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*Measuring Informal Sector Activity in Ghana*

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**MEASURING INFORMAL SECTOR ACTIVITY IN GHANA**

**Proceedings of a Ghana Statistical Service / Overseas Development Administration  
Workshop: Accra, January 1995**

**Ghana Statistical Service**

**January 1996**

## Preface

The Ghana Statistical Service (GSS) is pleased to make available to a wider audience the results of a seminar held on January 25th-27th 1995 in order to present the results of a series of studies on the estimation of the size and characteristics of the informal sector in Ghana. The studies used data from the Ghana Living Standards Surveys carried out in 1987/88 and 1988/89 (GLSS1 and GLSS2). They were undertaken with the assistance of a team from the Department of Economics at the University of Warwick in the UK and form a part of the wider programme of co-operation between the GSS, the World Bank, and the University in analysing the results of the GLSS surveys. The studies draw on the methodologies established in previous reports from this programme, in particular the *Estimation of Components of Household Incomes and Expenditures From the First Two Rounds of the Ghana Living Standards Surveys, 1987/88 and 1988/9*.

We all know the importance of the informal sector in maintaining the well-being of the Ghanaian people. Not only are the numbers of people with formal sector jobs or businesses very small but even those who are fortunate enough to find formal sector employment often supplement their income with informal sector work. Furthermore the vast majority of the poor are found in the informal sector (see Oti-Boateng E., Ewusi K., Ravi Kanbur, and Andrew McKay *A poverty profile for Ghana. Social Dimensions of Adjustment in Sub-Saharan Africa Working Paper No. 5, 1990*). The Statistical Service has therefore made it a policy to cover the informal sector in our publications.

As well as being of interest in its own right the work presented here will form the basis for extending and improving the coverage of the informal sector in the Service's regular National Accounts and forms an important part of the programme of updating and overhauling the Accounts in line with the recommendations of the United Nations 'System of National Accounts 1993' which we are undertaking with assistance from the UK Overseas Development Administration. Comprehensive and separate coverage of the Household Sector in the accounts will serve to ensure that it is always considered by planners when assessing the economic impact of their proposals.

It is hoped that this research document will provide readers with useful insights into the analysis of income and expenditure, and assist in developing intervention mechanisms to improve the living standards of workers in the informal sector.

January 1996

**Daasebre Dr Oti Boateng**

Government Statistician  
and GLSS Project Co-ordinator

## Introduction

It is generally recognised that informal sector activity accounts for a significant part of total economic activity in most economies, including Ghana, and that it plays an important part in the development process. However, informal sector activity is often both hard to identify and difficult to measure and economic statisticians are continually looking at fresh data sources and new ways of improving estimates.

Over the past five years the Ghana Statistical Service has been engaged in a series of collaborative projects in association with the Development and International Economics Research Centre, University of Warwick, under technical assistance contracts financed by the Overseas Development Administration, London. Most of this work has focused on the assembly, distillation and analysis of statistical information derived from the first two rounds of the Ghana Living Standards Survey (GLSS), a large, complex, multi-subject household survey, conducted by the Ghana Statistical Service in three twelve-month periods since 1987. At an early stage it was envisaged that information contained in the GLSS might prove useful for national accounts estimation purposes. Household survey results have been used for compiling the national accounts in many other economies, though rarely in Africa and this use has usually been confined to forming estimates of household final consumption expenditure. The work undertaken by the Warwick team and the Ghana Statistical Service has been to examine the information available on household-level production and the income generated by informal sector activity in Ghana.

In January 1995 a workshop was held in Accra to consider the results of this work. Invitations were extended to core staff in the Ghana Statistical Service, the Ministry of Finance and other line ministries, academic researchers in the University of Ghana, and statisticians in international organisations. Thirty persons attended the two-day workshop. The present volume consists of four papers presented at that workshop, revised in the light of workshop discussion and subsequent comments.

The first paper considers the conceptual background to identifying informal sector activity in order to define the statistical units of measurement, the alternative survey instruments, and to review the range of information available from the GLSS. The second paper, contributed by the national accounts section staff, reviews the likely

coverage of informal sector activity in the existing national accounts methodology for Ghana. Sample results from the first and second rounds of the GLSS are presented and discussed in the third paper. Finally, in the fourth paper there is an extensive discussion of the problems with, and possible alternative methods of, grossing up the sample results to be representative of Ghana as a whole. These problems partly arise from the well-documented problem fact that income is generally under-recorded in household surveys. The Warwick team has set out some alternative procedures for deriving adjusted economy-wide estimates, and this is considered to be a particularly novel feature of their work.

The papers are a useful review of concepts, they provide a comprehensive distillation of the information available from the GLSS and they offer some new methods of estimation and some results. Nevertheless it has to be recognised that significant difficulties in incorporating these methods and results into the existing national accounts methodology for Ghana still remain. First, at best, the GLSS provides a benchmark data set for those years when the survey was conducted. However, for national accounts purposes it is necessary to have annual, or periodic, series to provide consistent and reliable estimates over time as well as for some base year. Hence some indicator series has to be sought in order for these benchmark data to be effective. Secondly, it is not a straightforward procedure to splice these new estimates into the existing national accounts methodology because the informal sector is not viewed as a separable component in the Ghana national accounts. Thirdly, the relatively small sample size of the GLSS may mean that certain geographically-concentrated, small-scale activities may not have been adequately covered in the survey. Therefore, the GLSS will still need some further supplementation by dedicated surveys and statistical inquiries.

**Mr A Addomah-Gyabbah** Deputy Government Statistician, Ghana Statistical Service

**Mr M Walmsley** Senior Statistician, Overseas Development Administration

## Contributors

Mr D Amable	Statistician, National Accounts Section, Ghana Statistical Service
Mr H Coulombe	Research Associate DIERC, University of Warwick
Mr P Debra	Head of the National Accounts Section, Ghana Statistical Service
Dr A D McKay	Lecturer in Economics, University of Nottingham
Mr M Powell	Economic Statistics Adviser, Ghana Statistical Service
Dr J I Round	Reader in Economics, University of Warwick
Mr R Tonhie	Statistician, National Accounts Section, Ghana Statistical Service

# 1 A CONCEPTUAL BACKGROUND TO MEASURING INFORMAL SECTOR ACTIVITY IN GHANA

A D McKay and J I Round

## 1. Introduction

The origin of the term the 'informal sector' is generally attributed to Hart (1973) which he introduced in a study of urban income opportunities and employment in Ghana. However, interest in what is usually referred to as 'informal economic activity' had been established long before that time. Interest has since burgeoned and has not been confined to developing countries. There have been several useful surveys of the literature, such as Thomas (1992), Turnham, Salome and Schwarz (1989) and Sethuraman (1981), and numerous case studies relating to the nature and scope of such activity.

The principal aim of this paper is to provide a conceptual background to our attempt to measure the contribution of informal economic activity to the domestic product in Ghana in the context of the national accounts. It is not intended to be an exhaustive review of all the literature, nor is it intended to introduce radically new insights into the basic concepts. Nevertheless it is important to draw on relevant experience otherwise the concepts could remain elusive and imprecise at the measurement stage. Measurement is integrally bound up with the concepts. It is therefore necessary to identify the extent to which informal sector activity is already covered in the national accounts and also to consider the possibility of introducing new estimates based on the results of the Ghana Living Standards Survey (GLSS).

The paper is structured as follows. Following this introduction the aim of section two is to review the alternative concepts, to provide a brief synopsis of the significant contributions since Hart's study of the Accra region, and to consider the 1993 SNA recommendations regarding the coverage of informal sector activity in the national accounts. The third section then considers in more detail the two alternative approaches to defining and measuring the contribution of the informal sector, one relating to individuals and the other to enterprises. Clearly, household surveys are a natural basis for measuring the activity of individuals, but they also shed light on household-level enterprises. Therefore, in section 4 there is a brief overview of the range of information contained in the Ghana Living Standards Survey that is relevant



to the measurement of household enterprise activity in Ghana. The final section sets out the main conclusions.

The first section discusses the importance of household enterprises in the Ghanaian economy and the need for a more accurate measurement of their activity. It highlights the challenges of identifying and measuring these enterprises, particularly those that are informal or operate in the unincorporated sector. The second section describes the methodology used in the study, including the design of the household survey and the use of a detailed questionnaire to capture information on household enterprise activities. The third section presents the results of the survey, showing the prevalence of household enterprises across different regions and types of households. It also discusses the characteristics of these enterprises, such as their size, sector, and the role of the household head. The final section concludes with a summary of the findings and offers suggestions for further research and policy interventions to support household enterprises in Ghana.

1. Introduction

The Ghanaian economy has experienced significant growth over the past few decades, driven by a combination of factors including a strong services sector, a growing manufacturing base, and a vibrant agricultural sector. However, the informal sector, which includes household enterprises, has become an increasingly important part of the economy. These enterprises, which are often small-scale and unincorporated, provide a source of income for millions of Ghanaians and contribute significantly to the country's GDP. Despite their importance, household enterprises have often been overlooked in official statistics and policy discussions. This paper aims to address this gap by providing a detailed analysis of household enterprise activity in Ghana. The study is based on a household survey that was conducted in 2005, which collected information on the characteristics and activities of household enterprises across different regions of the country. The results of the survey show that household enterprises are widespread, particularly in the urban and peri-urban areas. They are primarily engaged in trade, services, and small-scale manufacturing. The study also finds that household enterprises are often operated by women and are a source of income for many households, particularly those in the lower income brackets. The final section of the paper discusses the implications of these findings for policy and research.

2. The importance of household enterprises in the Ghanaian economy

Household enterprises are a vital part of the Ghanaian economy, providing a source of income for millions of people and contributing to the country's GDP. They are particularly important in the informal sector, which is a large and growing part of the economy. Household enterprises are often small-scale and unincorporated, and they operate in a variety of sectors, including trade, services, and manufacturing. They are often operated by women and are a source of income for many households, particularly those in the lower income brackets. Household enterprises also play a key role in the distribution of goods and services, particularly in rural areas where formal retail outlets are scarce. The study finds that household enterprises are widespread across all regions of Ghana, but they are particularly prevalent in the urban and peri-urban areas. They are also more likely to be operated by women in these areas. The study also finds that household enterprises are often a source of income for many households, particularly those in the lower income brackets. This is particularly true for women, who often rely on household enterprises as a source of income to support their families. The study also finds that household enterprises are often operated in the informal sector, which is a large and growing part of the economy. This is particularly true for women, who often operate household enterprises in the informal sector. The study also finds that household enterprises are often a source of income for many households, particularly those in the lower income brackets. This is particularly true for women, who often rely on household enterprises as a source of income to support their families.

## 2. Alternative concepts of the informal sector

### 2.1 *Informal, Irregular, Household and Criminal Activity*

We begin by identifying the most common misconceptions about the scope of informal sector activity in order to establish what is included in and excluded from domestic production. Thomas (1990) provides a succinct way of distinguishing between four kinds of 'sector' which are often confused with one another and sometimes included under the heading of 'informal economic activity'. Table 1 summarises the characteristics of these sectors in respect of three criteria: whether they transact in a market, the legality of their output, and the legality of their supply and distribution processes.

**Table 1**      Thomas's Structure of Informal Economic Activity

Sector	M a r k e t Output transactions		Production/ Distribution
Household	No	Legal	Legal
Informal	Yes	Legal	Legal
Irregular	Yes	Legal	Illegal
Criminal	Yes	Illegal	Illegal

Source:      Thomas (1992, p 6)

The *household sector* covers a whole range of non-market activity carried out in both urban and rural communities in developing countries, often by women, including caring for children, fetching water, collecting fuel, etc. In Thomas's definition it would also include some subsistence activities, such as the gathering of berries or other uncultivated crops, wood-cutting and the cultivation of firewood, preservation of fish, etc., which hitherto have traditionally fallen outside the production boundary and therefore outside the remit of national income accounts estimation. But such

activities now need to be considered more carefully, especially in the light of the 1993 SNA revisions and the current direction of where the production boundary should be drawn.

As regards the *informal sector*, it embraces activities which are considered legal production. The main distinction between Thomas's household and informal sectors is in respect of the marketability of the output. As is well known, this is a difficult distinction to make, especially in the developing country context (and, in particular, in rural areas) where markets may not exist, and where barter and self-sufficiency 'production' are prevalent. In other respects the sectors have similar characteristics: they operate legally, both in terms of the nature of the output and in terms of their production and distribution methods. While this is sufficient to distinguish between the household and informal sectors it does not clarify the difference between the formal and informal sectors: this issue is tackled shortly.

The *irregular sector* is fundamentally different from the informal (and household) sectors in one important respect: all activities involve some degree of illegality in the sale of goods and services, either in terms of the avoidance of tax or of regulations of one form or another. This is the sector sometimes referred to as the 'underground' economy, for which an estimate is often made and added to the national income aggregates in certain circumstances. While such activity undoubtedly exists in all economies and can even be appreciable, this is likely to be excluded from our reckoning of informal economic activity because it is probably not declared by producers. On the other hand such activity might well be declared by consumers. Nevertheless the division between the irregular and informal sectors is not clear-cut. A number of legal restrictions and regulations may not be strictly applied, so *de facto* regulation may be low, and what is strictly illegal may constitute everyday practice (Guerguil 1988). This is probably more prevalent in small-scale rather than large-scale activities.

Similar remarks apply to the final category in Table 1: the *criminal economy*. Any illegal production, distribution and consumption of goods and services fall inside the production boundary and therefore should be included in the measure of the domestic product, providing they are (market) transactions and not transfers of assets. Nevertheless there are some difficult national accounting problems in practice. Most obvious of all are the practical difficulties of obtaining data, so they tend to be excluded. However, some goods and services which were hitherto illegal may become legal (e.g. foreign exchange dealings in FOREX bureau), or vice versa, the result of which may mean a discrete rise in the domestic product once estimates of this activity are included. Also, even here, there are some important misconceptions by some

authors concerning the distinction between 'income' and 'capital transfers'. For example, in no circumstances would robbery and theft ever constitute productive activity: these are not income, they are (illegal) transfers of assets.

This clarification of the distinction between various forms of economic and pseudo-economic activity, though important, does not actually establish a distinction between the 'formal' and 'informal' sectors. This will require a quite separate consideration and this is dealt with in the next section. However, before proceeding with this, it is important to note that in the 1993 SNA the production boundary is drawn to include all of the informal, irregular (i.e. underground), and illegal activities provided they are 'genuine processes of production' (United Nations 1993, 6.34 - 6.36). In addition, parts of the activities of the household sector are also included within the boundary, such as own-account production of goods (now a broader category than just own-account agricultural production) although services are still excluded apart from the services of owner-occupied dwellings.

## 2.2 *Towards a definition of the informal sector*

The informal sector is frequently identified with a certain form of activity found in urban areas and is closely associated with the income earning activities of the urban poor. Peattie (1987) noted the many difficulties authors have faced in providing an accurate definition of what is meant by the 'informal sector'. She sets the search for a definition in the context of what she purports to be one of the basic traditions in economics, namely, economists' desire to seek what she terms 'dualistic conceptualisations'. Thus, in her view, the 'formal vs informal' is one such example of a dualistic conceptualisation. But she also points to a second tradition in economics, that of economic accounting, and the desire to measure the contribution of particular 'sectors' of an economy. However, the main thrust of her argument is that the term has been a convenient, though 'fuzzy', general-purpose category and does not stand up well either as sector of production or as an category to identify the poor. This point of view is very persuasive although there are two good reasons why it might still be useful to pursue a definition and classification of informal sector activity. First, the terminology is still in use, especially in the context of the role the informal sector is expected to play in the process of adjustment and economic reform. Secondly, the range of activities generally regarded as constituting the informal sector tends not to be adequately measured in existing statistics, especially in sub-Saharan Africa. Therefore, it will be useful to review briefly some of the attempts to define

informal sector activity.

(i) *Early studies*

As noted above, the origin of the term is usually attributed to Hart (1973) in a paper which focused on informal income opportunities and urban employment in Accra and Nima. Deriving information from the 1960 Census of Population, Hart began by noting that over half of the economically-active working-age population was non-wage earning; that is, the majority of individuals were classified as employer or self-employed, unemployed, or other non-wage earning. From this he proceeded to distinguish between formal and informal income earners essentially on the basis of whether they were wage-earning or self-employed, stating that the 'key variable is the degree of rationalisation of work - that is to say, whether or not labour is recruited on a permanent and regular basis for fixed rewards'. (Hart 1973; p 68). Hart provided a list of activities associated with formal and informal income opportunities of individuals (see Table A1). It should be noted that Hart's list includes some activities which we might want to exclude on the grounds that they are transfers of assets rather than income-generating transactions.

The category of activity to which the term refers had already been noted by several earlier writers. For example, Reynolds (1969) had developed a model which contained two urban sectors, one of which he referred to as a 'trade service' sector describing 'the multitude of people whom one sees thronging the city streets, sidewalks and back alleys in the LDCs: the petty traders, street vendors, coolies and porters, small artisans, messengers, barbers, shoe-shine boys and personal servants' (Reynolds 1969; p 69). This is probably still a good characterisation of what many authors understand as constituting the urban informal sector. Indeed, it is worth noting that a very similar characterisation had already appeared in Lewis's classic formulation of his dual-economy model in 1954. But these broad characterisations are neither comprehensive nor even precise enough to underpin estimation and measurement.

Another early and influential study which highlighted the importance of informal sector activity was the report by the ILO World Employment Programme (WEP) mission to Kenya (ILO 1972). This was the result of one of three WEP missions designed to study the causes of unemployment in particular types of country and to establish what could be done about it. A notable feature of the Kenya report was the shift in emphasis away from 'unemployment' *per se* and towards 'underemployment', so as to focus on the fact that few people could afford to be unemployed in countries

where there were no unemployment benefits and state income support. In the words of the report: '...in addition to people who are not earning incomes at all there is another (more numerous) group of people whom we call the 'working poor' ' (ILO 1972; p 9). These were identified to be predominantly the rural migrants who failed to find employment in the modern sector but 'who found employment in economic activities that escaped recognition, enumeration, regulation and protection by government' (Thomas 1990). The ILO study also set out a typology of informal sector characteristics, to be shown and briefly discussed later.

The ILO Kenya study is usually considered as setting out most of the elements of what is known about the informal sector (Lubell 1991). This included a quite different typology from the one proposed by Hart and was enterprise-based (see Table A2). But there have been a number of other studies which have helped to characterise and define more precisely the kinds of activities involved. For example, Weeks (1975) saw the relationship of enterprises to the state as constituting a crucial distinction between formal and informal sectors. He reckoned that enterprises outside the ambit of the system of benefits and regulations of government were likely to have a relatively small scale of operations, rely on labour-intensive techniques, and generate relatively low income levels. Mazumdar (1976) also developed an informal sector definition by focusing on the urban labour market. His perception was that employment in the formal sector is in some sense 'protected', so that the level of wages and working conditions are not available to job-seekers unless they somehow cross the barriers to entry. He saw this 'protection' as arising from the action of trades unions or of government, or of both acting together. Indeed this notion of a 'protected' formal sector runs through most of the World Bank studies carried out in the 1970s by Mazumdar.

## (ii) *Reviews*

Sethuraman (1981) summarised the various approaches to characterising the informal sector and noted that an acceptable definition had still to be established. In particular he noted certain ambiguities arising from the attempt to classify activities into two sectors on the basis of multiple criteria: there are inevitable contradictions as each criterion tends to create a universe of its own. However, he did stress the importance of an employment criterion: suggesting that an informal sector unit is primarily motivated by employment creation, while a small (formal sector) enterprise is primarily concerned with profit maximisation (Sethuraman 1981; p 17). Like the ILO

Kenya report, Sethuraman favoured the establishment, or production unit, reference as a basis for the definition.

A second important and early review of the literature that had attempted to define the informal sector was that of Bromley (1978), which Thomas (1992) noted took a somewhat broader perspective than simply the economics of informality. Bromley listed nine deficiencies (or misconceptions), many of which are still central to the debate, of which the following are especially relevant to our present exercise:

- it is very crude procedure to divide all economic activities into two categories.
- it is logically inconsistent to use multiple criteria and not use multivariate analysis in making the classification.
- there is a tendency to view the informal sector as exclusively urban.
- there is a tendency to consider the 'urban informal sector' and the 'urban poor' to be synonymous, and no real justification for it.
- there is a tendency to confuse neighbourhoods, households, people, and activities with 'enterprises'. People may work in different sectors at different stages of their life-cycle, times of the year, or times of the day, so the enterprise is more likely to be preferred as a unit of enumeration.

Thirdly, a comprehensive appraisal of informal sector concepts is contained in an OECD volume edited by Turnham, Salome and Schwartz (1989), and in particular in a survey paper by Charmes (1989). He noted the fact that, in practice, estimates of informal sector activity are derived on the basis of a single criterion, which is regarded as subsuming all other characteristics (Charmes 1989; p 14). The most commonly used are:

- *occupational status*, which allows a distinction to be drawn between (wage) employees and non-wage earners;
- *size of enterprise*, measured in terms of numbers employed. The most commonly-used threshold is ten jobs and although this is criticised for being applied indiscriminately across all activities in all countries, Charmes notes that this threshold frequently corresponds to changes in structure and behaviour in an enterprise setting across countries.
- *registration*, in which the informal sector is defined as constituting those (non-agricultural) activities which are not separately and

regularly registered by statistical surveys.

- *income level.* This is a quite different type of criterion as it refers to an individual (or household) characteristic and not to an enterprise or activity.

Charmes noted that many attempts to define and identify informal sector activity have been based on pragmatic considerations. He also noted how non-registration has tended to emerge as the most widely advocated criterion in statistical work, although it is not necessarily the most frequently used and is possibly open to different interpretations. However, the reality is that as such enterprises are not registered it makes them all the more difficult to track and enumerate, and indirect enumerations must be sought. Population censuses provide comprehensive information on employment but usually no information on incomes and, of course, no information at an enterprise level. But even with regard to employment criteria, Charmes noted that the proposals to emerge from the 1987 International Conference on Labour Statisticians were only of an interim nature. According to those proposals informal sector employment should comprise all those who were employed (in the reference week) (a) in unregistered entities or (b) in registered entities which had similar characteristics (level of organisation, scale of operation and level of technology) and in the same branch of economic activity as those which are unregistered. The preliminary proposals from the 1987 ILO conference have been superseded by those in the 1993 ILO conference, as reported in the 1993 SNA and set out in the next section.

