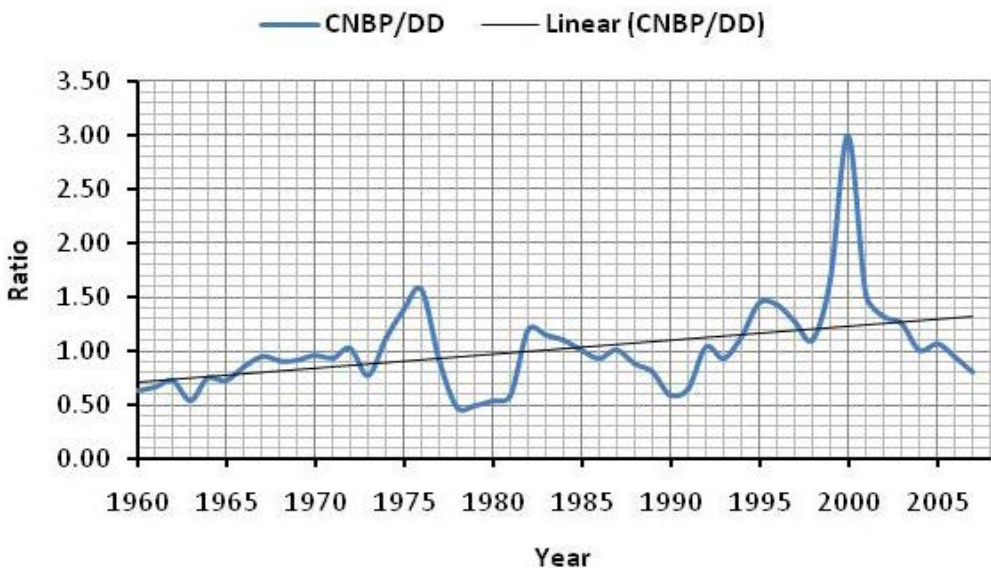
For example, while a large segment of the labour market is characterized as self-employed (i.e., about 5 million), their contribution to the national treasury in the form of tax as a share of GDP amounts to 0.5% while the about one million taxpayers in the formal sector contributes about 3% of GDP. Thus, 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).

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.

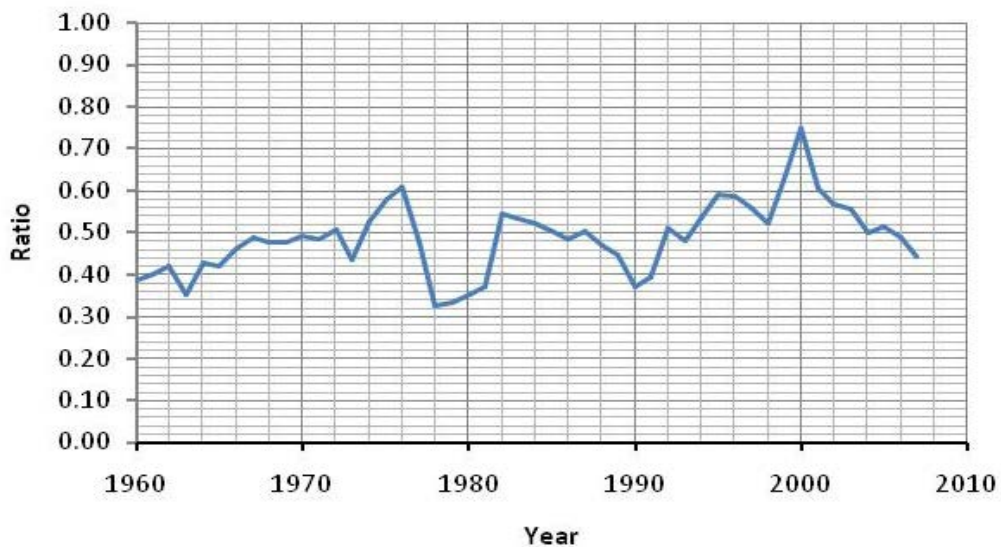
A cursory look at the ratio of currency with the non-bank public (CNBP) to demand deposit (DD) clearly shows an upward sloping trend (Figure 5). However, the period 1970-1990 saw a high degree of instability. Nonetheless, 2000 recorded a phenomenal spike. It may be argued that the crash of the cedi/dollar 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;

