Defining and measuring informal employment in South Africa: A review of recent approaches

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Defining and measuring informal employment in South Africa: A review of recent approaches

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ABSTRACT

This paper reviews the Stats SA methodologies to measure informal employment before and after the introduction of the Quarterly Labour Force Survey (QLFS), as well as other recently proposed approaches (e.g., Devey, Skinner and Valodia, Heintz and Posel, etc.), so as to investigate the congruence, if any, between the various measures of the rate of informality. Furthermore, econometric techniques are used to investigate commonalities and differences in the way in which the different measures of informality are associated with demographic and employment characteristics. The results suggest that informal employment is much bigger if the post-2007 Stats SA methodology, which considers employment as informal regardless of whether the activities take place in the informal sector or not, is adopted.

Keywords: South Africa, Household survey, Labour market trends, Informal employment
JEL codes: J00

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1. Introduction

Since Hart (1973) first introduced the concept "informal sector" in the early 1970s, there has been considerable debate about what exactly the term informal economy[2] refers to, as well as the appropriate way to measure informal employment. The International Labour Organization (ILO), in the 15th International Conference of Labour Statisticians (ICLS) in 1993, defined informal employment in terms of the characteristics of the enterprise in which the activities took place (the enterprise approach), i.e., informal employment only included those working in the informal sector. However, in the 17th ICLS in 2003[3], it was suggested that informal employment should be defined in terms of the employment characteristics of the persons involved (i.e., the labour approach). In other words, informal employment should also include people employed outside the informal sector who display informal characteristics[4].

In South Africa, between 1995 and 2007, the enterprise approach was adopted by Statistics South Africa (Stats SA) to define the employment in informal sector in the 1995-1999 October Household Surveys (OHSs)[5] and 2000-2007 Labour Force Surveys (LFSs). With the introduction of the Quarterly Labour Force Survey (QLFS) since 2008, Stats SA defined informal employment in two ways, namely employment in informal sector (again, adopting the enterprise approach but using different questions compared with the questions used in the 1995-2007 methodology, as will be discussed in Section 2) and informal employment, which included the employed in the informal sector as well as informal employment outside the informal sector.

Furthermore, alternative definitions of the South African informal employment have been proposed recently by Devey *et al.* (2006a), Essop & Yu (2008b) as well as Heintz & Posel (2008). In general, these approaches accepted that the enterprise approach could still be adopted to define informal employment in the case of self-employed. With regard to employees, it was proposed that informal employment should be defined according to the work characteristics of the employees, i.e., the labour approach as suggested by the 17th ICLS. However, different criteria were used by each approach. For example, entitlement to paid leave was included but receipt of medical benefits from employer was excluded by Heintz & Posel, but the opposite happened when Stats SA defined employment in the informal sector in the QLFS. Thus, the following three questions arise: Which methodology measures informal employment more properly? Would the other proposed methods result in a much larger size of employment? Would different people be identified as informally employed in each methodology? Besides, recent international studies recommended the productive approach to define informal employment, and this leads to two further questions: Could such a methodology be applied to South Africa, and what is the size of the informal employment if it is possible to adopt such methodology?

The paper is structured as follows: Section 2 reviews the South African methodologies to define informal employment since 1995, while the proposed definitions in recent international literature are also looked at. In Section 3, the degree of coincidence of different measures of informal employment is examined, while econometric techniques are used in Section 4 to investigate the commonalities and differences in the way in which the different measures of informality are associated with demographic and employment characteristics. Section 5 provides conclusions.

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[2] The informal sector is increasingly being referred to as the informal economy so as to get away from the idea that informality is confined to a specific sector of economic activity but rather cuts across many sectors. In addition, the informal economy emphasizes the existence of a continuum from the informal to the formal ends of the economy and hence the interdependence between the two sides (Flodman Becker, 2004:8).

[3] ILO (2002a) was used as a basis for discussion in the 17th ICLS.

[4] These characteristics will be discussed in detail from Section 2.