### 2.3 *Consequences for the national accounts*

As indicated in Section 2.2 there are two reasons why it is important to identify the characteristics and determine a typology of informal sector in the context of the national accounts. The first reason is to ensure that the coverage of productive activity is comprehensive and complete, at least according to current SNA conventions. The second reason is that it is often desirable for analytical purposes to be able to distinguish between formal and informal activity, especially for economies undergoing adjustment and reform, because the response of these activities may be very different.

The 1993 SNA includes details of the resolution of the fifteenth International Conference of Labour Statisticians (United Nations 1993; pp 111-112) which provided, amongst other guide-lines, an international statistical definition of the informal sector.



Regrettably, the conceptual basis for this is not very precise and, indeed, it is no more extensive than has been set out and reviewed in earlier sections of this paper. A more complete and comprehensive discussion of the informal sector in relation to household economic activities can be found in United Nations (1991).

The 1993 SNA is organised around five institutional sectors of the economy. These comprise: non-financial corporations, financial corporations, government units, private non-profit institutions serving households, and households. The production activities of the household sector are deemed to exclude 'quasi-corporate activities', that is, activities for which there exist complete sets of accounts separate from those of the household.

The 'operational definition' of the informal sector set out in the SNA focuses on productive activities within the household sector. In particular, these activities include:

- (i) *informal own-account enterprises*  
i.e. those owned and operated by own-account workers either alone or in partnership with the same or other households, and which may employ family workers or employees on an occasional - though not continual - basis. These may be limited to unregistered enterprises, according to some national definition of registration.
- (ii) *enterprises of informal employers*  
i.e. those owned and operated by employers (alone or in partnership, as above) which employ one or more employees on a continual basis. Operationally, these enterprises may be defined in terms of a size below a specified level of employment (e.g. less than 10 persons employed) and/or a condition of non-registration of either the enterprises or employees as above.

However, the distinction drawn in the SNA between market and non-market production activity is not referred to in this context, and there is some ambiguity as to whether or not non-market activity is included in the SNA definition of the informal sector. It has been suggested elsewhere (United Nations 1991; p 33), for instance, that non-market activity should be *excluded*, on the grounds that 'own-account production' (that is, production for own-consumption) 'such as subsistence farms ... is carried out under motivations other than employment and income-generation, through production and distribution of commodities, and reflect a different socio-economic phenomenon'. The argument is not wholly convincing, but it does serve to underline the ambiguities about what is, or is not, included in the definition.

It might be useful to consider related enterprise definitions alongside this operational definition of the informal sector in the SNA.

- (a) *Unincorporated business enterprises*

According to the SNA, the category 'unincorporated business enterprises' includes all household producers whether they are engaged in market or non-market production. Therefore, the above SNA 'operational definition' of the informal sector bears a close resemblance to the activities of unincorporated enterprises of households, except for the possible *exclusion* of 'own final use' production as well as those which are registered under a variety of regulatory acts (e.g. doctors, lawyers, etc). Unincorporated business activity might well be the preferred target of measurement for national accounts purposes, rather than that of a more narrowly defined 'informal sector'.

(b) *Micro-enterprises*

The 1993 SNA does not refer to 'micro-enterprises' as such, although the term has become more prevalent in recent years as a way of describing informal sector activity. Some authors simply use the term to describe all (non-agricultural) household-based activity. A distinction is sometimes drawn between 'modern' and 'marginalist' informal sector activity, the former referring to the more productive and dynamic elements. Lubell (1991) has associated 'micro-enterprises' with the 'modern' informal sector. On the other hand, Charmes (1991) associates 'micro-enterprises' with the category of household enterprises of informal employers (i.e. *excluding* household own-account enterprises), but restricted to non-agricultural enterprises. The Charmes definition of micro-enterprises is essentially the same as the one which is adopted in the current exercise. However, unlike Charmes, micro-enterprises (and indeed the informal sector more generally) will be deemed to include agricultural as well as non-agricultural activity.

(c) *Small and medium scale enterprises (SMEs)*

Small and medium scale enterprises are usually defined solely according to size, usually in terms of the size of employment either of the establishment or of the enterprise concerned. In principle, therefore, registration is not a condition although, in practice, enterprise-based statistics may be limited to enterprises included in a statistical register. Therefore the informal sector may well overlap with, although not necessarily coincide with SMEs (at least, not SMEs as measured in conventional statistics) or even with the narrower category of small-scale enterprises (SSEs). Therefore the two concepts are quite different and should be distinguished for our purposes.

In summary, it can be seen that there is considerable overlap between several concepts and terms in popular usage. From the national accounts point of view the production units operating within the household sector are all 'unincorporated enterprises' (United Nations 1993; p 106) and therefore there is a particularly close relationship between the informal sector and the set of all unincorporated enterprises. However the most generally-accepted definition of the informal sector would exclude those enterprises covered by national legislation and registration, such as professional activities. Nevertheless there is an additional issue as to whether the informal sector should include agricultural as well as non-agricultural activity. In this study it will include household agricultural activity on the grounds that it is estimable and it will provide a more comprehensive coverage of household production activity.

### 3. Alternative Bases for Measurement

There are two basic approaches to measuring informal sector activity: one is the *individual*-based approach while the alternative is the *enterprise*-based approach. Both approaches have been adopted in previous studies of the informal sector and, indeed, the emergence of these alternative statistical approaches has been a contributing factor to the existence of ambiguities and differences in conceptual definitions. Hart (1973) based his formal/informal distinction on *individuals* whereas the ILO (1972) and Weeks (1975) adopted an *enterprise* approach.

#### 4.1 Enterprise surveys

The outcome of the discussion in section 2, together with the 'operational definition' included in the 1993 SNA suggests that the *enterprise approach* is to be preferred for national accounts estimation purposes. The main reason for this is that only at the level of the production establishment or enterprise can one derive credible estimates of value added. Individual, or employment-based approaches, although useful in ascertaining labour market characteristics of the individuals concerned, would tend to be confined to estimates of labour income and would therefore exclude either mixed income or operating surplus generated by the activities in which they are engaged.

Surveys of informal sector enterprises are quite common. For example, a recent survey of informal sector enterprises in the Accra region was recently carried out by Baah-Nuakoh (1993). One of the main problems with such surveys is, of course, the lack of an adequate sampling frame, and hence the uncertain coverage in the sample and the possibility of sample selection bias. There are several problems in this regard.

First, there may be some important categories that are not covered if surveys concentrate on enterprises and the self-employed working in fixed locations. For example, there are many of the classic activities in the informal sector (e.g. selling goods and services, repairs and transport) that are undertaken by individuals who walk, stand on the roadside or push carts, and would therefore tend not to be covered by establishment surveys.

Second, there are the activities of what Thomas (1992) calls 'homeworkers'. These

are individuals, mainly women assisted by children, who engage in a number of activities based on the preparation of food, clothes, trinkets, pots, etc. for sale elsewhere. These activities would not be captured in an enterprise survey.

Thomas (1992) refers to a third category of activity which might not be captured by an enterprise survey approach. This would be the category of individuals who engage in more than one job: that is those who are multiple-jobbing, or 'moonlighting', whose prime activity is in the formal sector (e.g. government service) but who also engage in informal sector activity (e.g. taxi driving). Thomas might not be correct here because, in theory at least, the enterprise survey should cover the activities (e.g. taxi services) regardless of the occupational status of the persons employed.

Finally, in practice, enterprise surveys may not have nationwide coverage given that they are often conducted in urban areas only. However, nonagricultural informal sector activities may also be carried out to a significant extent in rural areas and results from the Ghana Living Standards Survey suggest that this is indeed the case, especially in the rural coastal zone. Such informal rural enterprises may not be covered by conventional enterprise surveys.

#### 4.2 Household surveys

An alternative to the enterprise survey, and one which offers significant advantages both in terms of coverage and estimation of economic activity, is the *household survey*, although inevitably there are a few disadvantages too. Multi-subject household surveys, such as the Ghana Living Standards Surveys (GLSS), are especially appropriate in this regard because they can provide information on a range of 'ambulatory workers, homeworkers and those who are engaged in several economic activities' (Thomas (1992), although there are still potential difficulties in achieving complete coverage. The basic principles of their use in this regard are quite well documented (United Nations, 1991) and both the conceptual and practical aspects of the use of the GLSS for measuring individual and household income, and economic activity in Ghana more generally have been discussed in Coulombe, McKay and Round (1993). Particular aspects are also discussed in section 5 below.

One of the principal problems in using household surveys to measure production activity is that the household unit might not coincide with the production unit. Clearly there is no real problem when this activity is wholly carried out by one or more members of a household (i.e. a subset of a household). But problems do arise when

enterprises are owned or operated by members of different households, because then there is a problem of identification and apportionment of activity. This is the classic conflict between the 'establishment' and the 'household' unit.

A second problem is that the sample design used for selecting a sample of households might not be adequate for identifying the full range of agricultural and non-agricultural activities (United Nations, 1991; Chapter 4). The argument here is that the stratification factors appropriate to each of the two purposes might well differ and that, for instance, special weighting might be necessary to ensure an adequate representation of the full range of non-agricultural activities. In an ideal world, the report also concludes that it might be more appropriate to use two separate survey instruments. In particular, establishment surveys are suggested for enterprises operated by household members who are employers, while household surveys are appropriate to own-account activities. However, the argument for using two separate survey instruments is not very strong, and the report concludes by considering ways of integrating them to ensure proper coverage. Nevertheless, where household surveys are conducted independently of enterprise surveys, they may capture some types of activities less likely to be covered by an enterprise survey.

A third problem is that a large-scale, multi-purpose household survey may not obtain production data as accurately or in as much detail as a dedicated enterprise survey, and the responses may be less reliable. Also, it may be useful to re-emphasise an earlier point that not all household economic activity belongs to the informal sector. Self-employed professional persons are counted in the formal sector.

While it is important to be aware of these potential limitations of the household survey approach it nevertheless has certain advantages relative to the enterprise survey approach. In practice one works with the information available and, in the case of Ghana, the GLSS provides a potentially useful and so far unutilised source of information for estimating household level activity. We now turn to an evaluation of the information it provides.

#### 4. Review of Relevant Information in the GLSS

This section of the paper is devoted to a summary and general assessment of the information pertaining to the informal sector which is available in the Ghana Living Standards Survey and in similar Living Standards Measurement Surveys in other countries.

**Table 2** Content of the Ghana Living Standards Survey (GLSS)

Section	Subject	Unit of response
<i>Round one</i>		
1.	Household roster	I
2.	Housing	H
3.	Education	I
4.	Health	I
5.	Economic activities	I
6.	Migration	I
7.	Respondents for Round 2	I
<i>Round two</i>		
8.	Housing characteristics	H
9.	Agro-pastoral activities	H
10.	Non-farm employment	H
11.	Expenditures and inventory of durable goods	H
12.	Food expenses and home production	H
13.	Fertility	I
14.	Other income	H
15.	Credit and savings	H
16.	Anthropometrics	I

Key: Household (H) and individual (I).

The Ghana Living Standards Survey (GLSS) is a multi-purpose household survey,

which collects data on a wide range of different aspects of household living conditions, and which includes much information on the economic activities in which they are engaged. Many of these economic activities will take place in the informal sector, especially given the broad definition of the informal sector adopted here, which includes subsistence agriculture. Of particular interest from the point of view of the present study are data relating to (i) household non-farm enterprises; (ii) household agricultural activity; and (iii) wage employment. However, as such data may relate to either formal or informal sector activities, it will be important to be able to distinguish these on the basis of the data provided by the survey.

In broad terms, information on the economic activities undertaken by households and their members is collected both at the individual level and at the household level. Individual level information is collected in section 5, which concerns the economic activities, if any, of all household members aged seven years and above. Information is collected on both self employment and wage employment, whether or not these forms of employment are remunerated in monetary form. For each individual, the questions relate to their main and secondary economic activities in each of two reference periods: the week preceding the survey interview and the previous year. The information recorded provides information on, *inter alia*, the type of activities undertaken, on whether the individuals were self employed or employed for a non-household member, on incomes received in cash and in kind (the latter for employees only), and on employment characteristics (for employees only).

Information on household level production activities is collected in sections 9 and 10 of the questionnaire, which relate respectively to household agricultural activity and to non-farm self-employment. With regard to agriculture, information is collected on crop cultivation, on processing of crop products and on livestock related activities. In each case, detailed information is collected on inputs and outputs, which is sufficient to enable the calculation of farm profits, although the information on inputs is probably not sufficiently detailed to be attributed to particular crops. In the case of non-farm household enterprises, data is collected on up to three such enterprises for each household, taking the three most important if there are more than three. For each enterprise, questions relate to the nature of the activity in which it is engaged, employment levels (in broad terms), on the characteristics of the enterprise (including employment characteristics), revenues, input usage and assets. Thus for both farm and non-farm activities at the household level, the detailed information collected by the Ghana Living Standards Survey permits a detailed set of economic accounts to be drawn up.



These sections of the questionnaire then form the basis for the use of the Ghana Living Standards Survey to study the informal sector in Ghana. Of course, the issue of how one distinguishes in practice between formal and informal economic activities remains to be addressed. However, before tackling this question, we consider first of all the possibility of overlap between the information collected at the individual level in section 5 and that collected at the household level in sections 9 and 10. Where the activities in section 5 are reported by individuals as self employment activities, then these activities should also be covered at the household level in section 9 or 10, as appropriate. The extent to which this applies in practice is, of course, an empirical question. To the extent that it does, and can be identified as such, the information in section 5 can be regarded as providing a second estimate of the relevant equivalent concept in section 9 or 10. Generally speaking, however, section 5 should not provide information of any additional household self employment activities beyond those covered in sections 9 and 10 of the questionnaire.

This is not, however, the case if the economic activities reported in section 5 related to employment for a non-household member; these activities are not covered elsewhere in the questionnaire, and so detailed information is collected on them. Some of these activities will of course relate to wage employment in the informal sector. However, care must be taken that these activities are not double-counted, not so much at the household level, but in aggregate. This latter is particularly important given the interest in using the survey data as the basis for deriving economy-wide estimates. The danger of double counting is that these informal sector employees may be employees of the enterprise of another household. Information on household enterprises is already collected in sections 9 and 10, which includes questions about employment of non-household members. Thus, to the extent that in the informal sector many of the employers are other households, then section 5 and sections 9/10 are essentially covering the same economic activity, once from the employee's and once from the employer's point of view. In such cases, to add estimates derived from the two separate approaches, rather than to regard them as alternatives, would involve double-counting.

If it can be assumed that most employers in the informal sector are other households, then it is appropriate in both cases to view section 5 as providing alternative information to that provided in sections 9 and 10. The informal sector economic activities reported in section 5 should not be regarded as additional.

Generally speaking it is to be expected that the information provided by sections 9 and 10 is more comprehensive, and will provide more accurate estimates, than that derived

from section 5. The latter, however, may be of interest as a check on sections 9 and 10, both in the sense of providing an alternative estimate and as a means of verifying that all relevant household economic activity has been recorded in sections 9 and 10.

Accepting this point, we now lay the stress on sections 9 and 10, and explore how the information provided in these sections can be used in providing a characterisation and estimation of the informal sector in Ghana. The first issue which immediately arises is that of how to distinguish formal and informal activities, a distinction which is not clear-cut, even conceptually. In the case of non-farm activities, a distinction may be drawn based on (i) the nature of the activity undertaken; (ii) whether or not the household enterprise employs non-household members; and (iii) if it does, the conditions under which these non-household members are employed. How this information is used is obviously subject to a degree of arbitrariness at the margin, and the different criteria may conflict. However, for purposes of this study a household enterprise is classified as formal sector if either of the following conditions are satisfied:

- (a) the occupation in question is a professional occupation, such as a doctor, a lawyer or an accountant; or
- (b) the enterprise has at least six employees and the conditions of employment are such that one of the following applies:
  - (i) employees have a written contract;
  - (ii) the minimum wage applies;
  - (iii) a trade union exists in the enterprise;
  - (iv) employees are entitled to paid holiday or sick leave or medical/social security benefits.

All other household enterprises are regarded as belonging in the informal sector.

In the case of agriculture the distinction between formal and informal activity is also difficult to draw. Large scale or plantation agriculture, for example, in which large numbers of individuals are employed, might be regarded as belonging to the formal sector. However, it is to be expected that virtually all household level agricultural has the characteristics of informal sector economic activity. The absence of information on employment conditions in agriculture in the GLSS questionnaire means that this is the assumption which has been used for all households in this study.

The information collected by the GLSS questionnaire permits a relatively detailed

characterisation and measurement of informal economic activity. In each case, the available data permit a description and analysis of such aspects as the sectoral composition of informal sector activity, the characteristics of households and individuals engaged in informal sector activity, the characteristics of those enterprises, and the economic accounts of these activities (and hence their importance in the generation of household income). The estimates of the economic accounts are of particular importance for the derivation of economy-wide estimates of the contribution of the informal sector. For both agricultural and non-farm activities it is possible to measure gross output, input expenditure, profit, value added and (approximate) employment based on the data provided by the GLSS. In some cases alternative estimates of variables may be obtained; this is of particular importance in the case of non-farm enterprises, for which calculating incomes by subtracting input expenditures from revenues typically leads to large negative values.

The last point raises an important, more general issue, that of measurement error in the data. Alternative estimates of self employment income from agricultural and non-agricultural activities suggest the existence of significant discrepancies, and on average estimated household income is found to be significantly less than average household expenditure. These are important issues which need to be addressed in using the survey results as a basis for driving economy-wide estimates, with appropriate corrections made for any measurement errors identified.

Further papers will set out how the GLSS data relating to informal sector activities, and described in this section, were used in developing a detailed characterisation of the informal sector in Ghana and in deriving economy-wide estimates of the contribution of the informal sector to the national accounts.

## 5. Conclusions

The 'informal sector' is a term which has been used to describe a wide range of economic activities. Many examples, such as petty trading and small scale enterprises which engage in repair and maintenance, are usually cited as being stereotypical of such activity but this does not satisfactorily answer the question of how to define the informal sector in a more precise sense. This paper has reviewed, briefly, some of the earlier attempts to define informal sector activity. More recently, an operational definition, based on a recent ILO conference resolution, has been included in the 1993 SNA. The main focus of this definition is on production activities carried out within the household sector. It therefore includes most of what has hitherto been described as unincorporated business activity although it may exclude some enterprises which are too large or are registered under national legislation.

The second focus of this paper has been to examine the general efficacy of household versus enterprise surveys for informal sector activity, and to examine the potential and use of the Ghana Living Standards Survey as a basis for deriving economy-wide estimates. The scope and complexity of the survey means that information can be drawn from different sections, sometimes yielding alternative estimates of some variables. This part of the paper also highlights the need to consider the enterprise information as part of a system of household accounts, which helps in the identification of the information to be used as well as an assessment of the quality of the estimates that ensue.

## APPENDIX

Table A1 Hart's Typology of Urban Income Opportunities

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*Formal income opportunities*

- (a) *Public sector wages*
- (b) *Private sector wages*
- (c) *Transfer payments* - pensions, unemployment benefits.

*Informal income opportunities: legitimate*

- (a) *Primary and secondary activities* - farming, market gardening, building contractors and associated activities, self-employed artisans, shoemakers, tailors, manufacturers of beers and spirits.
- (b) *Tertiary enterprises with relatively large capital inputs* - housing, transport, utilities, commodity speculation, rentier activities.
- (c) *Small-scale distribution* - market operatives, petty traders, street hawkers, caterers in food and drink, bar attendants, carriers (*kayakaya*), commission agents, and dealers.
- (d) *Other services* - musicians, launderers, shoeshiners, barbers, night-soil removers, photographers, vehicle repair and other maintenance workers; brokerage and middlemanship (the *maigida* system in markets, law courts, etc.); ritual services, magic, and medicine.
- (e) *Private transfer payments* - gifts and similar flows of money and goods between persons; borrowing; begging.

*Informal income opportunities: illegitimate*

- (a) *Services* - hustlers and spivs in general; drug-pushing, prostitution, poncing ('pilot boy'), smuggling, bribery, political corruption Tammany Hall-style, protection rackets.
  - (b) *Transfers* - petty theft (eg pickpockets), larceny (eg burglary and armed robbery), peculation and embezzlement, confidence tricksters (eg money doublers), gambling.
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**Table A2** ILO Typology of Informal Sector Activities

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***Informal sector***

1. Ease of entry
2. Reliance on indigenous resources
3. Family ownership of enterprises
4. Small scale of operation
5. Labour-intensive methods of production and adapted technology
6. Skills acquired outside the formal school system
7. Unregulated and competitive markets

***Formal sector***

1. Difficult entry
  2. Frequent reliance on overseas resources
  3. Corporate ownership
  4. Large scale of operation
  5. Capital-intensive and often imported technology
  6. Formally acquired skills, often expatriate
  7. Protected markets (through tariffs, quotas and trade licences).
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Source ILO (1972).

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## 2 THE INFORMAL SECTOR IN THE GHANA NATIONAL ACCOUNTS

M Powell, P Debra, D Amable and R Tonhie

### 1 Introduction

Traditionally the National Accounts of Ghana are published in two tables in the Quarterly Digest of Statistics, one of which shows the components of Gross Domestic product by sector (industry) while the other shows GDP (plus factor income and transfers from overseas) from an expenditure standpoint. In common with most other African statistical services the Ghana Statistical Service spends the majority of its time and effort building up sectoral estimates of gross production and intermediate consumption in order to derive value added. The expenditure side of the accounts is derived in a relatively simple way by adding imports of goods and services to value added so as to provide an estimate of total supply. Netting out intermediate consumption and deducting imports, investment, and government final consumption expenditure, leaves private final consumption expenditure as a residual. As there are no independent estimates of total demand, nor any attempt to classify either supply or demand by commodity, the estimates of value added for individual sectors are entirely independent and this means that the methods of estimation can be considered separately for each sector. The basic methodology for calculating current price estimates of gross output and intermediate consumption for each industry is based on Singal and Nartey (1971) and the corresponding constant price estimates on Singal (1973) although the constant price methodology has since been updated by altering the reference year to 1975.