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

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, GPD 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*
le	-2.067	-3.700**
lr	-0.597	-6.169**
lt	-1.646	-6.072***
ly	-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

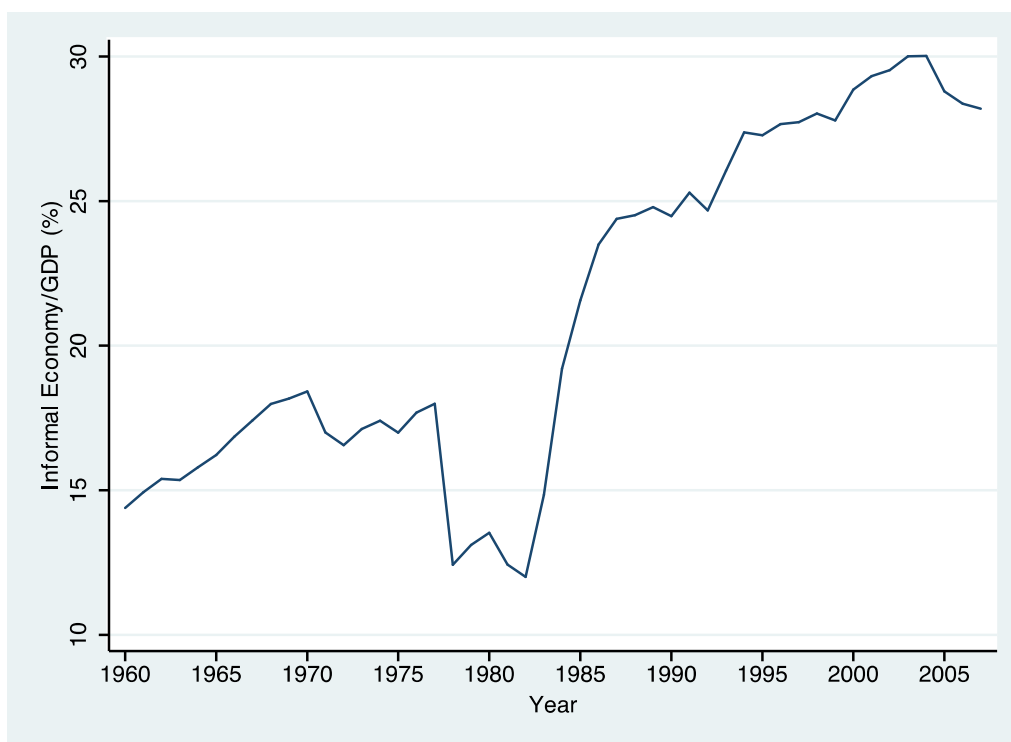
Variables	Model 1 DL [Cu/P]	Model 2 DL [Cu/DD]	Model 3 DL [Cu/M]
Constant	0.350 0.391 [0.90]	1.146 0.582 [-1.97]	-0.438 0.302 [1.45]
Cedi/US\$ Exchange rate	-0.029 0.466 [-0.06]	-2.951 0.694 [4.25]	0.539 0.360 [1.49]
Tax revenue	-0.659 0.642 [-1.03]	-2.828*** 0.956 [-2.96]	1.413*** 0.497 [2.84]
Interest 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)

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Figure A1. Currency holdings