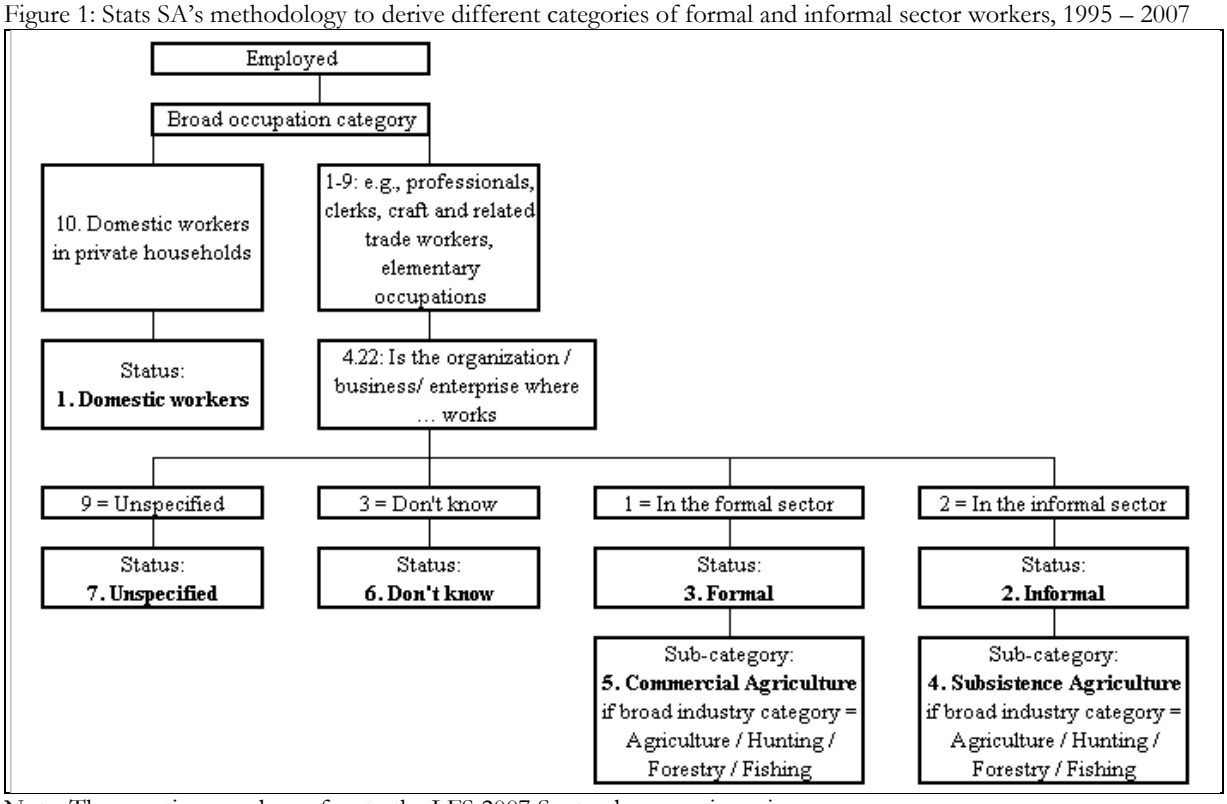
[5] The formal/informal sector status of the employed could only be defined in the case of self-employed in OHS 1995-1996 (Essop & Yu, 2008a: 7-8).

2. Methodologies to define informal employment

2.1 South African methodologies, 1995 – 2007

The Stats SA methodology until 2007 used the enterprise approach as suggested in the 15th ICLS to define informal employment as only those working in the informal sector[6]. The direct question on the formal/informal sector status (i.e., Question 4.22, LFS 2007 September[7]) was the key indicator used to distinguish informal workers from formal workers (Figure 1) and this took place regarding both the self-employed and employees[8].