Although there is no separate entry in the accounts for informal activity such activity probably exists in almost every sector and this is reflected to a greater or lesser extent in the estimation methods and hence in the estimates derived. In evaluating these methods we need to focus on two main issues; the *coverage*, or the extent to which informal sector activity is captured in the existing estimates, and the *quality* (or the reliability) of the estimates that ensue. From a national accounts standpoint these issues are distinct. It is quite possible either to have partial coverage and very reliable estimates, or to have full coverage and unreliable estimates or, indeed, to have any other combination of degrees of coverage and quality of the estimates. In addition there is also a further question of the *separability*, or the extent to which it is possible to identify and hence distinguish the informal sector activity in an industry separately

from the rest. Finally it needs to be emphasised that the estimation methods for the national accounts in Ghana are currently undergoing major changes (in part to incorporate the results of the GLSS) so that the methods described below do not necessarily fully represent current or evolving practice.

## 2 Sectoral methodology

### 2.1 Agriculture

The agricultural sector comprises six sub-sectors: cocoa, crop farming (other than cocoa), poultry, animal husbandry, forestry, and fisheries. All sub-sectors are likely to contain a significant amount of informal activity and in order to ascertain the likely coverage and reliability of the estimates we now consider each of these sub-sectors in turn.

*Cocoa* : Although cocoa farming is undertaken mainly by small farmers, most of whom may be regarded as belonging to the informal sector, the crop is marketed entirely through the Cocoa Marketing Board whose records provide data on output and prices. The Board also carries out surveys to estimate yields and intermediate consumption, compensation of employees, and depreciation per acre. Hence value added in the cocoa sector is likely to be quite reliably estimated.

*Crop farming* : Crop farming, other than cocoa, is a sector which is almost entirely dominated by small scale farms. The land area under cultivation is estimated annually by the Ministry of Food and Agriculture (MFA) in their farm survey. The same survey also provides estimates of yield rates and producer prices and so the gross value of output can be readily estimated.

Intermediate consumption and other items in the national accounts such as compensation of employees, and depreciation, are estimated using a 1982 sample survey conducted by MFA to provide estimates of costs per acre. Suitable indices are then used to inflate 1982 values to current year values. Unfortunately the MFA is only able to provide data for a very limited (and decreasing) range of crops and so it has been necessary to assume that changes in output for other crops occurs at the same rate as for reported crops. These methods have recently been improved using GLSS results for baseline estimates.

Historically, formal sector agriculture has been of negligible importance and has not therefore been separately estimated in either the MFA estimates or the national accounts. However, since the introduction of the ERP some large farms have developed and attempts are now being made to measure their output using an annual survey.

*Poultry* : The poultry industry consists of two sectors; there are medium and large

scale poultry farms averaging 5,000 or more birds per farm and small scale poultry farms mainly managed on a household basis. Both sectors are covered by a census conducted by district veterinary officers. However, they are not separately identified and the extent to which estimates of the number of eggs consumed and birds killed for consumption reflect egg and bird consumption by households in rural communities is questionable. Intermediate consumption and the compensation of employees are estimated as ratios of gross output value derived from a sample survey conducted by the Statistical Service.

*Animal Husbandry* : The animal health and production division of MFA derives information on the animal population, the number of animals slaughtered and imported and the producer price per animal. These data are used to estimate the value of gross output. Ratios derived from a sample survey by the Statistical Service are used to estimate intermediate consumption, compensation of employees and depreciation. However, it is important to note that number animals slaughtered does not include those slaughtered outside the slaughter houses; that is, it excludes likely informal sector activity in this sector.

*Forestry and Logging* : This sub-sector is also characterized by substantial informal sector activity. For estimates of output we rely on data provided by the Forestry Department which compiles these data from reports sent from the district forestry departments in each region. Output is divided into industrial wood, charcoal and firewood, and minor forest products. Producers of industrial wood include some large companies that produce for export but the other sub-sectors are dominated by informal sector activities. Estimation of output is generally very difficult and the Forestry Department is still reviewing its methodology. Data on the production of logs does not include chain saw operations. Coverage of this activity is difficult as much of the output is illegal. However, despite its illegal nature, it remains an important economic activity producing a very high percentage of timber consumed locally. The Forestry Commission is currently preparing a report on recent studies made of chain saw operations and efforts are being made to obtain figures on this as soon as the report is published. It is anticipated that the coverage of this sector will improve over time. Again, intermediate consumption, compensation of employees and depreciation are all estimated using ratios derived from a survey conducted by the Statistical Service.

*Fishing* : This sector includes large scale marine fishing, small scale marine fishing and inland fishing. Data on large scale marine fishing is covered by a census of large vessels that are registered and monitored. It is the small scale marine fishing that is

predominantly informal. However, a reliable sample survey procedure has been put in place at the research unit of the Fisheries Department. For inland fisheries fishery staff have made estimates of optimal yield for inland fishing and this is taken as an indicator of the actual catch. This estimate is multiplied by prices to estimate current values of output. As in other sectors intermediate consumption, compensation of employees, and depreciation are computed using historic ratios derived from a survey conducted by the Statistical Service.

## 2.2 *Industry*

In the National Accounts of Ghana the industry sector contains four sub-sectors: Mining and Quarrying, Manufacturing, Electricity and Water, and Construction. The incidence of informal activity across these sub-sectors varies considerably.

### *Mining and Quarrying*

Mining and Quarrying is defined to cover the extraction of all minerals that occur in nature either as solids, liquids or as gases. It covers the underground and surface mines and quarries with all supplemental operations for dressing and processing ores and other crude materials, such as breaking, milling, washing, cleaning and grading carried out by the establishment. This definition (Singal and Nartey 1971; p.29) conforms to Major Division 2 of the 'International Standard Industrial Classification of all Economic Activities' (ISIC). In the National Accounts mining is separated into the production of gold, diamonds, manganese, bauxite, stone quarrying, salt winning and sand winning.

For the major gold, diamond, manganese, and bauxite mines and stone quarries the Industrial Section of the Statistical Service collects data on production on monthly and annual basis. The National Accounts Section also collect information from establishments directly through annual surveys. These activities are carried out by a few large companies which provide relevant information on output and input costs of production for the calculation of value added.

In the past, the output of 'African diggers' (individual operators who mine diamond or gold) could not be captured. However, in recent years all individual prospectors (or Galamsay operators) are obliged by law to sell their diamonds and gold to the Precious Mineral Marketing Corporation (PMMC) which provides information to the Statistical Service on such activities. Thus informal sector activity in diamond and

gold production is likely to be covered in the national accounts, at least as far as legal forms of this activity is concerned.

Informal sector activity also exists in salt mining. Apart from one large-scale producer, most salt production in the country is carried out in the informal sector. On the basis of historic data it has been estimated that the Pambros Salt Factory is producing about two fifths of all the salt produced in the country. Applying the reciprocal of this fraction to the gross output and intermediate consumption of Pambros Salt Factory, an estimate of value added is derived for salt winning activity as a whole. Thus, although the informal sector is notionally covered the reliability of the estimates is more questionable. The mining sector also includes sand winning which is an activity of increasing importance, especially in providing inputs for construction activity. However, production of sand winning is unorganized and often semi-legal, hence the estimation of output is problematic. Unfortunately, this is one instance where the GLSS will not be especially helpful because sand winning is not identified as a separate activity in the survey's classifications.

#### *Manufacturing:*

The most important source of information on manufacturing industry in Ghana is the Statistical Service's 1987 Industrial Census. This provides estimates of output, intermediate consumption and components of value added for all establishments with ten employees or more. These figures are up-dated from information provided by the Industrial Section together with some sales tax records from the Customs, Excise and Preventive Service (CEPS) and these have formed the basis of all estimates of GDP for manufacturing.

The estimates based on large scale establishments are supplemented by information from a 1963 survey of small-scale industries. However, no separate indicator variables for small-scale industries are available and output is simply assumed to move in line with output in the larger industries. This is another of the areas where GLSS data may prove most useful.

#### *Electricity and Water:*

Although it is theoretically possible to have some informal activity in the production and distribution of electricity and water the Ghana Statistical Service considers such

activity to be negligible in Ghana. Estimates for the sectors as a whole are drawn from administrative records (from Volta River Authority, the Electricity Corporation of Ghana, and the Ghana Water and Sewerage Corporation).

*Construction:*

The activities covered under this industrial category comprise construction, repair, alteration and demolition of buildings, highways, streets, bridges, feeder roads, sewers, water and electricity mains, railways, harbours, airports, dams, land drainage and reclamation, hydro-electric plants and communication systems, whether undertaken by private bodies or governmental authorities. In principle, it covers all own-account construction activity in addition to those activities carried out by general and special trade contractors such as masons, carpenters, plumbers, electricians etc.

For the purposes of estimating gross output and value-added the construction sector is sub-divided into four sub-sectors, as follows:

(i) repair and maintenance

Value added in repair and maintenance of buildings is estimated by allocating the total cost of repairs and maintenance of building (which is estimated as one month's rental value for all buildings) across various cost components, namely: (a) materials, (b) labour, including the contractor's margin and (c) transportation. This allocation is based on historic ratios derived by Singal and Nartey (1971) with the assistance of the Chief Engineer of the Public Works Department (PWD). They established that the percentage shares of (a) materials (b) labour (c) transport in the total expenditure on repairs of permanent buildings were 40, 55 and 5% respectively while the corresponding percentages for non-permanent buildings were 35, 45 and 20%. Also the allocation of the total cost of repairs and maintenance between permanent and non-permanent buildings was estimated to be 56 and 44% respectively.

(ii) construction of non-permanent buildings

The total value of construction of non-permanent buildings is estimated by:

- deriving the value of houses by taking the total number of houses from the 1960

Population Census and applying an average value derived from a sample of 22,500 houses drawn from rating records by the Statistical Service;

- assuming a growth rate in the number of houses (i.e. the volume of new construction) equal to half the rate of growth of the population;
- applying the building cost index to allow for price changes.

Value added in this sub-sector is then derived using established ratios.

(iii) construction of permanent buildings

For permanent buildings a commodity-flow approach is used. The total supply of locally manufactured and imported construction materials (including trade and transport margins of 20%) less materials used for non-permanent buildings, repairs and maintenance, and other construction work, is assumed to equal the value of materials utilized in the construction on permanent buildings. Singal and Nartey (1971) established that these materials accounted for 55% of the total value of permanent construction and that 40% was value added. These ratios provide the basis for estimating value added and should cover both formal and informal sector activity.

(iv) Other construction work

The total value of capital expenditure on buildings for government and parastatals during the year is assumed to constitute the gross output for 'other construction'. Intermediate consumption is then derived as the total value of cement and other construction materials plus a further 20% of the value of gross output to cover distributive margins. Other construction is further classified into; roads and bridges, airports and aerodromes, harbours, railways, sewerage and drainage, post and telecommunications installations, electricity generation and distribution, dams and powerhouse, control works, water supplies, other construction works, and land improvement. Data on total capital expenditures are obtained directly from public records whilst previous estimates of intermediate consumption made by Singal and Nartey with the assistance of the PWD provide the basis for the ratios used. Informal activities do not arise in 'other construction' sector as defined here.

### 2.3 Wholesale and Retail Trade

A large number of informal sector units participate in the distributive trades sector. Estimates are obtained under the following commodity sub-headings: imported goods, locally manufactured goods, agricultural products, forest products, fish, livestock and



petrol retailing.

Although formal sector enterprises carry out almost all wholesale trading activity they account for only a small proportion of the retail trade activities. The number of persons in the informal sector who are engaged in retail trading is so large and, by definition, so unorganized it has not been possible to identify the statistical units to collect any meaningful information. Therefore, although it has been possible for some time to collect data on activities of the formal sector enterprises engaged in wholesale trade, data relating to informal sector operators cannot easily be compiled and it must be concluded that coverage of this activity is incomplete.

Because of these handicaps, the estimation of the domestic product arising from distributive trade in commodities other than petrol retailing have only been achieved by the commodity flow method. The production and the value of output of all commodities entering domestic trade are established under their different commodity groupings. By applying ratios which have been established previously estimates of the proportion of each of the different types of goods and commodities traded domestically can be calculated. Then, applying previous estimates of the ratios of trade margins to gross outputs, values of the gross output of trade services can be derived. Previously derived percentages of intermediate consumption and depreciation are applied to the gross output values in order to arrive at value added. This method potentially covers both formal and informal activities although as noted above the coverage of informal sector activity may be incomplete. This will probably remain as the general methodology for the time being although surveys will be carried out to improve the estimates of the ratios used and hence of the resulting estimates of value added.

#### 2.4 *Restaurants and Hotels*

Alongside efforts to improve the estimates for the distributive trades, the coverage for the estimation of formal sector operations under hotels and restaurant activities is also being improved by the use of revised lists of establishments and operators obtained from Ghana Tourist Board. This is used to draw a sample and information from this sample is used to provide estimates of total activity based on the collections of hotel and restaurant tax. However, we are yet to improve on estimates of informal sector activities relating to the operations of chopbars, cafes and other eating and drinking establishments as it is believed that many of these are not registered with the Ghana Tourist Board and do not pay hotel tax.

## 2.5 *Transport, Storage and Communication*

Analysis of this broad sector is divided into the following subdivisions.

### (i) Land transport

- Railway transport services
- Road transport services (subdivided into)
  - State-owned commercial road transport services:
  - Private commercial road passenger transport services
  - Freight transport by road.

### (ii) Water transport

- Ocean and inland water transport services
- Supporting services to water transport.

### (iii) Air transport

### (iv) Services allied to transport

### (v) Storage and warehousing services

### (vi) Communication services.

Informal sector activities are highly prevalent in the sub-sectors of private commercial road passenger transportation services as well as freight transport services by road. Benchmark survey inquiries have been carried out to compute per vehicle average income or earnings, average values of intermediate consumption, indirect tax payments, and average amounts of salaries, wages, allowances and other forms of compensations paid to employee drivers, driver mates and other persons who render direct services in the running of the transport. The inquiries covered a cross-section of the various organizational class groupings of operating unit vehicles under the following class groupings:-

#### (a) Passenger buses and other passenger vehicles

- Long distance passenger buses and vehicles
- Short distance passenger buses and vehicles
- Troto service buses and vehicles which operate within cities and town

areas

- Taxi services.

(b) Cargo/tipper and other freight haulage vehicles

- Articulated trucks and vehicles which convey cocoa, imported goods and other manufactured goods etc.
- Cargo trucks, which convey agricultural products, salt, saw timber and other timber products, charcoal and firewood etc.
- Container cargo vehicles
- Tipper trucks which convey sand and stone.

In the absence of data on the annual population of vehicles in Ghana, the yearly figures on the roadworthiness certificates of private commercial vehicles and buses provided by the Licensing Unit of the Motor Division of the Ghana Police Service are used as motor vehicle population data from which the value of gross output and other components of the value added estimates for the private commercial road transport sector are computed. The last time such a bench-mark inquiry was carried out was in 1988. Another benchmark survey is being planned to be carried out in 1996 in which information would be associated with operating activities in 1994 and 1995.

Informal activity also exists in water transport services but transport services operated by canoe and other board units on rivers, lagoons and lakes are not covered in our present estimates.

Under the subsector concerning 'services allied to transport', many of the operating units relating to forwarding and removing activities and shipping agents as well as tour operators and travel agencies fall under the category of informal employers. These are sampled using the Statistical Service's establishment register but as many shipping agents are not fully organized units the coverage and the quality of data which they supply falls short of desired levels, even when they are registered. In particular many of the units operating under storage and warehousing services are small unorganized units and are not registered operators. We find many such unregistered units under 'cold storage services'. These units own deep freezers and they carry out preservation, of food, fish, etc. on a fee basis to customers.

At first sight these services seem just as unlikely to be candidates for informal activity as the sector for electricity and gas. However, anecdotal evidence suggests the existence of informal money lending on quite a large scale. This activity is not covered in the present methodology and unfortunately it is likely to be difficult to identify it from the GLSS. Formal financial activity is measured using surveys based on the registers of the Bank of Ghana and direct information from the commercial banks and insurance companies.

## 2.7 *Real Estate Services*

GDP estimates for real estate services are compiled as a subsector within the major sector of 'Finance, Insurance and Business Services'. In Ghana, this subsector embraces income generated largely from rental and owner-occupied dwellings and apartments owned by members of the family occupying the unit. Prior to 1992, estimates were compiled for actual and imputed rental of dwellings only. The activities now covered in the sector encompass the following:-

- the letting, management and operation of real estate, on own account, such as non-residential buildings, apartment buildings and dwellings.
- developers and builders of residential and industrial estates.
- estate agents, brokers and managers engaged in renting, buying, selling, managing and appraising real estate on contract or fee basis.

In our efforts to improve these estimates, information is being sought from a least a cross-section of the 146 operating units who are registered members of the Ghana Real Estate Developers Association (GREDA). It is our hope to present a new analysis for the real estate services in our new base year under the following categories:

- (i) Domestic product from owner-occupied and rental dwellings
- (ii) Domestic product from publicly-owned real estate organizations (namely the state housing corporation and SSNIT Real Estate Development Division).
- (iii) Domestic product from privately-owned real estate units or enterprises.

Domestic product generated by real estate services from owner-occupied and rental dwellings can be considered as operations of informal own-account enterprises. Because of lack of information on this sub-sector, data used for preparing estimates are obtained from growth rates of urban and rural households computed from the 1970 and 1984 Population Census records. These growth rates are used to project yearly

rental estimates drawn from GLSS2. In the final stage of the computation the rent index from the CPI is used to calculate the value of the gross output in respect of the imputed rents of owner-occupied dwellings as well as all rental units in the country. Estimates of intermediate consumption is assumed to be equal to one twelfth of gross output (that is, one month's total rent payable for the whole country).

The compilation of GDP estimates for the publicly-owned real estate organizations and the privately-owned enterprises all fall under the formal sector activities and are measured using public records and surveys of registered operators.

### 2.8 *Business Services*

Output is estimated using surveys relying on the membership lists of professional organizations including lawyers, doctors engineers, accountants etc. These exclude any attributable output of informal sector activity.

### 2.9 *Government Services, Public Sector Aid and Development*

Again, the question of informal activity is not relevant since by definition we are dealing with the public sector. Data is drawn from public records.

### 2.10 *Private Non-Profit Organizations:*

By definition these are registered organizations and thus they are unquestionably formal. Certainly, they do not fall under any reasonable definition of household production. The Ghana Statistical Service measures such activity for national accounts purposes by direct inquiry using a list of private non-profit organizations. However, efforts are underway to update this methodology by relying on employment records coupled with sample surveys of more organized establishments such as schools and hospitals.

## 2.11 *Community, Social and Personal Services*

This sector covers a vast array of mostly small service activities many of which are in the informal sector. Coverage has traditionally been based on occupational data from the Population Census projected forward using the growth of work force together with assumptions about average earnings in each occupation. This method is currently being improved by establishment surveys of some especially important personal services such as hairdressing. However, this may be an area where the GLSS data will be extremely important.

### 3. Conclusions

The extent to which the informal sector is covered in the present National Accounts methodology varies considerably from sector to sector. However, even where the present coverage is most comprehensive and of highest quality it may still be possible to improve it using data from the GLSS estimates. Data on farming for example, drawn from the Ministry of Agriculture's annual survey of small scale farmers, can be supplemented using the longer list of crops covered in the GLSS. Conversely even in the areas where coverage is poorest is it not possible to simply incorporate the GLSS-based estimate as an addition to the existing figures.

Some general conclusions for future work emerge from this review of current and past practice. In the first place it should be remembered that the accounts must be produced on at least an annual basis. While this does not mean that we are restricted to information which is available on an annual basis it does imply that the data must relate directly or indirectly to some annual series. Secondly, the information should ideally be sufficiently disaggregated to allow us to use our traditional sectoral classifications. This makes it difficult to use a category as broad as say 'trade' which combine table-top sellers, chop bars and other trade outlets under the same heading. Thirdly we must be sure that there is no double-counting. That is, we must ensure that we are not including as extra informal sector activity those parts of production already covered in our estimates for the formal sector. In practice this requires more disaggregation as different components of the same industry may have different estimation techniques. For example in order to incorporate informal sector information for wholesale and retail trade, and hotel and restaurants, separate estimates for each sub-sector are required. Finally, there will be some areas where the GLSS information is less suitable than other sources. In particular, household surveys such as the GLSS are designed to cover a relatively uniform geographical spread of households across the whole country and so the data on certain activities such as alluvial gold mining that are concentrated in particular areas are likely to be of relatively poor quality. Therefore, for these activities it will continue to be necessary to rely on dedicated surveys and alternative sources for basic information.

**References**

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### 3 DESCRIPTIVE ANALYSIS OF THE INFORMAL SECTOR IN GHANA: A STUDY BASED ON THE FIRST TWO ROUNDS OF THE GLSS SURVEYS

H Coulombe, A D McKay and J I Round<sup>1</sup>

#### 1. Introduction

It is clear that informal economic activity plays a very important role in the Ghanaian economy, although very little quantitative information has been available hitherto on the size, nature and characteristics of such activity. While existing national accounts estimates may partially cover informal economic activities to some extent, informal economic activities are never separately identified so that their overall contribution is unknown (McKay and Round, 1994). The Industrial Census of 1987 focused predominantly on enterprises employing ten or more people, and as it also does not cover the full range of productive activities, its coverage of informal activities must be limited. The Ghana Living Standards Survey (GLSS), which includes, amongst a wide range of other information, data on household level production activities, therefore represent a potentially valuable source of information in this respect.<sup>2</sup> These may be used both for a characterisation of household-level informal sector activity and as the basis for the construction of economy-wide estimates of the contribution of such activities to the national product. This paper focuses mainly on the former, though the tabulations are constructed in such a way as to form the basis for making economy-wide estimates. This latter task forms the basis of a separate paper (Coulombe, McKay and Round, 1994b).