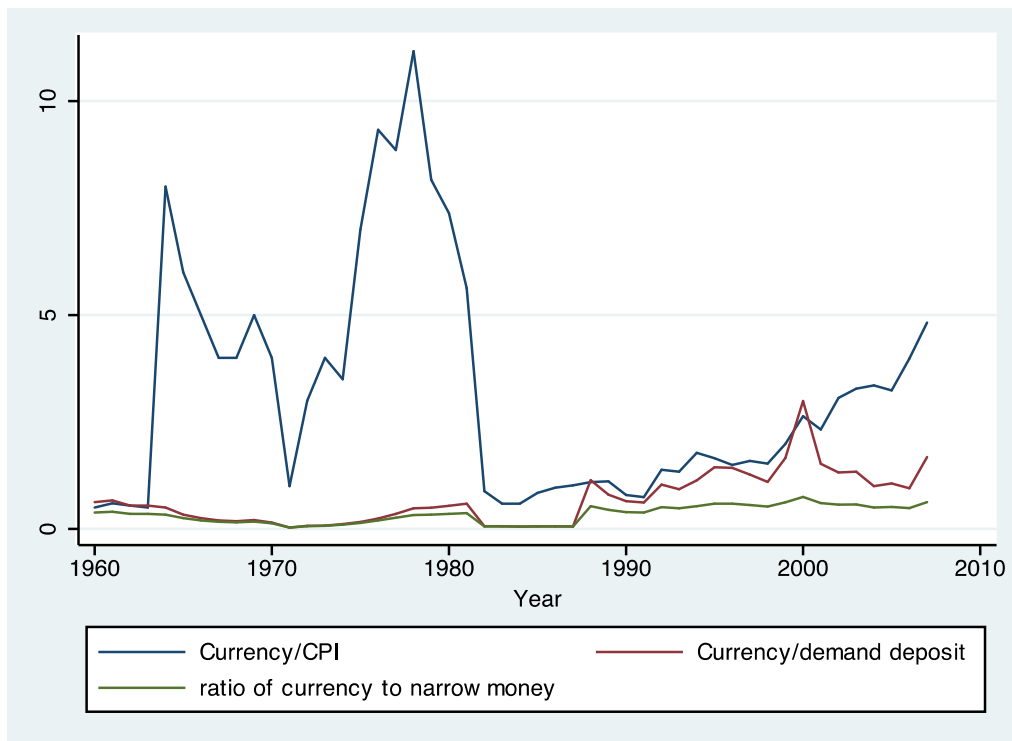


Figure A2. Ghana/US\$ exchange rate, 1960-2009

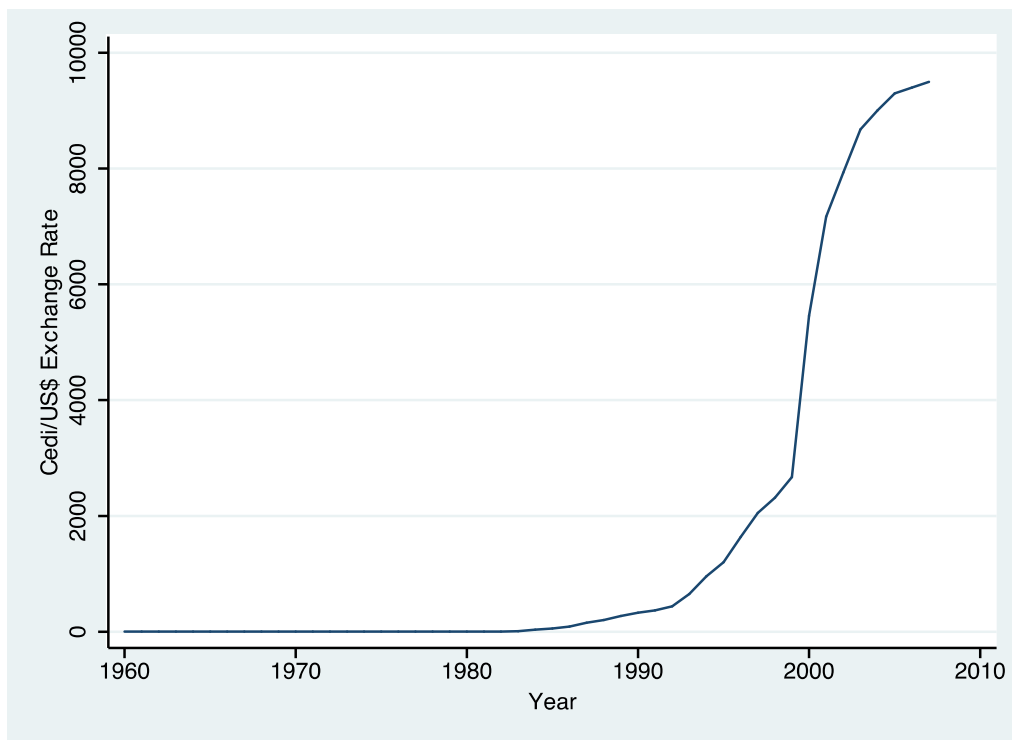


Figure A3. Tax revenue as a share of GDP.