Figure 1: Stats SA's methodology to derive different categories of formal and informal sector workers, 1995 – 2007



Note: The question number refers to the LFS 2007 September questionnaire.
Note: The option "I don't know" only became available since LFS 2000 March.

[6] In the 15th ICLS in 1993, informal employment was defined as comprising "all jobs in informal sector enterprises, or all persons who, during a given reference period, were employed in at least one informal sector enterprise, irrespective of their status in employment and whether it was their main or secondary job", with informal sector enterprises meaning private unincorporated enterprises, i.e., enterprises that are "not constituted as separate legal entities independently of their owners, and for which no complete accounts are available that would permit a financial separation of the production activities of the enterprise from the other activities of its owner(s)" (Hussmanns, 2005:3). Furthermore, it was suggested that the employment size in the informal sector enterprises should be defined as those with less than five employees.

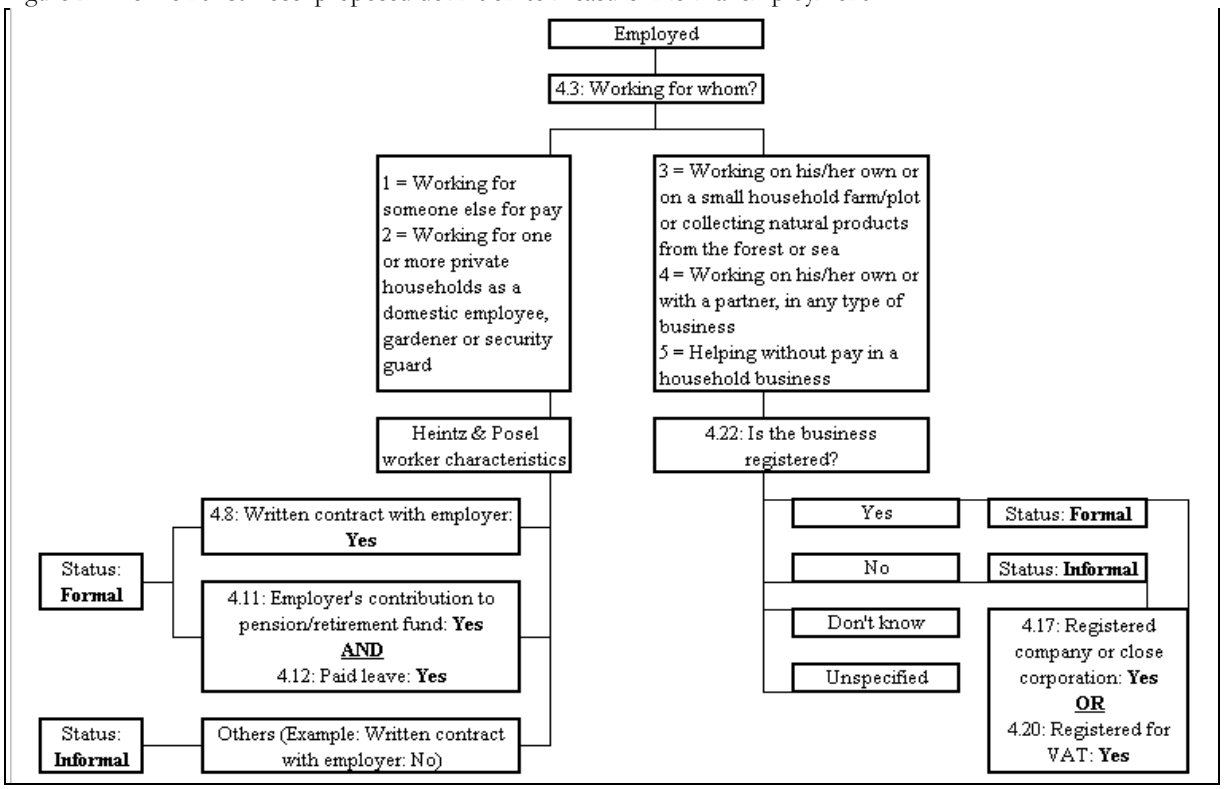
[7] The question was asked as follows: "Is the organization / business / enterprise / branch where … works: 1 = In the formal sector, 2 = In the informal sector (including domestic work), 3 = Don't know." In addition, there was a footnote in this question: "Formal sector employment is where the employer, institution, business or private individual is registered to perform the activity. Informal sector employment is where the employer is not registered".