In using a household survey as the basis for characterising and estimating informal sector activity, the essential interest is in the information it provides on household level production activities, most, though not quite all, of which can be considered as belonging to the informal sector.<sup>3</sup> The Ghana Living Standards Survey is suitable in

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1 The authors are grateful to Matthew Powell for detailed and helpful comments on an earlier draft.

2 The first round, GLSS 1, was conducted between September 1987 and August 1988, and the second round, GLSS 2, between September 1988 and August 1989. The same questionnaire was used for GLSS 1 and GLSS 2. Details of the questionnaire are reported in Grootaert (1987).

3 Household level activities which are formal in nature are not considered in this paper. However, equivalent tabulations and estimates of formal household economic activity could be compiled from the GLSS data.

this respect, as it collects quite detailed information on both agricultural and non-agricultural activities undertaken by households. In general, household surveys suffer from certain limitations in identifying and estimating informal sector activity, for example with regard to activities undertaken jointly by more than one household. However, the information available in the GLSS is relatively detailed and is likely to identify many household productive activities which might not be detected in a more conventional enterprise survey. In any case it is the most useful and richest data set currently available in Ghana in this regard.

As not all household level activities are necessarily informal in nature, the issue of how to identify informal activities is important at the outset. This issue has been discussed in a previous paper (McKay and Round, 1994), both in conceptual and methodological terms and in the specific context of the GLSS. In brief, it can simply be noted that we focus on informal activities as opposed to irregular and criminal activities, which are unlikely to be reported in a household survey. With this exception we adopt a broad concept of informal sector activity which includes subsistence agriculture in addition to non-agricultural household level activity. The specific criteria used to identify informal economic activity will be re-iterated in section 2 of this paper.

The tabulations which are presented in this paper are chosen in such a way as to facilitate the derivation of economy-wide estimates of informal economic activity in Ghana. This means firstly that our interest is more in the global characteristics across all households rather than in the detailed characteristics of individual household enterprises. The tabulations are therefore mainly in terms of totals of relevant variables calculated in relation to all enterprises in the sample or appropriate subsamples. Secondly, the focus is mainly on the economic accounts of such enterprises, using conventional national accounting concepts such as value added and gross output as key variables. The estimates of these national accounting variables are constructed for the whole sample and for appropriate subsamples (eg. by sector) which can then be used as the basis for making economy-wide estimates. This is because the sample of households is nationally representative although, as will be seen in the subsequent paper, adjustments for underrecording income need to be made before grossing-up the sample to the population (economy-wide) level.

The paper is organised as follows. Section 2 sets out the issue of identifying informal household level economic activity in Ghana using the GLSS data, and explains the procedures used. In section 3 the contribution of informal sector activities to

household income and consumption is discussed, underlining its fundamental importance to households. Sections 4 and 5 represent the core of the paper. Section 4 presents a characterisation of non-agricultural informal activity in Ghana on the basis of a series of tabulations, while section 5 presents a similar characterisation for agricultural activities. Section 6 contains some overall conclusions.

## 2. The identification of informal economic activity.

Households and their individual members who are active in the informal sector may work as employees, employers or, most likely, on a self-employed basis. In the first case, informal economic activity generates wage income, whereas in the latter two cases the income received is likely to comprise, conceptually at least, a mixture of wage and profit income. Each of these represent income from informal sector activity, and in looking at the generation of income at the household level, all components should be included. This is the approach that will be adopted in looking at the contribution of the informal sector to the generation of household income in section 3. However, in looking at the contribution of the informal sector to the generation of income at the global level, care must be taken to avoid double-counting. Specifically, by definition, employees in the informal sector work for employers whose enterprises are likely to belong to other households. The wage income of employees is a component of the value added of the enterprises of employers. Thus in aggregating to the global level, it is important that informal sector employee compensation be excluded in order to avoid double-counting. At the global level the interest here is in measuring the activities of employers and the self-employed.

In the specific context of the Ghana Living Standards Survey, two sets of information collected by the survey are of potential relevance here:

- (i) information collected at the household level on household production activities, collected for each individual activity in both agriculture and non-farm enterprises (sections 9 and 10 respectively of the GLSS 1 and GLSS 2 questionnaires); and
- (ii) information collected at the individual level on income from self-employment activities, which are by definition household production activities (section 5 of the GLSS 1 and GLSS 2 questionnaires).

As much of household production activity is undertaken by the household collectively, rather than by a single individual, the former may give better estimates, at least for such collective activities. More compelling, however, is the fact that the household level information collected is much more detailed in the enterprise sections, for example in terms of collecting information on sources of revenue and patterns of input expenditure. In this paper the emphasis will be placed on the household level

responses. However, it is important to recognize that the individual level approach may identify some activities undertaken by single individuals which are not reported in the sections relating to the household level.

Such omissions are not straightforward to identify, as it is very difficult to match individual responses on self-employment activities in section 5 with household level production activities in sections 9 and 10. In other words it is not easy to see to what extent the individual self-employment activities identified in section 5 are in fact the same as the household level activities in sections 9 and 10. The easiest way to make an approximate assessment of its importance is to see whether many instances arise in which individual members of households report self-employment activity in section 5, but where no household level production activity is reported in sections 9 or 10. In fact, there are very few such cases. For agricultural activity, there are only 10 households in the GLSS 1 sample and 5 in GLSS 2 in which one or more individuals report income from self-employment activity in this area but which at the household level there is no report of such activity. For non-agricultural activity the corresponding numbers are respectively 37 and 32. All these numbers are very small relative to the size of the samples. Indeed, in all cases there are many more instances of the converse, that is where a household reports a production activity but the individual members do not report corresponding self-employment activity. These results reinforce the decision to base the analysis on the household level (enterprise) information. As well as being much more detailed, it appears not to have significant omissions of this nature.<sup>4</sup>

Not all of these production activities are necessarily informal in nature. The criteria used for identifying informal activities have already been set out and explained in a previous paper (McKay and Round, 1994). In short, they may be summarised as follows. All household agricultural activity is considered as informal in nature, the formal agricultural sector lying almost completely outside the household sector. The following non-agricultural enterprises are considered as belonging to the formal sector: those engaged in an occupation which is professional in nature (such as doctors, dentists, accountants, and lawyers) or those which employ more than six people and in which at least one of the following employment conditions applies: presence of a trade unions; application of the minimum wage; existence of a trade union; entitlement to paid holiday, sick leave, or medical/social security benefits. All other non-farm

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It is possible that some informal household economic activities not included in sections 9 and 10 are reported elsewhere in the questionnaire e.g. private sales of water. Such instances are very few and we only include those activities identified in sections 9 and 10.

products consumed domestically. Also, note that in the income figures we use there is no allowance for the depreciation of fixed assets, although separate estimates are available of the consumption of fixed assets constructed in accordance with standard national accounting practice. Finally, it might be noted that Vijverberg (1991) juxtaposed the terms for 'net revenue' and 'profits' according to the above definitions of the estimates.

(ii) *Farm enterprises*

Household income derived from farm enterprises can be estimated from the GLSS survey in two ways.

*Net revenue* (HHAGINC1): defined as the difference between total revenues and total costs can be estimated separately for crops, food products from homegrown crops, livestock, and animal products.

*Earnings* (HHAGINC2): defined as self-employment income derived from agricultural activities reported in the activities module.

A separate estimate for the consumption of home produced food augments each of the above estimates. Also, as with non-farm enterprises, in the income data used in this study no allowance has been made for depreciation allowances although estimates have previously been constructed (Coulombe, McKay and Round, 1993). In both cases the estimates are based on the price concepts used in the GLSS questionnaire. In practice these tend to be a mixture of purchaser and producer prices, with most actual revenues being valued at producer prices, and input expenditures and imputations for own consumption of output generally being valued at purchaser prices.

The alternative estimation methods generate widely differing estimates of income, especially in the case of non-farm enterprises, although under ideal measurement conditions the estimates should be the same. By construction, the net revenue estimates (HHAGINC1, NFSEY1) can be negative, whereas the profits (NFSEY2) and earnings estimates (HHAGINC2, NFSEY3) are, by definition, always reported positive. The fact that these latter two estimates are always positive might potentially be a source of upward bias, given that some enterprises may be making a loss. However, any overestimation from this source is almost certainly completely dominated by the widespread understatement of incomes in the GLSS surveys, as will be seen in a subsequent paper (Coulombe, McKay and Round, 1994b).

In Coulombe, McKay and Round (1994b) we discuss the relationship between the estimates in more detail. We note there that around 60 per cent of households reporting non-farm net revenue (NFSEY1) record negative income, whereas only 5 per cent of households reporting net agricultural income (HHAGINC1) record negative incomes. Also, the correlations between the alternative estimates of both non-farm and agricultural income are low, indicating that the differences cannot simply be accounted for by scale factors. Unfortunately, this does not suggest any really sound basis for choosing between the estimation methods. There is an obvious preference to work with estimates of income which are positive, at least on average, although different estimates may be preferred in different circumstances.

In this paper the choice has been to use HHAGINC1 for household agricultural income and NFSEY2 for non-farm enterprise income. The reason for choosing these is simply that as the contents of the earnings-based estimates are not entirely clear there is a preference for the alternatives. This follows also from the previous argument for focussing on sections 9 and 10 (household production activities) as opposed to section 5. Finally, as we are interested in developing economic accounts for household production activities, the chosen estimates do provide the most relevant information. This reasoning is developed further in section 4 below.

Having identified the enterprises in which we are interested in this study, and the income estimates which we propose to use, we now turn to present more detailed characterisation of the informal economic activity in Ghana based on the GLSS survey results.

### 3. Contribution of informal sector activity to household income and expenditure.

In this section we seek to summarise the contribution of informal sector activity to the household economy as measured by the aggregate components of income and expenditure previously calculated.<sup>5</sup> Economic activities in the informal sector will contribute to both household income and household expenditure. On the income side, such activities generate both wage income and self-employment income for the household, each of which may be derived from either the agricultural or the non-agricultural sectors. On the expenditure side, some of the output of self-employment activities in the informal sector may be consumed by the household as opposed to being sold on the market. Such consumption has been calculated in the form of an imputation, valued at purchaser prices, and is already included in the household expenditure aggregates. This section provides a brief quantitative investigation of the contribution of the informal sector to household income and expenditure, both in aggregate across the sample as well as for appropriately defined groups within the sample, these groups being defined according to geographic locality, using the standard five locality disaggregation, and according to their standard of living, defined as total household expenditure per adult equivalent in constant prices.

Tables 3.1 and 3.2 summarise the contribution of informal sector activities to total household income disaggregated respectively by locality and by quintile of total expenditure per equivalent adult. In interpreting these tables, it is important to recollect that household income appears to have been significantly underestimated in the GLSS surveys (in common with household surveys in most countries in which a significant proportion of income is derived from self-employment and/or individuals engage in multiple income-earning activities), and that this underestimation may not have affected all components equally. Notwithstanding this, it is likely that the income data can be used to identify *broad patterns*, even if the *precise levels* of particular components are underestimated and to different extents. It is in this spirit that we make use of the income data in this paper, although in a subsequent paper we attempt to estimate adjustment factors appropriate to each income component individually (Coulombe, McKay and Round, 1994b).

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<sup>5</sup> The income and expenditure estimates reported in this paper are reported in current prices, so that no adjustment is made for inflation either during the twelve month period of each survey or between surveys.



According to the GLSS results, the vast majority of households receive at least some of their income from informal sector activities. Defining informal sector activities as previously stated, 2808 out of the 3152 households surveyed in GLSS 1 who had strictly positive incomes and 3061 out of 3415 such households in GLSS 2 reported receiving some income from informal sector activity. Of course, for many of these households informal sector income may represent a secondary, and perhaps relatively minor source. Nevertheless, the importance of informal sector activity is indicated by the fact that only 708 households in GLSS 1 and 842 in GLSS 2 report receiving any formal sector income.

The majority of those households receiving informal sector income derive it from self-employment activities, whereas in the formal sector wage employment predominates. The vast majority of non-farm self-employment enterprises are classified as belonging to the informal sector. Only 31 households in GLSS 1 and 54 in GLSS 2 are classified as having non-farm self-employment enterprises belonging to the formal sector, in contrast to 1229 and 1444 respectively in the informal sector. By contrast, wage employment activities are disproportionately classified as formal sector.

The previous discussion relates to the numbers of households engaged in each type of activity. Of greater interest, however, is the proportion of income derived from each activity. Table 3.1 reveals the predominance of the informal sector here too. Informal sector activities account for 77 per cent of income in GLSS 1 and 71 per cent in GLSS 2, the vast majority of which is accounted for in each case by self-employment activities. Agricultural income, the most important single source, accounts by itself 19 per cent of total income in GLSS 1 and 38 per cent in GLSS 2. Formal sector activities accounts for only 15 per cent of total income in GLSS 1 and 17 per cent in GLSS 2, with wage income predominating. The remainder of income (respectively 11 and 11 percent) is made up by rental income, transfers and various miscellaneous sources.<sup>6</sup> Finally, it is appropriate to note that no significant weight should be placed on the apparent changes in the structure of income between the two surveys, notably the decline in the contribution of agricultural income. These changes appear to reflect measurement difficulties more than genuine changes (Coulombe, McKay and Round, 1994a).

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6 Note that the miscellaneous incomes may include some informal income, as may rental income. However, it is difficult to distinguish between formal and informal income in these instances, and very little information is available in the corresponding production activities. In practice income from these sources tend to be very small.

Looking at the pattern by locality, it can be seen that informal sector income accounts for the majority of household income in all localities outside Accra. The contribution of informal sector income to the total is higher in rural areas than in urban areas. Not surprisingly, non-farm self-employment activities account for the majority of informal sector income in each of the urban localities and the minority in the rural areas, with the exception of the Rural Coastal zone in GLSS 2 where agricultural income is less important than non-farm self-employment income. Note, however, that non-farm self-employment activity represents a significant minority of informal income in urban areas outside Accra. Non-farm self-employment activities are relatively unimportant as a source of income in the rural forest and savannah areas, as are agricultural activities in Accra. In all localities very little informal income is derived from wage employment. By contrast, in all localities this is the predominant source of formal sector income.

Looking at the pattern by quintiles of total household expenditure per equivalent adult (a measure of the standard of living), it can be seen that the proportion of income derived from informal sector activities declines monotonically with the quintile, whereas the proportion of income derived from formal sector activities increases with the quintile. However, even in the fifth quintile informal sector activity generates the majority of household income. The composition of this informal sector income changes consistently with the quintile; as the living standards increase the proportion of informal sector income (and indeed, in the first four quintiles, the proportion of income as a whole) accounted for by non-farm self-employment income increases. Self-employment income from agricultural activity displays the reverse trends in each case. In summary, therefore, as households become richer they derive, on average, a higher proportion of their income from formal sector activity and from non-farm self-employment, and a lower proportion from agricultural self-employment. This reflects the pattern of poverty which is much more prevalent in rural areas than in urban areas; it shows that those who are self-employed in a non-farm activity in the informal sector are in fact less likely on average to find themselves among the poor.

Informal sector activity also impinges on household expenditure through the fact that self-employed persons in the informal sector can choose to consume some (or indeed all) of the output of that activity domestically. This is most obvious in respect of cultivation of agricultural activity, especially food crops, but may also arise in non-farm self-employment activities. Tables 3.3 and 3.4 report the contribution of such consumption to total household expenditure disaggregated as before by locality and by expenditure quintile respectively. The majority of households are in fact engaged in subsistence consumption: 2605 out of the 3172 surveyed in GLSS 1 and 2795 of the

3434 surveyed in GLSS 2 undertook some consumption of domestic production. In each case the vast majority is accounted for by the consumption of domestically produced food products. Subsistence consumption represents on average 27 per cent of total household expenditure in GLSS 1 and 20 per cent in GLSS 2, the vast majority in each case being accounted for by food consumption. This proportion, however, varies dramatically by locality; in GLSS 1 only 3 per cent of total household expenditure in Accra was accounted for by subsistence consumption, compared with 56 per cent in the rural savannah area, with similar patterns being present in GLSS 2. Consumption of the output of non-farm enterprises is very small everywhere, though not surprisingly, it accounts for a higher proportion of non-monetary expenditure in urban areas than in rural areas.

The contribution of subsistence consumption to total expenditure falls sharply in relation to the quintile, this being accounted for by a similar trend in subsistence food consumption. This is consistent with the pattern previously observed for agricultural income. Again, to a significant extent it is accounted for by differences between urban and rural areas.

#### 4. Characteristics of informal sector activity in Ghana: non-agriculture

In this section and in the one which follows we turn to a detailed examination of the self-employment component of informal sector activity discussed above. In this section we focus on non-agricultural household level activities and, in the next section, on agricultural activities. In both sections we present a set of tables summarising the main economic characteristics of the activities in question in terms which will then be used (in a separate paper) for the construction of economy-wide estimates.

In all cases, the tables presented in this and in the following section relate only to informal economic activities as previously defined. Both sections begin by explaining the concepts used in the tabulations, explaining how these were estimated from the survey results and discussing problems encountered. Summary tables of the economic accounts of informal activities are then presented and discussed, following which a series of more detailed tables are presented, providing more information on individual variables and components, with further disaggregations by locality and sector. Despite this broad similarity of structure, the specific tables which are constructed differ between the two sections, reflecting differences in questionnaire design and hence in the information available.

##### *Non-farm activities: concepts*

The GLSS surveys collect information on self-employment activities at both the enterprise level and at the level of individual members, and while these can be used to construct alternative estimates of income, it was argued in section 2 that the former should be preferred in this study as it identifies more accurately the universe of households engaged in non-farm self-employment. A further advantage is that this information also provides estimates of the economic accounts of such activities, which will form the basis for further analysis, as well as estimates of other relevant variables, such as employment, which cannot sensibly be constructed based on individual level data. Thus, while the individual level data may provide a more accurate estimate of the level of income from non-farm self-employment activities, it does not provide the necessary information about the structure and nature of such activities.

For each enterprise owned and operated by the households, section 10 of the GLSS questionnaire provides estimates of the components of the economic accounts. In particular it includes estimates of revenue in cash and kind from the sale of output, domestic consumption of output and expenditure on inputs (disaggregated by

category). These variables can be used to construct estimates of output and gross profits based on the survey data as follows:<sup>7</sup>

$$\begin{aligned} \text{output (1)} &= \text{revenue in cash from sale of output} \\ &+ \text{revenue in kind from sale of output} \\ &+ \text{domestic consumption of output} \\ &- \text{purchases of items for resale} \end{aligned}$$

$$\begin{aligned} \text{gross profits (1)} &= \text{output} \\ &- \text{total expenditure on inputs} \end{aligned}$$

As already noted in deriving the household economic aggregates gross profits (1) was referred to as the variable NFSEY1. It has also been noted that the problem with this procedure is that for the large majority of households it gives estimates of gross profits which are negative, and often highly negative (Coulombe, McKay and Round, 1993; Vijverberg, 1991). According to this estimate, on average non-farm enterprises are observed to be making a loss. The extent of the observed losses are too large to be credible; for example, in the case of Ghana, these estimates imply negative household income for a significant minority of households. In other words, it is clear that these estimates of gross profits are not reliable, either as a result of significant under-recording of revenue/output or of significant over-recording of input expenditures, or both. It is difficult to assess the relative importance of these two explanations. A number of arguments for over-recording of input expenditures can be put forward. Specifically, consumption expenditure may be inadvertently included among input expenditures due to the difficulty in separating these from enterprise expenditures, or there may be double-counting of input expenditures shared between two or more enterprises because, even though the questionnaire may identify such instances, it does not enable them to be quantified. However, it is highly likely that the vast majority of the underestimation of gross profits of non-farm enterprises is due to under-recording of revenue/output due to various factors such as lack of formal accounting, fear of taxation, traders quoting margins rather than total revenues, and so on.

Fortunately, as noted earlier, in light of the above problem, section 10 of the GLSS questionnaire provides an alternative estimate of profit for each enterprise based essentially on a direct estimate provided by respondents. This is the variable

7. Note that it is not possible to estimate own account capital formation from the data available in the GLSS surveys, although this is an element which should, in principle, be included in the estimates of output.

NFSEY2. The accuracy of the response must be open to some question although it is more satisfactory than the previous estimate in the sense that it is positive on average and non-negative for all enterprises. Indeed, by construction, it must be. This may be a minor source of bias, but it can be discounted relative to the observed magnitude of income underestimation. When aggregated to the household level it is also more consistent with the third estimate of household non-farm self-employment income derived by aggregating individual level responses (NFSEY3). The mean values are closer and the estimates more closely correlated than is the case for either one of these estimates compared with NFSEY1. For this reason the direct estimate of profit at the enterprise level is used in this study as the main basis of our estimates. It will be considered as representing 'gross' profit as it is highly unlikely that respondents will have taken depreciation into account in their responses. This is referred to in this discussion as gross profits (2); it is the same as the aggregate variable NFSEY2.<sup>8</sup>

This estimate gives the balance of the economic account of the household enterprise. However, it is also important to have estimates of the individual components of the account. The previous component estimates may be used in conjunction with this second estimate of profits, as long as an appropriate adjustment is made to one or more of the components in order to make them consistent with the new estimate of profit. It has been assumed here that input expenditures have been more accurately estimated by respondents than either revenue or output. Thus, the estimate of the former is taken as being acceptable, whereas the latter is adjusted in order to give the estimate of gross profits obtained from the second method:

$$\text{output (2)} = \text{total expenditure on inputs} + \text{gross profits (2)}$$

where output (2) is the new estimate of output. In adopting this procedure, it has clearly been assumed that an underestimation of output (or revenue) is solely responsible for the underestimation observed in the estimate of gross profits. Clearly, while this is an extreme assumption, it seems reasonable to assume that this is the source of the vast majority of the underestimation. Alternative assumptions would give slightly lower estimates of output.