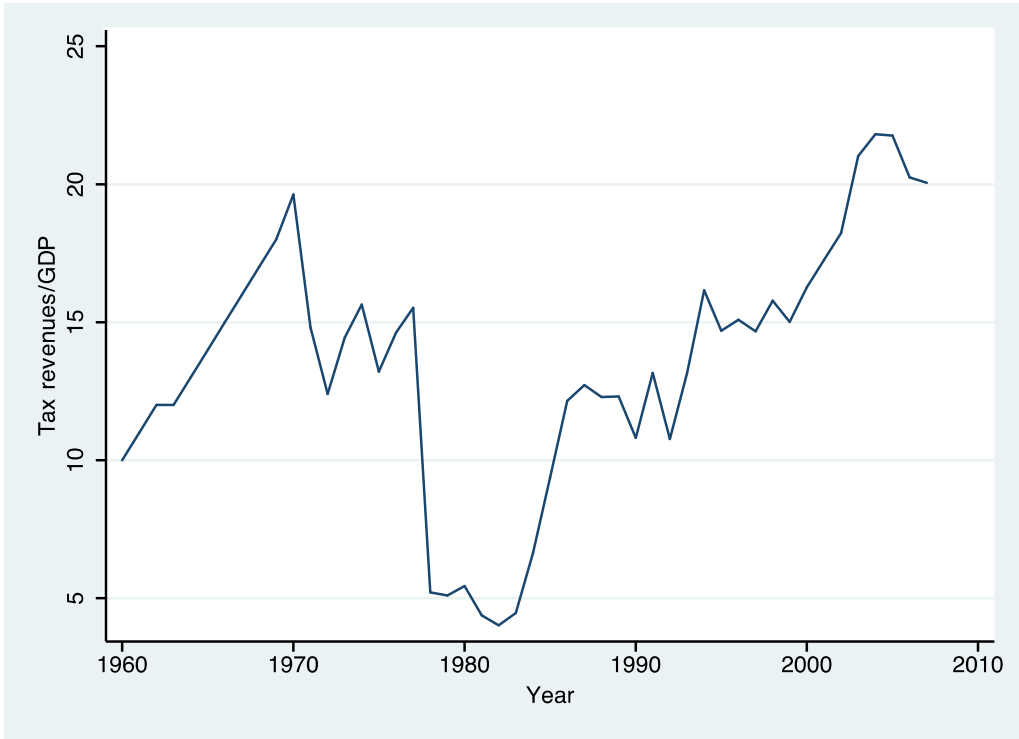


Figure A4. Trends in 90-day Treasury bill rates

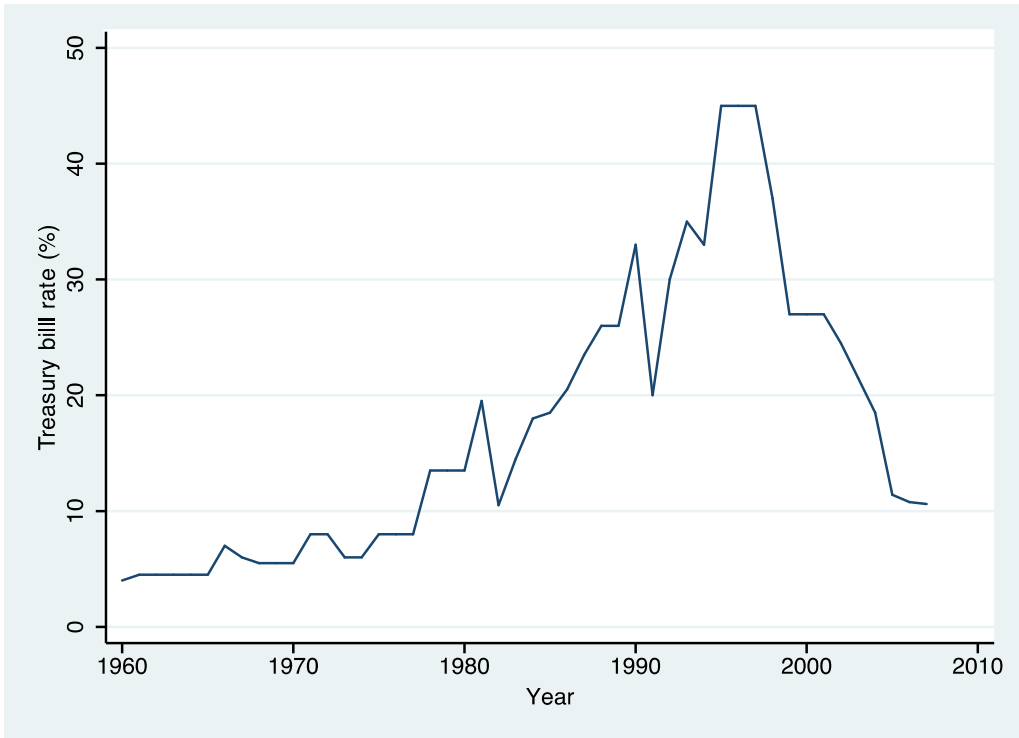
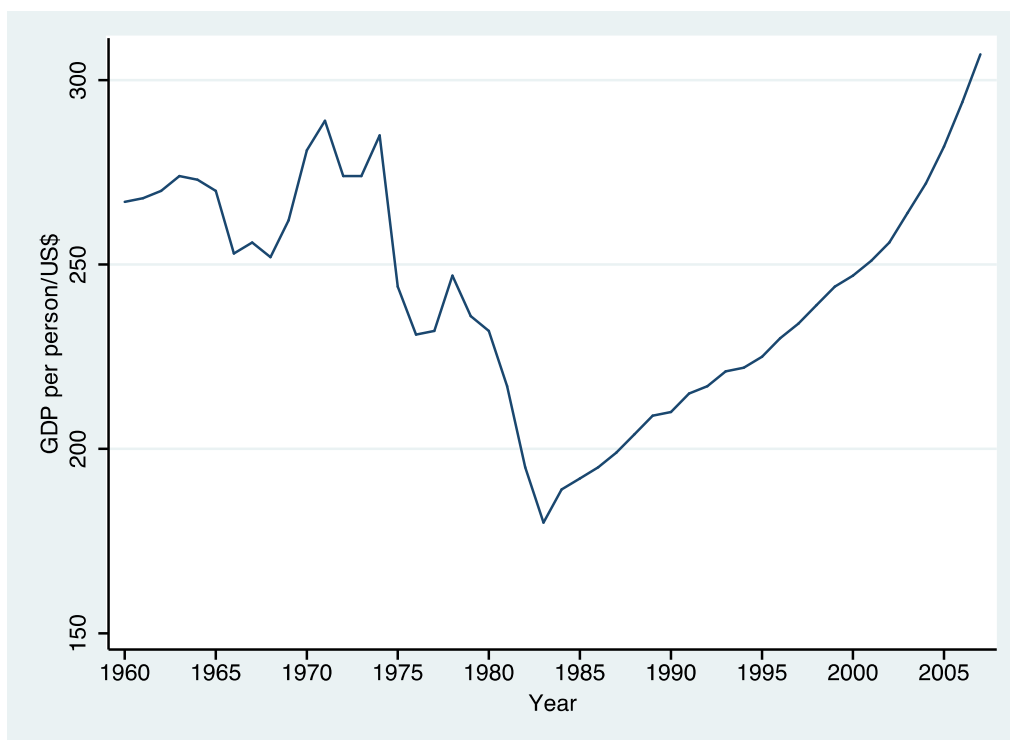


Figure A5. Income levels, GDP per person**Table 5. Estimates of the informal economy in Ghana, 1960 - 2007**

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%

continued next page

Table 5 Continued

Year	Velocity	GDPSE	GDP	GDPSE/GDP
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%

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