[8] In the OHS surveys, there were only three options regarding employment type, namely working for "someone else", "himself/herself" and "both himself/herself and someone else". A negligible proportion (less than 1%) of respondents chose the third option in all OHSs. People choosing the first and third options were regarded as employees, while people choosing the second option were classified as self-employed. In the LFSs, this question was improved, and there were five categories: "working for someone else for pay", "working for one or more private households as a domestic employee, gardener or security guard", "working on his/her own or on a small family farm/plot or collecting natural products from the forest or sea", "working on his/her own or with a partner, in any type of business (including commercial farms)" and "helping without pay in a family business". People choosing the last three options were regarded as self-employed.

However, Heintz and Posel (2008: 31) as well as Stats SA (2006: 10) argued that the answers to such direct question were guided by the respondents' self-perception, and this could explain the significant differences in the size of the informal sector when measured using questions 4.17 (Whether the enterprise is a registered company or close corporation or not) and 4.20 (Whether the enterprise is registered for VAT or not). In addition, Devey *et al.* (2006a: 311-314), Heintz and Posel (2008:30-32) as well as Muller (2003: 6-9) argued that the questionnaire did not instruct the interviewers to read the footnote that explained the difference between formal and informal sectors in such direct question, and even if the explanation was read, the respondents might not properly understand what registration of an enterprise entailed, thereby giving incorrect answers. Furthermore, the questionnaire assumed that the employees knew the enterprise's formal/informal sector status. Hence, Heintz and Posel (2008:32) concluded that the direct question, the only criterion being used by Stats SA to define informal employment until 2007, might not give reliable estimates of the informal employment, and other questions should also be considered in order to define the informal employment more precisely.

Therefore, Heintz and Posel (2008:32) proposed an alternative definition of informal employment, and the methodology is presented in Figure 2. Self-employment was considered as informal if the self-employed worked in unregistered enterprises. In other words, the enterprise approach from the 15th ICLS was still adopted by Heintz and Posel in the case of self-employed. However, it was decided that those who self-identified as self-employed in the informal sector, but also reported their enterprise as registered (i.e., the answer is "yes" to either question 4.17 or question 4.20) were re-coded as self-employed in formal sector[9].

Figure 2: The Heintz & Posel proposed definition to measure informal employment



Note: The question number refers to the LFS 2007 September questionnaire.

Looking at the employees, Heintz and Posel applied the recommendation of the 17th ICLS by defining informal employment as employment that lacked a set of social protections and/or enforceable employment contracts, regardless of whether the employees worked for a registered

[9] As a result of such re-coding, the number of self-employed in the informal sector as defined by Heintz and Posel was slightly smaller than the number of informally self-employed as defined by the Stats SA 1995-2007 methodology. This will be discussed in greater detail in Section 3.

enterprise or not[10]. In other words, job-related characteristics instead of the enterprise registration status were considered when defining someone as informally employed. With regard to the job-related characteristics used by Heintz and Posel in their methodology, they first considered the minimum standard of rights and protections of workers under the Basic Conditions of Employment Act (BCEA) of 1997 before deciding to use the following three criteria to define the informally employed: the contract status, entitlement to paid leave, and employer's contributions to pension funds. Wage employment was defined as formal if the worker had an employment contract or received both paid leave and pension contributions. They argued that such a definition "most closely captures the distinction between formal as protected (or regulated), and informal, as unprotected (unregulated), employment" (Heintz & Posel, 2008: 32). Therefore, to summarize, Heintz and Posel defined informal employment in South Africa by including self-employment in informal enterprises and employment in informal jobs.