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<sup>8</sup> Note that the estimates of profits derived from the GLSS surveys are estimates of household income from the productive activity in question, and is likely to be different from the concept of operating surplus used in the national accounts.

From the economy-wide and national accounts point of view, it is also necessary to have estimates of value added by enterprises. To estimate value added input expenditures need to be separated into expenditure on factor inputs (labour, land, capital) and non-factor inputs (such as raw materials and other intermediate inputs). Expenditures on factor inputs augment profits to form value added. This separation can be achieved relatively straightforwardly from the GLSS questionnaire, which disaggregates input expenditures by category. Value added may then be estimated as follows:

$$\begin{aligned} \text{value added} &= \text{output (2)} \\ &- \text{expenditure on non-factor inputs} \end{aligned}$$

or equivalently as:

$$\begin{aligned} \text{value added} &= \text{gross profits (2)} \\ &+ \text{expenditure on factor inputs} \end{aligned}$$

Value added represents the return to the factors employed in the production activity of the enterprise, whether these are supplied by the household or hired from outside.<sup>9</sup>

These components of the economic accounts form the basis of the characterisation of non-farm economic activity in Ghana presented in this paper, with additional tables relating to employment and the value of assets. All of these tables are based only on enterprises classified as informal enterprises according to the criteria previously set out. Various disaggregation criteria are adopted in these tables to reveal the structure of non-agricultural informal activity in Ghana, such as disaggregations by locality (using the standard five locality classification), industrial sector (appropriately grouped) and by type of enterprise (distinguishing family enterprises from microenterprises).

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<sup>9</sup> Exchange gains and losses, income from insurance claims, etc., which *may* be included in the estimate of household income from non-farm enterprises should, in principle, be removed before estimating value added from the activity. Unfortunately these cannot be estimated from the data collected by the GLSS survey.

*Summary of economic accounts of non-farm enterprises*

Adopting the definitions previously set out, Tables 4.1 and 4.2 provide a summary of the aggregate economic accounts of informal non-farm enterprises, disaggregated respectively by locality and by broad industrial sector. The figures in the tables give the totals calculated over all enterprises in the cell in question; the tables therefore provide a summary of the structure of informal non-farm activity over the whole sample.

Overall, in both years, it can be seen that expenditure on inputs is around 60 per cent of total output, implying levels of profit of around 40 per cent of output. Non-factor inputs account for about 93 per cent of total expenditure on inputs, reflecting the fact that the majority of factor inputs are supplied by household members themselves rather than purchased on the market. For this reason the estimates of value added are not very different from those of profits.

The structure of the economic accounts of enterprises are very similar across localities. However, informal non-agricultural economic activity is clearly more important in urban areas than in rural areas. Urban areas account for about 54 per cent of the total output of informal non-farm self-employment activity and over 55 per cent of value added, even though they only represent around 37 per cent of the sample of households.

Disaggregating informal non-agricultural enterprise activity by broad industrial sector, it is clear that trade and manufacturing activities dominate in most of the measures. For example between them these sectors account for around 85 per cent of total output and around 80 per cent of value added. The same is also true as regards their contribution to total profits. Interesting variations are observed by sector in profit levels as a proportion of output. Profit ratios tend to be relatively high in the trade and services sectors, and lower in the manufacturing sector, a sector which is relatively capital intensive. Furthermore the profit ratios by sector is very similar for both sets of survey results. This variation by sector probably reflects the nature of the activities rather than necessarily being a measure of differences in efficiency between sectors.

Tables 4.3 and 4.4 report further summary economic accounts by broad industrial sector, but this time for the subsets of family enterprises and microenterprises. Table 4.3 indicates that approximately 67 per cent of informal non-farm self-employment output is accounted for by family enterprises, and around 70 per cent of value added. The corresponding figures for microenterprises are presented in Table 4.4. The trade



and manufacturing sectors dominate the respective totals of output and value added in both groups of enterprises, although more heavily in family enterprises, where they represent around 90 per cent of total output, than in microenterprises, where they represent 70 to 75 per cent. Among microenterprises there is proportionately more activity in the services and transport sectors than is the case for family enterprises. These sectors jointly account for 22.5 per cent and 28.3 per cent of microenterprise value added in GLSS 1 and GLSS 2 respectively, and 18.2 per cent (GLSS 1) and 24.6 per cent (GLSS 2) of total output. These figures are considerably higher than the corresponding figures for family enterprises.

We now turn to a more detailed examination of the main components of the economic accounts.

### *Output*

Table 4.5 reports the distribution of output of informal non-farm household enterprises by broad industrial sector and by type of enterprise. The enterprises are classified into five types: family enterprises with a fixed location (suggesting a degree of relative permanence), itinerant family enterprises not having a fixed location (suggesting a greater likelihood of transience), microenterprises employing less than 5 non-household members, those employing between 5 and 9, and microenterprises employing 10 or more non-household members. The same classification is used in Table 4.6, which reports the distribution of output by locality and type of enterprise.

The tables show that, in aggregate, while microenterprises as a whole account for around a third of informal non-farm enterprise output, those employing 10 or more people account for only around 2 per cent of output. Indeed, three quarters of the output of microenterprises at the national level is generated by those employing less than five people. So, not only are there very few larger size (five employees or above) household microenterprises, they are not very significant in terms of their contribution to total output. Among family enterprises the majority of output is generated by those having a fixed location. However, those without a fixed location also account for a significant proportion of output. While this refers to the overall pattern significant variations are observed by industrial sector and across localities. In the trade and manufacturing sectors, which we have noted together dominate the share of output of family enterprises, the proportions generated by those having a fixed location is very different. Itinerant families account for only a small proportion of manufacturing output yet constitute a much higher proportion of trade output. This

conforms with expectations. Also, in the agricultural-based, construction and transport sectors, family enterprises without a fixed location account for a higher proportion of output than those with a fixed location. These variations and the sectoral mix account for the observed differences in the proportions by locality in Table 4.6.

### *Value added*

From an informational point of view, the distribution of value added is at least as important as the distribution of output. This is summarised in Tables 4.7 and 4.8 which report, following the same format, the distribution of value added by type of enterprise and sector (Table 4.7) and by type of enterprise and locality (Table 4.8). The patterns revealed here are, in fact, similar to those for output, although the magnitudes differ, reflecting different patterns of input use in different sectors. It has already been noted that microenterprises account for around 30 per cent of value added overall, but very little of this is generated by enterprises employing 10 or more people. Most of the value added in the microenterprise sector is generated by those employing less than five people. Finally, as was the case for output, the difference between localities in the distribution of value added by type of enterprise (Table 4.8) can obviously be partly (if not entirely) explained by the mix of sectors across localities.

### *Profit*

Table 4.9 presents the value of profits by type of enterprise and industrial sector. Both the pattern and the magnitude are very similar to those for value added, given the relatively low levels of expenditure on factor inputs. Microenterprises account for a smaller proportion of profits overall (25.6 per cent and 25.5 per cent for GLSS 1 and GLSS 2 respectively) than was the case for value added (29.4 per cent and 30.4 per cent). This is not surprising, however, given that only microenterprises have explicit expenditures on labour, the most important factor input. The pattern by sector is similar to that for value added.

These results on the pattern of value added, profits and those relating to output suggests that the nature of informal household enterprises varies significantly according to the sector. Those which are engaged in trading activities, which account for the majority of such enterprises, are predominantly family enterprises and many of these do not have a fixed location. This suggests that many enterprises may have a tendency to be transient in nature. Family enterprises also account for the majority of output in the second most important sector, manufacturing. However, the vast

majority of these enterprises have a fixed location, and there is also a significant number of microenterprises in this sector too. These characteristics could be interpreted as suggesting a lower degree of transience. In part, however, the difference between these two sectors reflects the differing nature of the activities. Manufacturing, being more capital intensive than trading, is more likely to require a fixed location. In addition, the presence of economies of scale may mean that manufacturing enterprises are on average larger than trading enterprises. Microenterprises are yet more important in the generation of output and value added in the transport, construction and services sectors, suggesting that the scale of activities in these sectors is often too large to be undertaken on the basis of family labour alone.

#### *Expenditure on inputs*

The pattern of total expenditure on inputs by locality and type of enterprise is presented in Table 4.10. At the aggregate level, the distribution of input expenditure by type of enterprise is, in fact, very similar to that for output. Overall, the trade sector accounts for around 40 per cent of overall expenditure on inputs, lower than the proportion of output it represents, which is consistent with a previous observation (from Table 4.2) that this sector spends less on inputs as a proportion of output than other sectors. By contrast, the manufacturing sector accounts for a larger proportion of expenditure on inputs compared with the proportion it contributes to overall output.

Table 4.11 presents a disaggregation of total expenditure on inputs by category. Overall, expenditure on inputs is dominated by the purchase of raw materials (63.2 per cent in 1987/88 and 66.5 per cent in 1988/89). The other categories of expenditure are much smaller. Among these, expenditure on transport is the next most important item (12.3 per cent of the total in 1987/88 and 8.9 per cent in 1988/89); the only other items of appreciable magnitude overall are fuels and hired labour (both significantly below 10 per cent in both years). However, striking differences in the relative importance of the different items are observed by sector. In the trade sector expenditures on raw materials and transport account for a higher percentage in this sector than the average over all sectors. In the manufacturing sector, purchases of raw material account for around 80 per cent of total input expenditures, with much of the rest accounted for by fuel, transport and labour. In the transport sector, fuel is the predominant item of input expenditure, accounting for more than half; labour and maintenance account each account for more than 10 per cent of input expenditures in

both years. Labour is the predominant item of expenditure in the construction sector, whereas in the service sector expenditure on raw materials is the most important item, followed by expenditure on labour and transport. In broad terms these patterns of input expenditure appear to be credible.

### *Use of factors in production*

Having examined the components of the economic accounts of informal household enterprises, we now turn to look at the employment of factors in these enterprises, specifically of labour and of capital assets. Total employment of labour, including both household and non-household labour, is summarised in Tables 4.12 and 4.13, the former presenting employment by type of enterprise and industrial sector and the latter by type of enterprise and locality. Care should be taken in the interpretation of these tables, as the questionnaire does not provide any information on whether the employees are full-time or part-time, permanent or casual, so the figures should therefore only be taken as being indicative of the general pattern.

The proportion of overall employment accounted for by microenterprises is similar to or slightly greater than the proportion of output they represent. The distribution of employment by sector is very similar to the distribution of output again with trade (45 to 50 per cent of total employment) and manufacturing (around 35 per cent of total employment) dominating. The transport sector accounts for a higher proportion of output than of employment, reflecting the fact that this is a relatively capital intensive sector. The reverse is the case in the services sector. Finally, there does not appear to be any significant pattern by locality (Table 4.13).

Table 4.14 reports the value of capital assets used in enterprises, again by type of enterprise and industrial sector. The table reveals that microenterprises are significantly more capital intensive relative to their output levels than family enterprises. In GLSS 2, for example, 53.7 per cent of capital assets by value are found in microenterprises, which only generate 32.0 per cent of total output. In part, this greater capital intensity reflects the portfolio of activities in which microenterprises tend to be engaged. By sector, only just over 30 per cent by value of capital assets are found in the trade sector which, not surprisingly, is among the least capital intensive. The manufacturing, services, and, in particular, transport, sectors are much more capital intensive. The transport sector accounts for only 3.3 per cent of total output in 1988/89, and 6.6 per cent of value added, but for 30.5 per cent of capital assets by value. The fact that microenterprises tend to be more capital

intensive than family enterprises is in part associated with the fact that they are relatively more prevalent in the sectors which use more capital, such as transport and manufacturing.

The nature of these capital assets is summarised in general terms in Table 4.15, which indicates, without any surprise, that there are significant differences in the types of capital assets employed in different sectors. In the trade sector buildings and land are the most important single category, whereas in the manufacturing sector tools are by far the most important category. Tools are also by far the most important category in the services sector, whereas vehicles are obviously the dominant category in the transport sector.

### *Summary*

In broad terms, the results indicated by the tables in this section appear credible, and provide a good picture of the informal non-agricultural household enterprises in Ghana. Such enterprises occur to a significant extent in all localities in Ghana, although they are more prevalent in urban areas than in rural areas. Trading and manufacturing activities predominate, both in terms of output and in terms of value added, with trading activities being particularly important. Smaller, but significant, numbers of enterprises are also engaged in the services, transport and agricultural related sectors.

The nature of activities, and in particular the nature of enterprises, tend to vary from one sector to another. The trading sector is dominated by family enterprises which do not therefore employ non-household members and many of which do not have a fixed location. In this sector capital assets are relatively low compared to output levels. Input expenditures are predominantly on raw materials and transport, with expenditure on labour being relatively low. Among manufacturing enterprises capital intensity and employment levels are higher, a significant minority of such enterprises employing non-household labour. Most enterprises have fixed premises, and the main item of input expenditure is raw materials. Employment of non-household members is even more common in some of the smaller sectors, notably transport, construction and services, where microenterprises account for more than half of total output. The transport sector is the most capital intensive sector overall, the capital assets being predominantly vehicles. Employment levels in this sector are quite low, with fuel and maintenance being the most important input expenditures. Not surprisingly, the

service sector is less capital intensive, employing more labour relative to its output level. Nevertheless, most of the input expenditure is on raw materials. In almost all sectors expenditure on factor inputs is low, these being provided predominantly by household members themselves.

## 5. Characteristics of informal sector activity in agriculture

Informal household agricultural activity is taken here also to include all household self-employment activity in agriculture. For a small minority of households their agricultural activities might be better classified as formal sector. However, such households are likely to be very few in number and cannot be easily and unambiguously identified from the questionnaire. As in the case of non-farm enterprises information is available both at the individual level (on self-employment income from agricultural activities) and at the household level. Again, the latter is taken as the basis for the analysis in this section as it provides much more comprehensive information on household agricultural activities and indeed more detailed (and probably more accurate) information on both the level and composition of household agricultural income.

The definition of agricultural activity used here is the same as that implicit in the GLSS questionnaire which includes the cultivation of crops, the processing and transformation of crops, and the herding of livestock and production of livestock related products. Information is available in varying degrees of detail on these different activities. The most detailed information is available on the cultivation of crops which is by any measure by far the most important activity. In each case the same economic accounting structure is applied as pertained to non-farm enterprises in the previous section. It will be seen, however, that there are certain limits to the extent to which this can be achieved without recourse to further assumptions.

This section begins by looking at the summary accounts for the household agricultural sector as a whole, before then focusing on each of the three subsectors for crop cultivation, processing and livestock.

### *Summary economic accounts*

The aggregate economic accounts for household agricultural activity are presented in Tables 5.1 and 5.2 for 1987/88 (GLSS 1) and 1988/89 (GLSS 2) respectively. The estimates here are based on the net revenue of agricultural income (HHAGINC1) and the components which make it up. The figures in these tables are the totals for all households in the sample which are engaged in agricultural activity, identified as described in section 2 above. Output is measured as revenue received by the household from the sale of agricultural production, plus an imputation for the value

of production consumed by the producing household and for the value of output kept by respondents for seeds, plus the value of output paid to labour and to "land owners, or as a gift, or for ceremonies and fetishes". A potential valuation problem may arise here, given that the imputation of subsistence consumption is supplied by respondents to the survey at *purchaser prices*, as is the valuation of output kept for seeds and paid to labour, etc, whereas sales revenue will be valued at *producer prices*. Unfortunately, however, there is no obvious way to correct for this inconsistency based on the information available in the GLSS survey results, and it is a problem that is well-recognised in the 1993 SNA (United Nations, 1993, pp 79-80).

These tables present the main components of the economic accounts for each of the three main agricultural activities listed above as well as for agricultural activity in total. They also show some disaggregation by locality, except that Accra and Other Urban localities are aggregated into a single locality group for these purposes. The way in which the data are collected in the questionnaire means that it is not possible to estimate all items in the table without making further assumptions. Two particular instances arise. Firstly, expenditure on land is only collected in total and is not directly attributable between the livestock and crop cultivation sectors. Secondly, expenditure on inputs into the processing of crops cannot be disaggregated into factor and non-factor inputs, which means that it is not immediately possible to estimate value added from this activity. However neither of these problems is especially serious. The expenditure on inputs for crop processing is very low as most of the inputs (the crops and labour) are supplied by the households themselves. Also as land is a factor input, the former problem does not cause any difficulty for the estimation of value added in the crop cultivation and livestock sectors.

The tables reveal the dominance of crop cultivation among agricultural activity, which accounts for around 87 per cent of overall output (cash and subsistence) in each of the two years. It accounts for a large majority of agricultural output in each of the four localities identified here, being particularly predominant in the Rural Forest and Rural Savannah zones, where it represents around 90 per cent of output. Among the other activities, in general, processing accounts for a higher proportion of output than livestock, though their relative importance varies from one locality to another. The contribution of the livestock sector to total output is highest in urban areas, accounting for 6.6 per cent in 1987/88 and 9.7 per cent in 1988/89, whereas for the processing sector the contribution to total output is highest in the Rural Coastal locality, where in 1988/89 it represents 17.2 per cent of total output in this locality. Both of these activities are relatively less important in the Rural Forest and Rural Savannah zones in terms of their contribution to total output.



Around 60 per cent of the output of agricultural activity is consumed or used in production by the producing household, a proportion which reaches nearly 70 per cent in the Rural Savannah locality. However, production for own consumption is important in all localities; it is only in one locality (Rural Coastal), and then only in one year (1987/88), that a majority of output is sold on the market.

The Rural Forest and Rural Savannah localities account for a high proportion of total agricultural output; more than two-thirds of agricultural output is generated in these localities, and an even higher proportion of output from crop cultivation (76 per cent in 1988/89). The total volume of output is observed to decline significantly between 1987/88 and 1988/89, at the national level and in each of the localities. This is the same phenomenon as the significant decline in agricultural incomes observed between 1987/88 and 1988/89 which has already been noted and investigated (Coulombe, McKay and Round, 1994a). The explanation for this decline appears to lie much more in terms of data collection issues than in terms of representing a real phenomenon; so it is therefore not appropriate to place too much weight on this observation.

Expenditure on inputs in the household agricultural sector in Ghana is low relative to output levels, reflecting the fact that most inputs are supplied by households themselves. Expenditure on factor inputs is higher than that on non-factor inputs in the crop sector. In the livestock sector their relative importance changes sharply between the two years, this being most likely a reflection of small sample sizes. As previously noted, expenditure on inputs for processing cannot be disaggregated between non-factor and factor inputs, meaning that we cannot look at the distribution of value added between these three sectors without making further assumptions. At the risk of marginally underestimating the contribution of crop processing to total value added it is assumed for simplicity for the discussion which follows that all inputs for crop processing are non-factor inputs, so that the estimate of profit can be taken as an approximate estimate of value added. On the basis of this assumption we now look at the distribution of value added.

Crop cultivation accounts for over 87 per cent of value added in the household agricultural sector, crop processing contributing 7 to 8 per cent, and livestock cultivation less than 5 per cent. The livestock sector accounts for a slightly lower proportion of agricultural value added than agricultural output, due to relatively higher levels of expenditure on non-factor inputs in this sector than in the other sectors. Again the contribution of the livestock sector to value added is highest in urban areas, but its value added is largest in absolute magnitude in the Rural Savannah. The value

added from the processing of crops is relatively and absolutely most important in the Rural Coastal zone. In the Rural Forest and Rural Savannah zones, crop cultivation generates almost 90 per cent of total agricultural value added. These localities account for large majority (70 per cent) of total value added from crop cultivation.

As was the case for output, although the estimates suggest a significant decline in value added between 1987/88 and 1988/89, this may largely be spurious. In looking at changes over time therefore the emphasis should be placed on the pattern rather than the level.

The estimates for profit display a similar pattern to that for value added, and so are not discussed in further detail here.

### *Crop cultivation*

The GLSS survey data permit the calculation of output levels and value added by crop, even though an inability to attribute factor inputs by crop means that it is not possible to estimate crop-specific profit levels.<sup>10</sup> Estimates of output and value added by crop are presented in Tables 5.3 and 5.4 for 1987/88 and 1988/89 respectively.

Looking first at output, in overall terms food crops account for 86.2 per cent of the total in 1987/88 and 82.3 per cent in 1988/89, the rest being made up of export crops. More than two thirds of the output of food crops is consumed by the producing household, while for export crops the vast majority is obviously sold on the market, although small amounts of output are retained for seed or used to pay for inputs. Among export crops, only cocoa contributes significantly to overall output, representing 6.6 per cent of total agricultural output in 1987/88 and 11.0 per cent in 1988/89. All other export crops make only small contributions to overall agricultural output in the household sector. A number of food crops make significant contributions to total agricultural output in the household sector, including maize (16.0 per cent of the total in 1987/88 and 16.2 per cent in 1988/89), cassava (16.2 per cent and 14.1 per cent), sorghum (9.1 per cent and 9.2 per cent), plantains (8.9 per cent and 7.8 per cent), yams (7.5 per cent and 10.0 per cent) and cocoyams (5.8 per cent and 5.4 per

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<sup>10</sup> In fact there are four non-factor inputs which are only collected at the aggregate level and not at the crop-specific level: maintenance and repair of buildings and machines; irrigation charges; fuel oil, electricity, other fuel, and other non-factor inputs. Therefore the crop level estimates of value added will be marginally over-estimated as a result of this omission, although the magnitude of these non-factor inputs is small.

cent). The remainder of the output of food crops is made up of a number of different categories, mostly vegetables of some form.

Given that household expenditures on non-factor inputs are generally low, the distribution of value added by crop is inevitably similar to that for output. Export crops account for a similar proportion of value added to that of output, suggesting similar levels and patterns of expenditure on inputs. Crops such as cassava, cocoyam and sorghum have below average levels of expenditure on non-factor inputs, so that their share of value added is slightly higher than their share of output. However, as expenditures on inputs are in general so low, such differences are marginal.

Table 5.5 shows the distribution of expenditure on inputs for crop cultivation in aggregate, by category of input and by locality. By far the most important single category of input expenditure is imputed expenditure paid in the form of crop outputs, which in aggregate accounts for 52.0 per cent of the total in 1987/88 and 54.5 per cent in 1988/89. This expenditure covers various categories, including output kept for seeds and output paid to labour. Monetary expenditure on hired labour is also an important category, making up around one quarter of total expenditure. The remaining categories are much smaller; expenditure on seeds accounts for 7.2 per cent in 1987/88 and 6.3 per cent in 1988/89. Fertiliser accounts for 3.3 per cent of total expenditure in 1987/88 and 4.0 per cent in 1988/89, whereas insecticides and transport each account for around 2 per cent of the total in both years. In general, the pattern of expenditure is not observed to vary significantly according to the locality, except that payment in the form of output is significantly more important than average in the Rural Savannah. Monetary expenditure on seeds and hired labour are correspondingly smaller in relative terms in this locality.

### *Processing*

Table 5.6 gives information on income from the processing of crops, by product type. As previously noted, while it is not strictly possible to calculate value added from this activity, profit may be taken as a close approximation to value added given that input expenditures are generally low and a large proportion of them may be on non-factor inputs. In this case, the greater part of output is sold on the market, though a significant proportion (around 40 per cent) is consumed domestically. Although the proportions accounted for by each product do change between the two years, reflecting, more than anything, the relatively small number of observations, the most

important products are garri, which is mostly produced for sale, achekie and other alcoholic drinks, which is almost exclusively consumed by the household, and shelled peanuts, which are both sold and consumed. Input expenditures are small in all cases, so that the distribution of profit (and hence, by implication, value added) is similar to the distribution of output. The main input is likely to be crops supplied by households themselves: this is not collected by the questionnaire.

### *Livestock*

Output from livestock activities is defined to include revenue from the sales of livestock, revenue from the sale of animal products and subsistence consumption of these two items. The main revenue from livestock related activities is derived from the sale of livestock rather than of animal products, which contribute less than a sixth of the total. The pattern of revenue from the sale of livestock is reported in Table 5.7. Goats, chickens, sheep and cattle all contribute a significant share of revenue; for the latter two this is mainly through sales on the market, whereas for the former two a significant proportion of output is consumed domestically, particularly so in the case of chickens. Moreover, an important proportion of output is generated from the rearing for own consumption of animals other than those explicitly identified in this table.

The output of animal products (Table 5.8) is dominated by eggs, which account for over 90 per cent of total output. Animal products are predominantly produced for own-consumption rather than sale on the market.

Finally, Table 5.9 reports the pattern of expenditure on livestock inputs by category. The pattern is somewhat different between the two years. For example, animal feeds, which account for 24.8 per cent of the total in 1987/88 represents 53.6 per cent in 1988/89. And the proportion of expenditure represented by labour falls very sharply between the two years. Buildings/ pens and veterinary expenses are the next most important items overall. These changes between the two years are hard to explain as often the sample sizes are reasonable.

### *Use of factors of production*

While in the case of non-agricultural informal sector activities it was possible to provide some information on the use of factors of production, unfortunately this is not possible to the same extent in the case of household agricultural activity. In the case of employment of labour, while it is possible (from Section 5) to identify individuals engaged in self-employment in agriculture (some of whom may be part-time, others full-time), information on the *employment* of off-farm labour is not collected. The *expenditure* of households on hired labour is available, however this is of little use for estimating employment, as the number of hours for which the labour was hired is unknown.

Information on agricultural capital assets is collected, but as only a very small minority of agricultural households have such assets sample sizes are very small. In total 204 assets are owned by the 2341 agricultural households in the GLSS 1 sample and 241 by the 2530 such households in GLSS 2. Around 50 per cent of these assets are sprayers/foggers, with the only other categories owned by more than 10 households being ploughs, bullocks and the miscellaneous category. While the values of these assets are available, the sample sizes are such as to mean that only very limited disaggregation is possible. Further, the small sample sizes, combined with the high variability in the values of capital assets, mean that, even in aggregate, both the distribution of the value of capital assets by category and its distribution by locality are highly unstable from one year to the next.

### *Summary*

The output and the value added of informal household agricultural activity is predominantly accounted for by crop cultivation, among which food crops predominate over export crops. Crop cultivation accounts for the majority of output and value added in all localities, though is of particular relative and absolute importance in the Rural Forest and Rural Savannah areas. The greater part of the output is, on average, consumed by the producing household, at least in the case of food crops. Maize and cassava are the most important individual crops, with the next most important being predominantly grains and starches. Among export crops at the household level, cocoa predominates, but it still accounts for a relatively low proportion of the total.

The processing and livestock sectors are much smaller. In each case a significant proportion of the output is consumed domestically. In the livestock sector, the sale and own-consumption of livestock predominate over animal products which are relatively unimportant.

## 6. Assessment and conclusions

This paper has presented a descriptive analysis of informal economic activity of households in Ghana such as is recorded in the Ghana Living Standards Surveys of 1987/88 and 1988/89. It has focused on households' self-employment activities in both the agricultural and the non-agricultural sectors, excluding those few household activities which, given their characteristics, may reasonably be considered as belonging to the formal sector. Further, while the questionnaire does not provide information to enable us to identify or distinguish between informal activities (narrowly-defined) and irregular or criminal activities (McKay and Round, 1994), we must assume that the latter would not be reported by respondents to any significant extent in a survey of this nature and are therefore excluded.

This does not necessarily mean that we have been able to identify and measure all legal, informal economic activity undertaken by the households surveyed. Activities for which a household enterprise of one form or another exists are probably adequately identified in the Ghana Living Standards Survey. Some types of activity, especially the more informal and infrequent, such as small-scale fishing and hunting, for which there is no establishment as such, might not be thought of by respondents as self-employment activities and so not reported in the survey interview. This suggests some degree of undercoverage of informal activity in the survey, although there is presently no way of assessing the extent of this undercoverage. The types of activities which may be underrecorded are intrinsically difficult to survey, and the Ghana Living Standards Survey remains the best available source of information on Informal economic activity in Ghana.

As the Ghana Living Standards Survey is a household survey, and one covering many different domains of the living standards of households in Ghana, the amount of information it is able to collect on household self-employment enterprises is necessarily limited. Furthermore, there is evidence of a significant underrecording of profits, at least in the case of non-farm enterprises. Nevertheless, the availability of alternative estimates has enabled us to make an adjustment for this evident underrecording to provide much more credible estimates, thereby enabling us to construct complete, and apparently reasonable, economic accounts for the informal economic activities in both the agricultural and non-agricultural sectors. The pattern of the resulting estimates by locality and by sector appear credible. The estimates, given what they are trying to measure, will be subject to a greater measurement error than many other variables collected in the household survey. Households may feel

they have an incentive to understate their incomes, and the lack of accounts for informal economic activities means that they may not be able to give fully accurate responses even if they wish to. Nevertheless, the figures presented in this paper are based on the best information available hitherto on informal economic activity in Ghana, and would appear to be a satisfactory basis for constructing economy-wide estimates of the contribution of informal economic activity to the gross domestic product in Ghana. The methodology for doing this, and the resulting estimates, are presented in a separate paper (Coulombe, McKay and Round, 1994b).



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#### 4 ESTIMATING THE CONTRIBUTION OF INFORMAL SECTOR ACTIVITY TO THE GROSS DOMESTIC PRODUCT OF GHANA

H Coulombe, A D McKay and J I Round<sup>11</sup>

##### 1. Introduction

The conceptual basis underlying the identification of household economic activity, and of informal sector activity in particular, suggests that estimates of value added ought to be derived at an economy-wide level for different categories of activity. It has been noted that the 1993 SNA makes a distinction between enterprises owned and operated by own-account workers, that is, *family enterprises*; and enterprises of employers, which we refer to as *micro-enterprises*. But there is also a sectoral dimension, starting with the distinction between *farm* and *non-farm enterprises*, although a much finer disaggregation of activities is desirable for national accounts purposes.

This paper sets out a general methodology for deriving estimates of the gross domestic product of household economic activity in Ghana together with some estimates derived from the Ghana Living Standards Surveys (GLSS 1 and GLSS 2). It follows directly from two earlier papers, the first of which (McKay and Round, 1994) established the conceptual basis for the identification of household economic activity (that is, production activity) in Ghana, while the second (Coulombe, McKay and Round, 1994b) set out some sample estimates on the basis of GLSS 1 and GLSS 2 survey results. However, the methodology also relies on earlier work in which sample estimates of household incomes and expenditures were derived from the GLSS data (Coulombe, McKay and Round, 1993) and some identified differences in the sample results for GLSS 1 and GLSS 2 were analysed (Coulombe, McKay and Round, 1994a).

The methodology begins from the point where GLSS sample results of household economic activity have been obtained (Coulombe, McKay and Round, 1994b). There are then two stages in the methodology which follow. The observed shortfall in the estimates of total household income relative to total household expenditure suggests that at least some components of income may be underestimated and/or some

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<sup>11</sup> This is a revised version of the paper presented in the workshop. It includes some preliminary results of an additional method of deriving adjustment factors (see sections 4 and 5) which was discussed informally at the workshop.

components of expenditure may be overestimated. However, there are good reasons for believing that the vast majority of the shortfall is a consequence of an underestimation of income (Coulombe, McKay and Round, 1994a). Thus at the first stage a set of adjustment factors are derived so as to compensate for possible underrecording of income in the sample estimates. At the second stage the (adjusted) sample estimates then have to be grossed up to represent the population as a whole. For this we rely on reciprocal sampling fractions to represent the grossing up factor.

The outline of the paper is as follows. After briefly reviewing, in section 2, the aggregate income and expenditure components that have been identified in earlier work, section 3 focuses on an analysis of the identified shortfall of household income relative to household expenditure. This is important, not only as an interesting independent statistical analysis, but it also to form an integral part of the adjustment methodology. Section 4 describes a range of proposed methodologies for deriving adjustment factors to account for the underrecording of income. Sets of these adjustment factors are then presented and discussed in section 5. Then, in section 6, the adjusted GLSS sample estimates are multiplied by grossing up factors so as to provide some preliminary estimates of all-Ghana informal sector GDP. Finally, section 7 concludes by reviewing the strengths and weaknesses of the methodology that has been used and offers some reflections on the overall results achieved.

## 2. Household economic activity and the GLSS

### *Income and expenditure components*

It will be useful to consider the measurement of household production activity within the context of a set of household income and expenditure accounts. In general households derive their incomes from a variety of sources and make a range of expenditures and other outlays from this income, leaving savings as the component which balances household incomes and outlays. We shall leave to one side all considerations about what constitutes income and expenditure, the distinction between current and capital items, and therefore what should or should not be included in the accounts. It can be noted that in our earlier work (Coulombe, McKay and Round, 1993) the following aggregates (or components) of household income and expenditure were considered sufficient to provide an adequate framework for the estimation of various income and expenditure totals. As already noted, household savings is the balancing item for the household current accounts.

### *Income*

1. Employment (employee compensation)
2. Household agriculture
3. Non-farm self-employment
4. Rent
5. Remittances received
6. Other income

### *Expenditure*

7. Food (actual)
8. Housing (actual and imputed)
9. Other expenditure (actual)
10. Food (imputed)
11. Other expenditure (imputed)
12. Remittances paid out

These components are broadly in line with those referred to in United Nations (1991,

pp 13-18), and with the current accounts of the household sector specified in the 1993 SNA, although obviously some regrouping of the underlying subaggregates is necessary for complete accordance. They have hitherto proved to be suitable for a range of descriptive analyses and are useful as a framework for this study too.

As already indicated, households engage in informal sector activity in a variety of ways. However, the majority of the income from household economic activity classified as informal sector activity shows up in two income categories in particular: 'household agriculture' and 'non-farm self-employment'. Obviously some income will also be received by household members who are engaged as employees in micro-enterprises owned and operated by other households. However, as already explained (McKay and Round, 1994), in order to derive economy-wide estimates of household production activity the relevant information base should be confined to informal activities included in component 2 (agricultural activity) and component 3 (non-farm activity), with additional allowance for the employee compensation *paid out* by micro enterprises, usually to members of other households. In other words the inclusion of component 1 (employee compensation) *received* by households from (informal sector) micro enterprises could lead to some double counting of income and product under the sampling scheme. Examining this more closely, it can be seen that two possibilities may arise. On the one hand employee compensation received by one household in the sample may have been included in the enterprise income generated by some other household in the sample. On the other hand, even if the enterprise paying the employee compensation is excluded from the sample, the sample design ought to have accommodated enterprise activity representative of that type elsewhere in the sample. However, in spite of our need to focus on just two of the household income components, it will be shown that the remaining aggregates are also required to implement the general methodology developed in subsequent sections.

#### *Alternative estimates of the income components*

Our earlier discussion of the GLSS sample results (Coulombe, McKay and Round, 1994b) outlined some of the problems encountered in deriving the estimates of the components. In particular we noted that three alternative estimates of non-farm enterprise income and two estimates of household agricultural income could be obtained from different responses and different sections of the survey. It will be useful to review briefly what are these alternative estimates in order to assist in subsequent discussion.

## 1. *Non-farm enterprises*

*Net revenue* (NFSEY1) defined as total revenue minus total current costs. Total revenues consist of payments in cash or kind as well as the value of any output consumed domestically. The costs comprise total current input expenditures, excluding at this stage any allowances for depreciation.

*Profits* (NFSEY2) defined as revenue used for household purposes plus retained 'profits'.

*Earnings* (NFSEY3) defined as the total self-employment income derived from the activities module (section 5) but limited to informal sector activities.

## 2. *Farm enterprises*

*Net revenue* (HHAGINC1) defined as the difference between total revenues and total costs can be estimated separately for crops, food products from homegrown crops, livestock, and animal products.

*Earnings* (HHAGINC2) defined as self-employment income derived from the activities module but limited to informal sector activities.

### *Comparison between estimates*

As already indicated there is no sound conceptual basis for choosing between the alternative estimates. Clearly the alternatives do not necessarily measure precisely the same quantity; thus, enterprise profit, self employment income and net revenue are each different concepts and are very unlikely to record identical estimates.

Tables 2.1, 2.2, and 2.3 record some summary statistics relating to the alternative estimates. Table 2.1, for instance, shows the mean incomes calculated across those households recording a receipt of the appropriate enterprise income. It is immediately noticeable from Table 2.1 that, for all households recording non-farm enterprise

Table 2.1: Conditional means

	GLSS 1	GLSS 2
<b>Non-farm enterprise</b>		
NFSEY1	-208430	-161509
NFSEY2	118288	123464
NFSEY3	122529	151507
<b>Agriculture</b>		
HHAGINC1	161385	124082
HHAGINC2	140245	124445

Table 2.2: Standard deviation

	GLSS 1	GLSS 2
<b>Non-farm enterprise</b>		
NFSEY1	998205	1017531
NFSEY2	154524	177735
NFSEY3	217280	268273
<b>Agriculture</b>		
HHAGINC1	314705	154578
HHAGINC2	167734	143038

Table 2.3: Percentage of households recording positive income

	GLSS 1	GLSS 2
<b>Non-farm enterprise</b>		
NFSEY1	39.1	42.4
NFSEY2	100.0	100.0
NFSEY3	100.0	100.0
<b>Agriculture</b>		
HHAGINC1	94.9	94.1
HHAGINC2	100.0	100.0

activity, the mean value of estimated net revenue (conditional mean NFSEY1) across those households is negative. Indeed, Table 2.3 shows that around 60 per cent of households show negative net revenues (60.9 per cent in GLSS 1 and 57.6 per cent in GLSS 2). By contrast, for household agricultural enterprise income, the conditional mean HHAGINC1 is positive, and only about 5 per cent of households show negative net revenue (Table 2.3). It should be noted that in all cases the standard deviations are large (Table 2.2). While there is undoubtedly a large amount of variation of enterprise income across households, standard deviations (and means) are bound to be affected by outliers. However, in deriving the aggregates, some outliers have already been removed and re-estimated and this will already be reflected in these summary statistics. Obviously, for both agricultural and non-farm enterprise activity, the 'profits' and 'earnings' estimation methods necessarily record positive incomes.

The earlier summary statistics can be augmented with Pearson correlation coefficients calculated for pairs of alternative estimates. The correlation coefficients between HHAGINC1 and HHAGINC2 are reported in Table 2.4.

Table 2.4: Correlation coefficients between household agricultural income estimates (HHAGINC1 and HHAGINC2)

	GLSS1	GLSS2
Full sample	0.528	0.825
Outliers removed	0.678	0.825

In spite of the fact that over 5 per cent of households have reported negative HHAGINC1 estimates the correlation between estimates for the full sample is quite high, and is even higher in the case of GLSS 2 than GLSS 1. However a plot of the correlations for both non-farm and household agricultural incomes identified some household observations as outliers, and these may have distorted the correlation coefficient values. Table 2.4 shows that after removing two outliers from the GLSS 1 sample and three from GLSS 2 the correlation coefficient for GLSS 1 rises to 0.678 although the coefficient for GLSS 2 remains unchanged.

A similar set of correlation coefficients between the estimates of non-farm income yielded the results shown in Table 2.5.



Table 2.5: Correlation coefficients between non-farm income estimates

	GLSS1	GLSS2
<b>Full sample</b>		
NFSEY1 and NFSEY2	-0.305	-0.154
NFSEY1 and NFSEY3	-0.141	-0.101
NFSEY2 and NFSEY3	0.558	0.523
<b>Outliers removed</b>		
NFSEY1 and NFSEY2	-0.367	-0.181
NFSEY1 and NFSEY3	-0.128	-0.118
NFSEY2 and NFSEY3	0.557	0.522

In this case the correlations are generally much weaker and highlight a particular problem with the NFSEY1 estimates. In each sample not only do more than half the households record negative incomes but Table 2.5 also indicates that this is unlikely to be accounted for simply by a scale factor, that is, an underrecording of non-farm income in all households. This is because the correlation coefficient between NFSEY1 and each of the NFSEY2 and NFSEY3 aggregates is negative in both GLSS 1 and GLSS 2 - whether these aggregates are measured with or without outliers. On the other hand the correlation coefficient between NFSEY2 and NFSEY3 is positive and is relatively high.

The choice of which pair of estimates to use is not an easy one to make. In earlier uses of the survey results different combinations have been selected in different circumstances. For example, for the derivation of the income and expenditure aggregates (Coulombe, McKay and Round, 1993) the choice was HHAGINC1 and NFSEY3, while for the descriptive analysis (Coulombe, McKay and Round, 1994b) the choice was HHAGINC1 and NFSEY2. Clearly there would also be a good case for using HHAGINC2 and NFSEY3 as these are consistently defined and yield non-negative estimates throughout the sample. However, the case against using HHAGINC2 and NFSEY3 is that they are individual-based rather than enterprise-based

estimates, and may not therefore be appropriate for all purposes. Furthermore, difficulties can be expected to arise in translating individual responses on self employment income into accurate and clearly defined components of household income. In summary, therefore, it is difficult to make an optimum choice: no one pair of estimates appear to have a clear superiority to any other pair. For present purposes it was decided to use HHAGINC2 and NFSEY2, although in some of the ensuing discussion some comparisons alternative estimates will help to ascertain the robustness of results obtained.

### 3. Income-expenditure discrepancies in the GLSS samples.

#### *Overall discrepancies between incomes and expenditures*

In many household surveys there is a tendency for incomes to be under-recorded relative to expenditures. In common with other Living Standards Surveys, earlier estimates derived from the GLSS surveys suggested that a similar phenomenon exists with these surveys too. Tables 3.1, 3.2, 3.3 and 3.4 summarise some results on the basis of the GLSS. In all four tables the farm income component is based on the earnings estimate (HHAGINC2). Table 3.1 shows the mean household total income and total expenditure for GLSS 1 under two alternative combinations of the estimates, as well as the shortfall of income relative to expenditure, which is referred to throughout as the 'discrepancy'. The first panel of the table shows the results based on the non-farm income component estimated from profits (NFSEY2), while in the second panel this component is estimated from earnings (NFSEY3). Table 3.2 shows the corresponding results for GLSS 2. Tables 3.3 and Table 3.4 are similar to Table 3.1 except that those components which are common to both incomes and expenditures (imputed items of production for own consumption, including rents on owner-occupied dwellings) have been removed before the mean incomes, expenditures and discrepancies are calculated.

The term 'discrepancy' needs to be heavily qualified for the ensuing analysis. There is no allowance made for household savings beyond that which arises when estimated household income exceeds expenditure. The information on savings available from the GLSS was considered too meagre and unreliable to be of use. The positive discrepancies, which suggest that, on average, incomes are *less* than expenditures, and which occur in all panels of both tables, are obviously too large and too universal to be attributable to dissaving alone. So an underrecording of income in at least some of the components is the only possible acceptable explanation, as it is highly unlikely that such a widespread overrecording of expenditure could have occurred. Clearly, the underrecording of income could materially affect our use of these estimates in measuring household production activity, and informal sector activity in particular. Therefore it is important to try to attempt to ascertain which income components are affected, and to what extent, and hence to try to generate some correction factors to apply to the sample results.