Table 1: The indicators used to derive the Devey *et al.* formal-informal index for the employees

Question number	Index = 1	Index = 0
4.4: Number of employers	(1): One employer (2): More than one employer	???
4.6: Permanence of work	(1): Permanent	(2): Fixed period contract (3): Temporary (4): Casual (5): Seasonal
4.8: Written contract with employer	(1): Yes	(2): No
4.10: Who pays wage	(1): Employer (2): Labour broker (3): Contractor or agency	(4): Other
4.11: Employer contributes to pension or retirement fund	(1): Yes	(2): No
4.12: Paid leave	(1): Yes	(2): No
4.13: Trade union membership	(1): Yes	(2): No
4.16 Number of regular workers in enterprise	(6): 50 or more	(1): 1 (2): 2 – 4 (3): 5 – 9 (4): 10 – 19 (5): 20 – 49
4.17: Working for a registered company or close corporation	(1): Yes	(2): No
4.18: Employer makes UIF deductions	(1): Yes	(2): No
4.19: Employer makes medical aid or health insurance payments	(1): Yes, for himself/herself only (2): Yes, for himself/herself and his/her dependents (3): Yes, but he/she is not using it	(4): No, because he/she is covered by someone else's medical aid (5): No medical aid benefits
4.20: Enterprise is registered to pay VAT	(1): Yes	(2): No
4.23: Location of work	(3): Inside a formal business premises (4): At a service outlet	(1): In the owner's home (2): In someone else's home (5): At a market (6): On a footpath or street (7): No fixed location (8): Other

Note: The question number refers to the LFS 2007 September questionnaire.

[10] In the 17th ICLS, it was proposed that informal employment should be defined as the total number of informal jobs, whether carried out in formal sector enterprises, informal sector enterprises, or households (Hussmanns, 2005:4-6). In addition, it was proposed that employees holding formal jobs in informal sector enterprises should be excluded from informal employment.

Next, the Devey, Skinner and Valodia formal-informal index is looked at. They argued that (Devey *et al.*, 2006a: 314) the distinction between the formal and informal "sectors" seemed to imply there is a clear line dividing the two, but they are integrally linked[11]. Furthermore, while the enterprise approach exposes differences in characteristics of formal and informal workers, the categories are by no means mutually exclusive, since some informal workers display characteristics of formal workers, and vice versa.

Hence, Devey *et al.* (2006a: 315-316) proposed a formal-informal index, which was developed from a set of thirteen indicators. The indicators used for the index carried equal weight. The most formal worker would achieve a score of thirteen for the index, while the most informal worker would achieve a score of zero. The thirteen indicators used to derive the index are presented in Table 1 above. It can be seen that the three indicators used to define employees in informal employment in the Heintz and Posel methodology (Questions 4.8, 4.11 and 4.12) were also included as indicators in the Devey *et al.* index.

Looking at the Devey *et al.* approach in greater detail, such methodology could only be applied to employees in the LFSs, as the self-employed were only asked seven of the thirteen questions used for deriving the index. In addition, a few more problems were discovered, and they were discussed in great detail by Essop and Yu (2008b: 10-11). Hence, the revised Devey *et al.* index was derived by Essop and Yu, and this is presented in Table 2. The main change of such approach, compared with the Devey *et al.* approach, was that thirteen indicators were still used to derive the formal-informal index, but the number of employees question (Question 4.4) was replaced by the flexibility in work hours question (Question 4.26)[12]. For the remainder of the paper, such revised Devey *et al.* approach would be referred to as the Essop & Yu approach.

With regard to the questions used in these two formal/informal index approaches, the number of regular workers question as well as the two questions on company/close corporation registration status and VAT registration status are actually enterprise-based rather than worker-based criteria to define informal employment. Hence, it might be more appropriate to say that these two formal/informal index approaches are derived by adopting a combination of enterprise-based and worker-based indicators, but the latter carry a greater weight.