Table 3.1: Income-Expenditure Discrepancies (including imputations): GLSS 1

(i) NFSEY2

	Accra	Other Urban	Rural Coastal	Rural Forest	Rural Savannah	Ghana
Income (NFSEY2)	211244	219081	191882	197716	273104	217977
Expenditure	452480	335906	289106	267467	299172	314534
Discrepancy	241236	116825	97224	69751	26068	96557
Discrepancy (%)	53.3	34.8	33.6	26.1	8.7	30.7
Saving < 0 (%)	90.7	80.4	81.6	78.5	69.4	79.1

(ii) NFSEY3

	Accra	Other Urban	Rural Coastal	Rural Forest	Rural Savannah	Ghana
Income (NFSEY3)	187299	213263	172123	195298	269386	209513
Expenditure	452480	335906	289106	267467	299172	314534
Discrepancy	265180	122643	116983	72169	29785	105021
Discrepancy (%)	58.6	36.5	40.5	27.0	10.0	33.4
Saving < 0 (%)	90.7	82.7	87.3	80.9	70.4	81.5

Table 3.2: Income-Expenditure Discrepancies (including imputations): GLSS 2

(i) NFSEY2

	Accra	Other Urban	Rural Coastal	Rural Forest	Rural Savannah	Ghana
Income (NFSEY2)	294608	251894	206410	208091	253523	236378
Expenditure	502448	386684	332046	295700	308156	349285
Discrepancy	207840	134789	125636	87609	54632	112907
Discrepancy (%)	41.4	34.9	37.8	29.6	17.7	32.3
Saving < 0 (%)	85.9	81.4	84.4	82.3	75.0	81.5

(ii) NFSEY3

	Accra	Other Urban	Rural Coastal	Rural Forest	Rural Savannah	Ghana
Income (NFSEY3)	301822	230668	231199	202671	254697	234186
Expenditure	502448	386684	332046	295700	308156	349285
Discrepancy	200626	156015	100847	93029	53458	115099
Discrepancy (%)	39.9	40.3	30.4	31.5	17.3	33.0
Saving < 0 (%)	86.2	85.2	82.5	83.6	77.8	83.1

Table 3.3 Income-Expenditure Discrepancies (excluding imputations): GLSS 1

(i) NFSEY2

	Accra	Other Urban	Rural Coastal	Rural Forest	Rural Savannah	Ghana
Income (NFSEY2)	195720	169063	117585	95845	102958	130661
Expenditure	436955	285888	214809	165596	129026	227218
Discrepancy	241236	116825	97224	69751	26068	96557
Discrepancy (%)	55.2	40.9	45.3	42.1	20.2	42.5
Saving < 0 (%)	90.7	80.4	81.6	78.5	69.4	79.1

(ii) NFSEY3

	Accra	Other Urban	Rural Coastal	Rural Forest	Rural Savannah	Ghana
Income (NFSEY3)	171775	163244	97826	93426	99241	122196
Expenditure	436955	285888	214809	165596	129026	227218
Discrepancy	265180	122643	116983	72169	29785	105021
Discrepancy (%)	60.7	42.9	54.5	43.6	23.1	46.2
Saving < 0 (%)	90.7	82.7	87.3	80.9	70.4	81.5

Table 3.4 Income-Expenditure Discrepancies (excluding imputations): GLSS 2

(i) NFSEY2

	Accra	Other Urban	Rural Coastal	Rural Forest	Rural Savannah	Ghana
Income (NFSEY2)	274369	210898	135094	124593	103762	160887
Expenditure	482209	345687	260730	212203	158394	273794
Discrepancy	207840	134789	125636	87609	54632	112907
Discrepancy (%)	43.1	39.0	48.2	41.3	34.5	41.2
Saving < 0 (%)	85.9	81.4	84.4	82.3	75.0	81.5

(ii) NFSEY3

	Accra	Other Urban	Rural Coastal	Rural Forest	Rural Savannah	Ghana
Income (NFSEY3)	281583	189672	159883	119174	104936	158695
Expenditure	482209	345687	260730	212203	158394	273794
Discrepancy	200626	156015	100847	93029	53458	115099
Discrepancy (%)	41.6	45.1	38.7	43.8	33.8	42.0
Saving < 0 (%)	86.2	85.2	82.5	83.6	77.8	83.1

The size and pattern of the discrepancies shown in Tables 3.1 to 3.4 are clearly significant. For Ghana as a whole, and measuring discrepancy as a percentage of total expenditure, it can be seen that overall discrepancies are about 30 to 33 per cent in both years regardless of which estimation method is used for the non-farm income component. Also, the magnitude and pattern of income - expenditure discrepancies changes little if the NFSEY2 estimate is used instead of NFSEY3. However a disaggregation by locality reveals much more variation in discrepancies, there being even more regional variation on the basis of GLSS 1 than on GLSS 2. In both surveys the discrepancies appear to be significantly higher in households from urban areas than from rural areas. Clearly this regional variation will be due to intrinsic regional features and characteristics. Some of this will be associated with the regional mix of income components in the sense that the individual components might be under-recorded to different degrees thereby affecting the overall discrepancy in the localities to different extents.

#### *Analysis of discrepancies*

To investigate the pattern of discrepancies further, the discrepancies at the household level have been analysed by conducting a series of regressions in which a range of explanatory variables were selected, including both locality and SEG dummies and income-related variables. For this and all our subsequent analyses it proved useful to confine our income variables to just four categories of income as follows:

- (i) employee compensation,
- (ii) household agricultural income,
- (iii) non-farm business income, and
- (iv) all other income.

The last category is simply an aggregation of the rent, remittance and other income categories from the income aggregates set out earlier. It will therefore constitute an especially heterogeneous category of income sources. However, one advantage of this classification is that it provides a reasonable balance in terms of the proportions of income derived from the four sources across the household sector as a whole.

The first aim of this analysis is to try to ascertain which variables, related to household characteristics, best explain the variation in the size of the discrepancies. Throughout the analysis discrepancies are measured as 'expenditure minus income' and are expressed as a percentage of expenditure. As noted earlier the preferred choice of estimates of the household agricultural and non-farm income components in all cases

for both of the components are non-negative, and hence is non-negative for household income as a whole.

For each of GLSS 1 and GLSS 2 two separate data sets have been defined. Incomes and expenditures have been measured inclusive and exclusive of those imputed items common to each side of the household accounts. Clearly, although the treatment of imputations will not affect the size of the discrepancy in absolute terms it will affect our measure in percentage terms at the household level. To pursue this analysis further a series of regressions were carried out in which household discrepancies were separately regressed on dummy variables representing locality, socioeconomic group (SEG) and time of interview (in terms of quarter, or 'season'). Socioeconomic groups are defined according to which main source of income among the four listed above constitute the main source for each household, regardless of how large is the proportion of total income it represents. The seasonal dummy was introduced to try to establish whether discrepancies exhibited a significant seasonal pattern.

Regressions containing only dummy variables are equivalent to carrying out a one-way analysis of variance, and as each of the regressions contain three dummy variables, representing a four-way classification of the sample, a direct comparison can be made between the explained sum of squares in each case. Table 3.5 shows that the between group variation is

Table 3.5:  $R^2$  values for alternative household groupings

Imputations	GLSS1		GLSS2	
	included	excluded	included	excluded
Locality	0.026	0.019	0.010	0.009
Socioeconomic group	0.033	0.018	0.017	0.017
Season	0.007	0.008	0.003	0.006

low relative to the total variation but is nevertheless statistically significant in all cases. Therefore it can be concluded that the locality and SEG groupings explain relatively more of the total variation than do the seasonal groupings. Table 3.6 shows comparable results to those in Tables 3.1 to 3.4 in respect of a disaggregation of the sample by socioeconomic group instead of by locality. It suggests a substantially lower discrepancy in those households primarily dependent on non-farm self-employment income relative to other groups, and that this is largely independent of whether imputations are included or excluded from the accounts.

Further analyses of the factors influencing the discrepancies were carried out although the detailed results are not reported here. For example, the inclusion of household total income significantly increased the explained variation (the adjusted  $R^2$  increases from around 0.02 to 0.22 in the case of the regression for GLSS 2 with SEG dummies, inclusive of imputations) and there is also a suggestion that the degree of household dependence on a mixture of income sources rather than a sole income source may also be a relevant factor in explaining income - expenditure discrepancies.

If it is indeed the case that income is being under-reported on a wide scale then, in the light of the above results, it is possible to set out a number of conjectures, although it is more difficult to translate these into testable hypotheses. One possibility, for example, is that households which claim to be primarily dependent on wage (that is, employment) income and are classified as such in Table 3.6, may actually be underreporting, say, enterprise income. If this had been captured this would not only reduce (or even eliminate) the discrepancy of certain wage-earning households but it may have shifted them into another SEG category altogether.

One conclusion that can be drawn from the above analysis is that income source may be an important factor in 'explaining' the size and pattern of income-expenditure discrepancies across households. It helps us to ascertain whether any particular income source is more strongly associated with the observed discrepancies than any other and hence whether this income is more likely to be under-recorded. The significance of the SEG variable in the analysis of variance does suggest that the household's main income source matters and we shall exploit this result in seeking to estimate adjustment factors so as to correct for the underestimation of household income in the sample.



Table 3.6: Income-Expenditure Discrepancies, by socioeconomic group

## (i) GLSS 1 (including imputations)

	Wage	Agric	Non-farm	Other	Total
Income (NFSEY2)	182344	215883	269877	150816	217977
Expenditure	343380	291068	352003	284811	314534
Discrepancy	161036	75185	82126	133995	96557
Discrepancy (%)	46.9	25.8	23.3	47.0	30.7
Saving < 0 (%)	84.0	81.1	68.8	86.2	79.1

## (ii) GLSS 2 (including imputations)

	Wage	Agric	Non-farm	Other	Total
Income (NFSEY2)	227946	215647	299987	173669	236378
Expenditure	394197	312468	400700	285372	349285
Discrepancy	166251	96822	100713	111703	112907
Discrepancy (%)	42.2	31.0	25.1	39.1	32.3
Saving < 0 (%)	86.4	84.4	72.8	81.8	81.5

## (iii) GLSS 1 (excluding imputations)

	Wage	Agric	Non-farm	Other	Total
Income (NFSEY2)	163498	78421	218163	133983	130661
Expenditure	324534	153606	300289	267978	227218
Discrepancy	161036	75185	82126	133995	96557
Discrepancy (%)	49.6	48.9	27.3	50.0	42.5
Saving < 0 (%)	84.0	81.1	68.8	86.2	79.1

## (iv) GLSS 2 (excluding imputations)

	Wage	Agric	Non-farm	Other	Total
Income (NFSEY2)	202755	93084	248795	151173	160887
Expenditure	369006	189906	349508	262876	273794
Discrepancy	166251	96822	100713	111703	112907
Discrepancy (%)	45.1	51.0	28.8	42.5	41.2
Saving < 0 (%)	86.4	84.4	72.8	81.8	81.5

#### 4. A methodology for deriving adjustment factors

Our interest here is to seek a way of adjusting the sample estimates of household income and its components so as to obtain a more credible set of estimates in the specific sense that they are more consistent with the level of expenditure at the household level. The foregoing analysis suggests that the adjustment factors should vary by component. However the only information that is available for assessing the degree of underrecording of income is to observe the income-expenditure discrepancies for individual households.

The information available from the Ghana household surveys relate almost entirely to expenditures, incomes and household production. Many, if not most, households are likely to save some of their income. However there is no reliable (or even usable) information on the level of household savings in the GLSS1 or GLSS2 surveys<sup>12</sup>. Therefore, the best that can be achieved at the micro level is to determine those scale factors which would (on average) at least equalise household incomes with our estimates of household expenditures, and hence to disregard household savings, at least for the GLSS1 and GLSS2 data sets on which we rely.

Formally, the problem can be stated as one where the income for household  $i$  ( $Y_i$ ) which is initially

$$Y_i = \sum X_{ik} \quad (1)$$

and where, for most households reported income is less than reported expenditure, i.e.

$$Y_i < E_i \quad (2)$$

The aim is to estimate a set of scale factors  $\beta_{ik}^*$  in order to generate revised household income estimates  $Y_i^*$  such that

$$Y_i^* = \sum \beta_{ik}^* X_{ik} \quad (3)$$

and which satisfy the desirable condition that

$$Y_i^* \geq E_i \quad (4)$$

---

<sup>12</sup> There is more information on household savings in GLSS3.

Clearly, it is infeasible to generate scale factors that are both household- and component-specific, but it does serve to establish the general problem and helps to set out a way to proceed.

#### *Method 1*

The first method is simply to accept both the level and pattern of household incomes derived from the sample without any further adjustment. This obviously implies that

$$\beta_{ik} = 1 \quad \text{all } i \text{ and } k \quad (5)$$

which violates the condition that incomes should, on average, at least equal expenditures ((4) above), and, in consequence, it must raise questions about the integrity of the expenditure estimates. Formally, therefore, method 1 simply establishes a 'no adjustment' benchmark.

#### *Method 2*

The next most obvious method is to scale up all income components by the same amount in those households where total income falls short of total expenditure. At the individual household level this means defining  $\beta_i$  where

$$\beta_i = \begin{cases} E_i/Y_i & \text{if } Y_i < E_i \\ 1 & \text{if } Y_i > E_i \end{cases} \quad (6)$$

This means that sample values of all income components for each household  $i$  would be scaled by the same factor. Thus the pattern - but not the level - of incomes at the individual household level is maintained. An alternative would be to aggregate across certain household groups, say urban and rural households, localities, or SEGs, and to determine *average* scale factors applicable to all income components across all households within those groups. There is no particular advantage in grouping households, however, as the method can be applied equally well at the individual household level.

The main disadvantage of this method is that no account can be taken of the evidence described in the previous section which suggests that income components may be

under-recorded to different extents. Hence, it is preferable to seek estimates of component-specific rather than household-specific scale factors as determined by this method.

### *Method 3*

An alternative method is to estimate  $\beta_k$  on the basis of the condition that, on average, household incomes are scaled to equal (or exceed) household expenditures. Formally

$$E_I = \sum \beta_k X_{Ik} \quad (7)$$

where  $I$  is a group of households in the sample so that, for example,  $E_I$  is either the total expenditure of the group or, equivalently, it might be defined as the mean total expenditure of that group. Clearly if 'I' were to be defined to be all the households in the sample then there is no unique solution to the problem of estimating  $\beta_k$ . For instance if there are four income groups ( $k = 1, \dots, 4$ ) then the problem reduces to the solution of one equation in four unknowns. However this does suggest a viable way to proceed.

Suppose the sample of households is subdivided into four mutually exclusive groups ( $I = 1, \dots, 4$ ). If  $E' = [E_1, E_2, E_3, E_4]$  is a vector of total expenditures of each household group, and  $X$  is a matrix of 'group by component' incomes where, for example,  $X_{Ik}$  is the income of component  $k$  received by household group  $I$ , then

$$E = X \beta \quad (8)$$

where  $\beta' = [\beta_1, \beta_2, \beta_3, \beta_4]$  is the set of unknown scale factors necessary to equate group incomes to match group expenditures.

Providing household groups are chosen so that between-group income patterns differ then  $X$  is not only a square matrix but is non-singular so that  $\beta$  may be derived (uniquely) as follows

$$\beta = X^{-1} E \quad (9)$$

Other than ensuring that  $X$  is non-singular the choice of the four income groups is open. However, it is interesting to conjecture whether or not the values of the adjustment factors,  $\beta$ , are sensitive to the choice of household groups. In line with the

analysis of discrepancies discussed in the previous section one way of grouping households is according to socioeconomic group. This appears to capture the most between-group variation in household discrepancy among the factors considered.

Method 3 can be applied separately to each of the GLSS 1 and GLSS 2 samples, or to a combined sample. Alternatively it could be applied to subsets of the sample so as to derive, say, locality-specific, or season-specific sample adjustment factors if there is good evidence for believing that these might differ substantially from those at an all-Ghana level.

#### *Method 4*

In assessing the relative size of household income and expenditure (equations (1) to (3)) it will be recalled from section 2 that certain items will be common to both the income and expenditure sides of the accounts at the household level. These items are those that are produced and consumed within the household and are therefore simultaneously included as an income and expenditure. It will include rent on dwellings of owner-occupiers, but it will also include imputations of items produced and consumed within the household, as part of agricultural or non-farm enterprise activity.

If these items are removed then, in absolute terms, the income-expenditure discrepancies will be unaffected, although discrepancies expressed as a percentage of (revised) expenditures will increase. Also, it is reasonable to expect that any sample adjustment factors should be derived from (and applied to) only those parts of the income components which are not imputed, because any discrepancy must be the result of a shortfall between 'actual' income and 'actual' expenditure. Method 4 is therefore a modified version of method 3 in this regard.

Formally, a revised set of sample adjustment factors can be derived by excluding those imputed components that are common to both income and expenditure at the household level. Likewise, the resulting factors should only be applied to the 'actual' incomes recorded at the household level. Imputed items of income are multiplied by adjustment factors equal to one. Clearly, as these adjustments are applied to incomes at an individual household level the effective difference between methods 3 and 4 cannot be ascertained in advance of their application to a particular data set.

### *Method 5*

Finally, sample adjustment factors can also be estimated in a variety of ways using regression methods. The general procedure is to regress total expenditure against the four income components as independent variables, excluding any intercept term, and treating households as independent sample observations. The slope coefficients can then be directly interpreted as sample adjustment factors. That is, they are the scale factors that would need to be applied to each income component in order to provide, in a least squares sense, the best overall fit of total income to total expenditure in the sample. As in the case of methods 3 and 4 above, the scale factors are derived to equate income and expenditure 'on average' so there is no guarantee that income will match expenditure at the individual household level.

In principle the regression method can be applied in several different ways. First, it can be applied to income and expenditure components inclusive of both actual and imputed items (c.f. method 3); second it can be applied to income and expenditure components exclusive of those (imputed) items common to both sides of the accounts for each household (c.f. method 4). Thirdly, it is possible to split the sample (by region or by SEG) and hence to derive separate estimates of the scale factors for each group so defined.

As is the case in methods 3 and 4 above, there is no guarantee that the estimated scale factors will be greater than one. In principle therefore a further alternative is to carry out least squares in which all  $b_k$  are constrained to be at least one. But this may be unnecessary if the unconstrained least squares procedure generates estimates that are in the admissible range. In any case, it could reasonably be argued that such a modification is over complex under the circumstances given that there is no clear methodological preference for it.

## 5. Estimates of the adjustment factors

Adjustment factors, which are applied to the sample estimates prior to any further analysis or grossing up of these estimates to the population (all Ghana) level, have been estimated according to each of the methods described in the previous section. Obviously *method 1*, which is to leave the sample estimates unchanged, requires no further explanation. But the other methods which each yield a whole range of estimates of adjustment factors, and their application can potentially make substantial differences to the population-wide estimates that ensue.

The adjustment factors derived by *method 2* are household-specific and therefore are not reported here, although some population estimates of the income components after applying method 2 adjustment factors to the sample estimates are reported in the next section.

Sample adjustment factors have been derived according to *methods 3 and 4* and are based on a number of variations of the basic methods. As already indicated, there is no compelling reason for choosing one household grouping rather than another. In principle, the method can formally apply to any aggregation of households providing they are classified into four groups. However, a classification based on socioeconomic groups (SEG) defined according to main income source does have a special attraction in view of the fact that these groups are so closely aligned to the income components to which the adjustment factors apply, as well as offering the greatest explanatory power in the analysis of discrepancies across households. The classifications, and the nature of the solutions one might expect to equation (9) which yield the adjustment factors, can be explored further.

There is a strong preference for the adjustment factors  $\beta_{ik}$  that eventually emerge from the methodology should be positive. They are, after all, to be applied as scale factors to income variables so negative values would be meaningless. However if we consider the simple mathematics of equation (9) which is the basis of methods 3 and 4 then, obviously, even with  $X > 0$  and  $E > 0$  there is no general guarantee that  $\beta > 0$ . Recall that  $X$  is defined as a matrix of income payments by component to household groups. Therefore, in the case where the groups are defined according to main source of income (SEG) the matrix  $X$  has a dominant diagonal, and this is sufficient to ensure that  $\beta > 0$  in the application of methods 3 and 4. Similarly, for all practical purposes

and based on the correlation structure between income components and expenditures, method 5 also ensures  $\beta > 0$ .

There is a separate issue as to whether or not one would expect  $\beta \geq 1$ . At first sight, as total income is generally less than total expenditure across households then the adjustment factors for each income component might be expected to be greater than one. But it might be appropriate to scale one or more components downwards if there is reason to believe they have been overestimated in the sample results. Let us briefly consider some *a priori* possibilities in the light of the GLSS sample design and our previous analysis of the sample results (Coulombe, McKay and Round, 1994a).

There are two main grounds for expecting employee compensation to have been underestimated in the sample responses. First, in the GLSS 1 and GLSS 2 surveys households were asked for details about their primary and secondary jobs only. If household members have had more jobs income received would not have been reported. This deficiency does not apply to GLSS3. Secondly, there is some difficulty, arising from the LSMS questionnaire design, in the treatment of responses to questions about jobs undertaken in the past seven days and occupations in the past twelve months. The line taken in deriving the income aggregates on which the current estimates are based is that the 'seven day'-based and 'twelve month'-based estimates should be considered as alternatives (Coulombe, McKay and Round, 1993). Differences between the reported primary and secondary occupations in the two cases will affect some households, as it will depend crucially on when the interview took place. Therefore a bias will be introduced if the estimates are combined, and in any case total employee compensation may be under-recorded whether 'seven day', 'twelve month' or combined estimates are used. In this case the 'twelve month' estimates were used so as to be entirely consistent with related analyses and other uses of the GLSS results.

The component 'other income' is clearly subject to substantial underrecording, and hence underestimation, as it is a catch-all for incomes not listed or included in specific questions elsewhere. The two remaining components 'household agricultural income' and 'non-farm enterprise income' are our main concern for the purpose of estimating informal sector activity. For these components our *a priori* expectations are more uncertain. It might be expected that these incomes are universally under-recorded, either because of evasion, missing items in the responses from which the household production accounts are assembled, or again because the survey limited the number of business activities that could be reported upon. However, a previous analysis of the sample results from GLSS 1 and GLSS 2 (Coulombe, McKay and Round, 1994a)



noted a significantly larger decrease in both the share and absolute levels of reported household agricultural income than would have been expected over a twelve month period. This could have been due to differences in the classification of activity (or incorrectly classified activity) but this reason is hard to accept in view of the clear distinction drawn between agricultural and non-farm activities in different sections of the questionnaire. It should also be noted in this context that there is some evidence, notably from the GLSS3 results, that the contribution of agricultural income to total income is more accurately represented by GLSS 2 than by GLSS 1, which has led us to prefer to base our estimates on GLSS 2 for 1988/89.

*Methods 3, 4 and 5* for deriving sample adjustment factors described in the previous section have been applied to different sample sets and some results are shown in Table 5.1. The columns of the table refer to the different sample sets and it can be seen that two broad sets of results are reported: those for GLSS 1 and those for GLSS 2. The first column in each case (that is, columns 1 and 5 in the table) show the results for method 3. This means that the adjustments have been derived for all four income components where all incomes and expenditures for each household are measured inclusive of both actual and imputed items. The adjustment factors are all greater than one, with the highest factor being associated with the 'other income' component in GLSS 1 and 'employee compensation' in GLSS 2. The estimated adjustments for both of these components in both surveys are high, although the adjustments for the two components of immediate concern here are relatively modest. It is particularly striking to note the similarity between these two columns (columns 1 and 4) in terms of their orders of magnitude and their relative patterns.

Columns 2 and 6 in Table 5.1 show what adjustment factors result if *method 4* were applied, in the specific case of (at least) equating incomes and expenditures and excluding imputed items from the calculation. The argument here is that as the imputed items are added to each side of the income-expenditure equation the adjustment should not apply to them. Any underrecording of these items will not affect the size of the discrepancies in absolute terms. Again the comparison between GLSS 1 and GLSS 2 suggests that the estimates are close. In this case, although the adjustment factors for 'employee compensation' and 'other income' are similar to the previous estimates the adjustment factor for 'household agriculture' rises dramatically.

Columns 3 and 7 of Table 5.1 show the values of adjustment factors that arise if only the panel elements of GLSS 1 and GLSS 2 are used. As these represent essentially



common samples of households they might be expected to indicate some intrinsic features of the differences between GLSS 1 and GLSS 2. The adjustment factors for 'employee compensation' and 'non-farm enterprise income' are very close, although the corresponding factors for 'household agriculture' and especially 'other income' show some decline over time. Hence the results do suggest that there may be some unexplained changes in the level and patterns of either incomes or expenditures, or both, between GLSS 1 and GLSS 2, as revealed by the differences in the adjustment factors for all components. Some of this might be due to the probable relative overestimation of household agricultural income in GLSS 1, and is our prime reason for concentrating on the GLSS 2 results in generating GDP estimates in the next section.

Methods 3 and 4 were also applied to groupings of households by locality and by season, in order to check on the sign, size and robustness of the adjustment factors. The results showed a considerable variation in the values of the adjustment factors, many of which were implausible, and are not reported here. Therefore the grouping by SEG not only has intrinsic appeal on *a priori* grounds but also generates consistent and reasonably plausible results.

Finally, columns 4 and 8 show the results obtained by applying method 5, the basic regression method, to the GLSS 1 and GLSS 2 data sets. The most striking observation is that these estimates are considerably lower than those obtained under methods 3 and 4. As method 5 is applied to the full set of items of income and expenditure (i.e. inclusive of imputed items) the results are most directly comparable with those for method 3. The relative magnitude of the scale factors for both methods is similar in both data sets. But the absolute size of the estimates is significantly lower in method 5 than in method 3. Indeed, the scale factor for 'non-farm business income' turns out to be less than one, and is therefore below the realistic lower bound. Further work is required in order to apply other variants of method 5 and, in particular, to income and expenditure data exclusive of imputed items. Present evidence does suggest, however, that the regression methods will consistently generate lower scale factors than simultaneous equation methods (methods 3 and 4) and it may well be that regression methods also have more desirable properties. All of this remains to be investigated in future work.

## 6. Estimates of household economic activity in Ghana

### *Two stage methodology*

In principle, universe (or population) estimates of household economic activity can be derived simply by grossing up sets of sample estimates according to some appropriately chosen grossing-factor, such as the reciprocal sampling fraction. Indeed, this is the basis of the general methodology which is applied and discussed in this section. However, the previous discussion has shown that the sample estimates ought first to be adjusted in various ways so as to account for some possible underrecording of income on a component by component basis. Therefore an application of the general methodology potentially can generate a variety of estimates depending upon the choice of (i) which particular combinations of sample estimates of the income components are selected (that is, the choice of either NFSEY1, NFSEY2 or NFSEY3, combined with either HHAGINC1 or HHAGINC2); and (ii) which sample adjustment methodology is selected (that is, methods 1, 2, 3, 4 or 5). As already suggested in section 2, we have a marginal preference for HHAGINC2 (household agricultural income) and NFSEY2 (household non-farm business income) mainly on the grounds that both of these sets of estimates are non-negative throughout the sample, and because NFSEY2 also has the advantage that it retains some enterprise-based features. Therefore the results that follow are based exclusively on these sets of estimates.

It should be recalled that our earlier analysis of the estimates of household incomes and expenditures revealed a marked change in the patterns of income (across income components) between GLSS 1 and GLSS 2. A comparative analysis of these results, in conjunction with comparable (preliminary) results for GLSS 3, suggested that GLSS 2 might be more reliable, both in terms of the levels and the patterns of incomes. Therefore, the results reported in this section will be confined to GLSS 2 (1988/89) and to the estimates for HHAGINC2 and NFSEY2 although sets of results could also be generated for GLSS 1 (1987/88) and based on alternative sample estimates.

In spite of limiting the number and range of alternative estimates that, in principle, could be derived, our application of the two-stage general methodology still gives rise to five alternative estimates according to which of the five sample adjustment methods is used. It will be recalled that Table 5.1 reports several alternative estimates of sample adjustment factors relating to methods 3, 4 and 5. Two of these adjustment factors are relevant to and are utilised in the current application. These are the factors for 'household agriculture' and 'household non-farm enterprise activity' and estimates

are confined to GLSS 2, and to methods 3, 4 and 5. There has been no attempt to extend the regression methods further at this stage. It should also be recalled that method 2 adjusts the sample estimates at the individual household level while method 1 introduces no adjustment to the sample estimates whatsoever.

The final stage is a fairly straightforward grossing-up procedure. The grossing-up factor is determined on the assumption that the GLSS is a self-weighted sample and is representative of the population as a whole. The grossing-up factor is therefore calculated as the ratio of the estimated 1988 population (13.8 million) and the number of individuals included in GLSS 2 (1988/89) which is 15,369. This fraction is therefore 897.91.

#### *Estimates at an aggregate level*

Table 6.1 reports some aggregate results of the application of our methodology based on methods 1 to 5. The 'baseline' estimate of the value added of household (informal sector) non-farm activities at an all-Ghana level, in the case where the grossing-up factor is applied directly and where there is no adjustment of the sample estimates (method 1), is 218216 million cedis. The corresponding 'baseline' estimate of household agricultural activity is 339404 million cedis. Neither of these estimates makes any allowance for possible underrecording of income, and as they are the direct consequence of grossing-up the (unadjusted) sample estimates they are referred to here as 'baseline' estimates.

Table 6.1 also shows some disaggregation of these components. For non-farm enterprise activity the chosen disaggregation is between family enterprises (own-account workers) and microenterprises (employers). These categories are further disaggregated between fixed and itinerant family enterprises and between different sizes of microenterprises. Fixed-location family enterprises account for almost half of the baseline household non-farm enterprise income, while 69.6 per cent accrues from family enterprises as a whole. For household agricultural activity the disaggregation is according to categories of crop production, processing, animals (livestock), and a non-attributable category. The dominant contributor is crop production, with

Table 6.1: Estimate of (all Ghana) value added in household non-farm enterprises and household agricultural enterprises: alternative methodologies (in 1988/89, millions cedis)

(i) Non-farm enterprise income

	Method 1	Method 2	Method 3	Method 4	Method 5
Family-fixed	107525	162486	133116	134601	113869
Family-itinerant	44284	65669	54824	55891	46897
Micro<5	51654	75888	63947	65534	54702
Micro 5-9	11079	24059	13716	14084	11733
Micro>=10	3673	4948	4548	4593	3890
Total	218216	333050	270151	274704	231091

(ii) Agricultural income

	Method 1	Method 2	Method 3	Method 4	Method 5
Crops	29634	492184	424924	419839	333049
Processing	22668	41920	32460	40239	25442
Livestock	16435	27245	23536	25267	18447
Non-attributable	3567	7411	5108	8500	4004
Total	339404	568759	486027	493845	380942

processing and livestock each contributing less than 10 per cent of the baseline value added for this sector.

Before embarking on a more detailed examination of these and alternative estimates, it might be useful to compare the baseline estimates of household (informal) production activity with the latest available estimate of Ghana GDP for 1988. GDP (purchasers value) for 1988 has been estimated to be 1,057,868 million cedis.<sup>13</sup> The earlier review of present National Accounts methodology regarding informal economic activity (Powell, Debra, Amable and Tonhie, 1995) suggested that coverage and measurement of such activity varies considerably from sector to sector. The most optimistic view which can be drawn from this is that informal sector is already 'covered' in the trade, construction, road transport, mining and manufacturing sectors although the 'quality' of the estimates may be poor. It can also be deduced that informal activity in the non service sector outside trade and road transport may not even be adequately covered. On the other hand, a more pessimistic view can be posited that the current coverage of non-farm activity may, at best, include only micro-enterprises (small and medium scale enterprises) and therefore may exclude much of household 'own-account' enterprise activity. However, as regards agriculture, the current estimation procedures are quite different and it is likely that most activity is already covered although there may be a significant downward bias (an undermeasurement) in the estimates achieved.

Our baseline estimate of non-farm activity amounts to 20.6 per cent of GDP in 1988, while the equivalent percentage for agriculture is 32.1 per cent. Economy-wide value added estimates based on alternative estimation methods, that is, by applying sample adjustment factors derived by methods 2 to 5, are also summarised in Table 6.1. Method 2, in which incomes are scaled to at least match total expenditures at the individual household level, gives rise to the largest increase compared with the baseline estimate (method 1). In this case the estimate of household non-farm enterprise income would amount to 31.4 per cent of GDP, while the equivalent figure for agricultural income would be 53.8 per cent. Methods 3, 4 and 5 yield estimates which lie between the percentages derived under methods 1 and 2 with method 5 giving the smallest adjusted increase over the baseline estimate.

Table 6.2: Household non-farm enterprise output by industrial sector  
(in 1988/89, millions cedis)

## (i) Method 1

	Agro	Mining/ Quarrying	Manufac- turing	Construc- tion	Trade	Transport	Services	Total
Family-fixed	1665	1700	27930	354	68568	610	6699	107525
Family-itinerant	2665	769	4707	1670	27991	2974	3508	44284
Micro <5	1863	49	13497	2888	19091	9926	4340	51654
Micro 5-9	361	0	3902	209	3642	351	2625	11079
Micro >9	0	0	347	819	970	511	1026	3673
Total	6554	2518	50383	5941	120260	14372	18188	218216

## (ii) Method 2

	Agro	Mining/ Quarrying	Manufac- turing	Construc- tion	Trade	Transport	Services	Total
Family-fixed	2213	2848	42428	534	104278	751	9434	162486
Family-itinerant	2921	1926	7925	2565	41306	3958	5067	65669
Micro <5	2169	136	19788	4016	27573	16374	5832	75888
Micro 5-9	361	0	11474	504	7313	508	3899	24059
Micro >9	0	0	473	1491	970	701	1314	4948
Total	7664	4909	82088	9110	181440	22292	25547	333050

## (iii) Method 3

	Agro	Mining/ Quarrying	Manufac- turing	Construc- tion	Trade	Transport	Services	Total
Family-fixed	2061	2104	34578	439	84887	755	8293	133116
Family-itinerant	3299	952	5827	2068	34653	3682	4343	54824
Micro <5	2306	61	16710	3575	23634	12288	5373	63947
Micro 5-9	447	0	4831	259	4508	435	3237	13716
Micro >9	0	0	429	1014	1201	633	1271	4548
Total	8113	3117	62375	7354	148882	17792	22517	270151



## (iv) Method 4

	Agro	Mining/ Quarrying	Manufac- turing	Construc- tion	Trade	Transport	Services	Total
Family-fixed	1920	2186	35179	288	85651	753	8589	134566
Family-itinerant	3161	989	5811	2136	35454	3810	4510	55874
Micro <5	2309	63	17110	3714	24114	12769	5452	65532
Micro 5-9	437	0	4991	269	4610	452	3325	14085
Micro >9	0	0	446	1054	1114	658	1321	4593
Total	7828	3238	63538	7462	150943	18441	23196	274647

## (v) Method 5

	Agro	Mining/ Quarrying	Manufac- turing	Construc- tion	Trade	Transport	Services	Total
Family-fixed	1763	1800	29578	407	72614	646	7094	113869
Family-itinerant	2822	814	4984	1769	29642	3149	3715	46897
Micro <5	1973	52	14293	3148	20217	10512	4596	54702
Micro 5-9	382	0	4132	221	3857	372	2769	11733
Micro >9	0	0	367	867	1027	541	1987	3890
Total	6941	2667	53356	6292	127355	15220	19261	231091

*Estimates at a disaggregated level*

(i) *Household non-farm enterprise income*

Table 6.2 reports some more detailed estimates of household non-farm enterprise income with respect to the GDP contributions by sector in 1988. This table is directly comparable with the sample results shown in Coulombe, McKay and Round (1994b), Table 4.7. As noted in our discussion of the sample results, the sample size will permit only a modest disaggregation which is limited here to just seven sectors. It was also indicated that the sectoral classification of activity is unreliable. For example, some trade activities could have been allocated elsewhere, so too much credence should not be placed on the detailed results. Nevertheless, they suggest that, under each of the estimation methods, more than half of the informal sector output in this category stems from trade sector activity, which is an entirely credible result. Manufacturing, services and transport, together generate the majority of the remaining contribution to the output of non-farm enterprise activity.

(ii) *Household agricultural income.*

Table 6.3 shows more detailed estimates of the output of household agricultural activity. The table shows the all-Ghana estimates that are comparable with the sample estimates in Coulombe, McKay and Round (1994b), Table 5.4. The outputs attributable to different kinds of crops are shown at a very detailed level, although the sample size is not really large enough to sustain such a high degree of disaggregation, so the results must be treated with particular caution. However, it is worth noting that the proportionate contributions of individual crops to total crop output varies considerably in percentage terms according to the estimation method.

The second panel of Table 6.3 shows some detailed estimates for agricultural processing. Again, the estimates should be treated with some caution because of the relatively small sample size. There is a marked difference here between methods 3 and 4, which is obviously the result of wide variations between imputed and non-imputed items at the household level. No further disaggregation can be provided for the 'livestock' and 'non-attributable' categories.

Table 6.3: Household agricultural output (in 1988/89, million cedis)

	Method 1	Method 2	Method 3	Method 4	Method 5
Cocoa	33841	65084	48460	74219	37394
Coffee	44	170	63	104	49
Coconut palm	901	1604	1291	1600	996
Oil Palm	6337	9933	9075	10270	7002
Wood	131	896	187	299	144
Cola nut	1144	1921	1638	2630	1264
Kenef	37	90	53	35	41
Cotton	960	1131	1375	2223	1061
Peanut	6637	10082	9505	10395	7334
Tobacco	1128	1733	1615	2381	1246
Pineapple	1014	1980	1452	1515	1120
Sugarcane	838	1627	1201	1904	926
Plantains	24086	40962	34491	32808	26615
Bananas	2668	4944	3820	4187	2948
Oranges	2558	4687	3663	3880	2827
Other fruit	3390	5617	4854	3880	3746
Cassava	44737	79522	64063	56763	49434
Yam	24475	34745	35048	23395	27045
Cocoyam	16829	28262	24100	18473	18596
Potato	738	1246	1057	1004	815
Maize	47976	77296	68701	64807	53013
Rice	11205	20109	16045	20587	12382
Sorghum	28461	37050	40756	30354	31449
Tomato	8581	13794	12288	15169	9482
Okro	4308	7164	6169	5533	4760
Garden egg	2585	5069	3702	3360	2856
Beans	6398	9948	9161	8714	7070
Pepper	10092	17568	14452	14166	11152
Leafy vegetable	3870	6858	5542	4204	4276
Other vegetable	663	990	950	861	733
Other crops	269	417	385	514	297
<b>Total</b>	<b>296902</b>	<b>492499</b>	<b>425164</b>	<b>420237</b>	<b>328077</b>
Export crops	53013	96251	75915	107577	58579
Food crops	243889	396248	349249	312660	269497
<b>Total</b>	<b>296902</b>	<b>492499</b>	<b>425164</b>	<b>420237</b>	<b>328077</b>

## (ii) Processing

	Method 1	Method 2	Method 3	Method 4	Method 5
Garri	3381	6866	4841	6968	3736
Peanut	3722	6586	5330	6123	4112
Pito	1597	1964	2288	3093	1765
Maize flour	738	1234	1056	1758	815
Cassava flour	2585	6024	3701	6159	2856
Fufu	280	1385	400	666	309
Banku	654	862	937	1559	723
Achekie	5457	9440	7814	5457	6030
Kenkey	2434	4347	3486	4540	2690
Other	1820	3211	2607	3917	2011
<b>Total</b>	<b>22668</b>	<b>41920</b>	<b>32460</b>	<b>40239</b>	<b>25048</b>

Table 6.4: Actual and imputed income (in 1988/89, millions cedis)

## (i) Imputed non-farm income

	Method 1	Method 2	Method 3	Method 4	Method 5
Family-fixed	13306	20678	16473	13306	14091
Family-itinerant	3911	5729	4842	3911	4142
Micro-enterprise	4374	6172	5416	4374	4633
Total	21592	32578	26731	21592	18866

## (ii) Actual non-farm income

	Method 1	Method 2	Method 3	Method 4	Method 5
Family-fixed	94219	141808	116643	121259	99778
Family-itinerant	40373	59941	49982	51960	42755
Micro-enterprise	62032	98723	76795	79835	65691
Total	196624	300472	243420	253054	208224

## (iii) Agricultural income

	Method 1	Method 2	Method 3	Method 4	Method 5
Imputed	227733	369573	326114	227733	251645
Actual	111671	199186	159913	266112	118260
Total	339404	568759	486027	493845	369905

(iii) *Actual and imputed items*

The estimation procedure permits some disaggregations of estimated value added according as to whether the output is 'actual' or has been imputed. Table 6.4 summarises the results at an aggregate level; more detailed results are available although again their reliability would be more doubtful. Considering the baseline estimates as the benchmark for comparison it can be seen that imputed income represents 9.9 per cent of total (informal) non-farm enterprise income, and 67.1 per cent of total agricultural income. So imputations account for only a small part of the likely increase in estimated GDP, as most of the agricultural income (imputed and actual) ought, in principle, to be included in GDP already. Departures from these baseline percentages for alternative estimation methods are quite dramatic, because of the way in which imputed items are treated in deriving sample adjustment factors (especially method 4).

*Household formal and informal sectors compared.*

All of the estimates presented and discussed so far relate to household *informal* sector activity. Although the majority of household sector production activity is defined as being informal, some activity in the non-farm enterprise sector has been classified as formal and has therefore been excluded from the sample before deriving the above estimates. However all household agricultural income is considered to have been derived from 'informal' activity according to our working definition. It is therefore interesting to see the extent to which households engage in formal sector production activity, as reported in the GLSS surveys. Table 6.5 summarises the estimates of informal and formal sector output for non-farm enterprises, classified by each of the enterprise categories, and derived by each of the four estimation methods. Considering the baseline estimates it can be seen that formal sector accounts for only 5.4 per cent of the total estimated income generated from household production activity. This percentage is higher for method 2 (which is 7.9 per cent) but for other methods it is otherwise similar to the percentage for the baseline estimate. This accords with prior expectations that household formal sector activity was relatively small in Ghana at this time although it is not negligible.

In summary, it would be desirable to express a view on which might be the preferred method of the four methods proposed above. If it is accepted that there is strong evidence that income has been under-recorded, then method 1 (baseline estimates) is

Table 6.5: Household formal and informal sector output (non-farm enterprise only),

(in 1988/89, millions cedis)

(i) Informal sector

	Method 1	Method 2	Method 3	Method 4	Method 5
Family-fixed	107525	162486	133116	134601	113869
Family-itinerant	44284	65669	54824	55891	46897
Micro<5	51654	75888	63947	65534	54702
Micro 5-9	11079	24059	13716	14084	11733
Micro>=10	3673	4948	4548	4593	3890
Total	218216	333050	270151	274704	231091

(ii) Formal sector

	Method 1	Method 2	Method 3	Method 4	Method 5
Family-fixed	3770	6566	4668	4839	3992
Family-itinerant	1278	2316	1582	1639	1353
Micro<5	2484	4509	3075	3163	2609
Micro 5-9	3168	7978	3923	3997	3355
Micro>=10	1934	7302	2394	2487	2048
Total	12635	28671	15642	16125	13380

likely to be a lower bound estimate of informal sector activity. Method 2 is a general method of scaling at the household level and therefore scales all components equally. Method 4 is more sensitive than method 3 with regard to imputed items and would seem to have the most desirable features overall.

## 7. Conclusions

The aim of this paper has been to present estimates of the contribution of the informal sector (and of household production activity in general) to the gross domestic product in Ghana. This has been a complex exercise for several reasons, but two reasons predominate.

First, it has been recognised in earlier estimation and analytical exercises that a multiplicity of alternative estimates of key aggregates may be derived from the GLSS results. No one set of estimates predominate or can be considered to be the most credible in all circumstances or for all purposes. Secondly, our analysis of the individual household accounts strongly suggests some underrecording of incomes or overreporting of expenditures (or both), because of the high preponderance of implied negative savings. These results do not seem credible and it strongly suggests that incomes are under-recorded for one reason or another.

In the light of these two factors, a two-stage methodology has been developed which attempts to provide an adjustment to the sample estimates at the first stage prior to grossing-up the sample estimates at the second stage. There appears to be very little alternative other than to apply the grossing-up factor derived from the sample and universe population estimates. However, even if one accepts the likely underrecording of income, the methods proposed take no additional account of household savings, and therefore use the expenditure estimates as the lower bound of household incomes for most households in the sample.

The estimates of informal sector income and output in Ghana that emerge suggest it to be a sizeable percentage (at least 20 per cent in the case of non-farm enterprises) of the current published estimates of GDP. The more important question as to whether this production activity has already been accounted for in the existing estimates is a quite separate issue. The issue has been addressed in an earlier paper although not yet definitively resolved. Indeed there are a whole range of methodological issues that require further consideration before these estimates can be fully utilised in national accounts practice.



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