With the introduction of the QLFS in 2008, the 1995-2007 Stats SA methodology could still be applied, as the direct question on formal/informal sector status was still asked[13]. Looking at the Heintz and Posel methodology, the company/close corporation registration question was no longer asked, and thus the Heintz and Posel methodology might need some revision before it could be applied in the QLFS, as will be discussed later. Finally, both the Devey *et al.* and Essop & Yu methodologies could not be adopted, as only seven questions were still asked in the QLFS.

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[11] Over the years, the diverging views on the informal economy are categorized into three main schools of thought: the dualist school, the structuralist school and the legalist school. Dualists view the informal units and activities have few (if any) linkages to the formal economy but, rather, operate as a distinct separate sector of the economy. In contrast, structuralists see the formal and informal economies as intrinsically linked, with the latter comprising small firms and unregistered workers, subordinated to large capitalist firms. In addition, legalists claim that the informal economy comprises micro-entrepreneurs who prefer to operate informally so as to avoid the costs associated with registration (Bacchetta *et al.*, 2009: 40 & Chen, 2007: 7). Furthermore, Devey *et al.* (2006b: 1-3) argued that, contrary to the dualistic view by the South African government and the ANC in the early years of the previous decade, there are in fact close linkages between the formal and informal economies.

[12] Essop & Yu (2008b:16) explained the reason for replacing the number of employer question with the work hours flexibility question in detail.

[13] When the 1995-2007 methodology was applied on the QLFS 2008Q1-2009Q2 data, it was found that the size of employment in informal sector was slightly lower (by between 100 000 and 200 000 in each of these six QLFSs) compared with the employment size when the new methodology to define informal sector was adopted. (Such methodology will be discussed in Section 2.2) Note that in QLFS 2009Q3-Q4, although the direct question was still asked, the results were not included when Stats SA released the data. Stats SA did not explain the reason for such exclusion in their metadata document.

Table 2: The indicators used to derive the Essop & Yu formal-informal index for the employees

Question number	Index = 1	Index = 0
4.6: Permanence of work	(1): Permanent	(2): Fixed period contract (3): Temporary (4): Casual (5): Seasonal (6): Don't know (9): Unspecified
4.8: Written contract with employer	(1): Yes	(2): No (3): Don't know (9): Unspecified
4.10: Who pays wage	(1): Employer (2): Labour broker (3): Contractor or agency	(4): Other (5): Don't know (9): Unspecified
4.11: Employer contributes to pension or retirement fund	(1): Yes	(2): No (3): Don't know (9): Unspecified
4.12: Paid leave	(1): Yes	(2): No (3): Don't know (9): Unspecified
4.13: Trade union membership	(1): Yes	(2): No (3): Don't know (9): Unspecified
4.16 Number of regular workers in enterprise	(6): 50 or more	(1): 1 (2): 2 – 4 (3): 5 – 9 (4): 10 – 19 (5): 20 – 49 (7): Don't know (9): Unspecified
4.17: Working for a registered company or close corporation	(1): Yes	(2): No (3) Don't know (9) Unspecified
4.18: Employer makes UIF deductions	(1): Yes	(2): No (3): Don't know (9): Unspecified
4.19: Employer makes medical aid or health insurance payments	(1): Yes, for himself/herself only (2): Yes, for himself/herself and his/her dependents (3): Yes, but he/she is not using it	(4): No, because he/she is covered by someone else's medical aid (5): No medical aid benefits (6): Don't know (9): Unspecified
4.20: Enterprise is registered to pay VAT	(1): Yes	(2): No (3): Don't know (9): Unspecified
4.23: Location of work	(3): Inside a formal business premises (4): At a service outlet	(1): In the owner's home (2): In someone else's home (5): At a market (6): On a footpath or street (7): No fixed location (8): Other (9): Unspecified
4.26: Flexibility in work hours	(3): Work hours fixed by employer	(1): Can decide fully for himself (2): Can decide, but within a limited range (4): Don't know (9): Unspecified

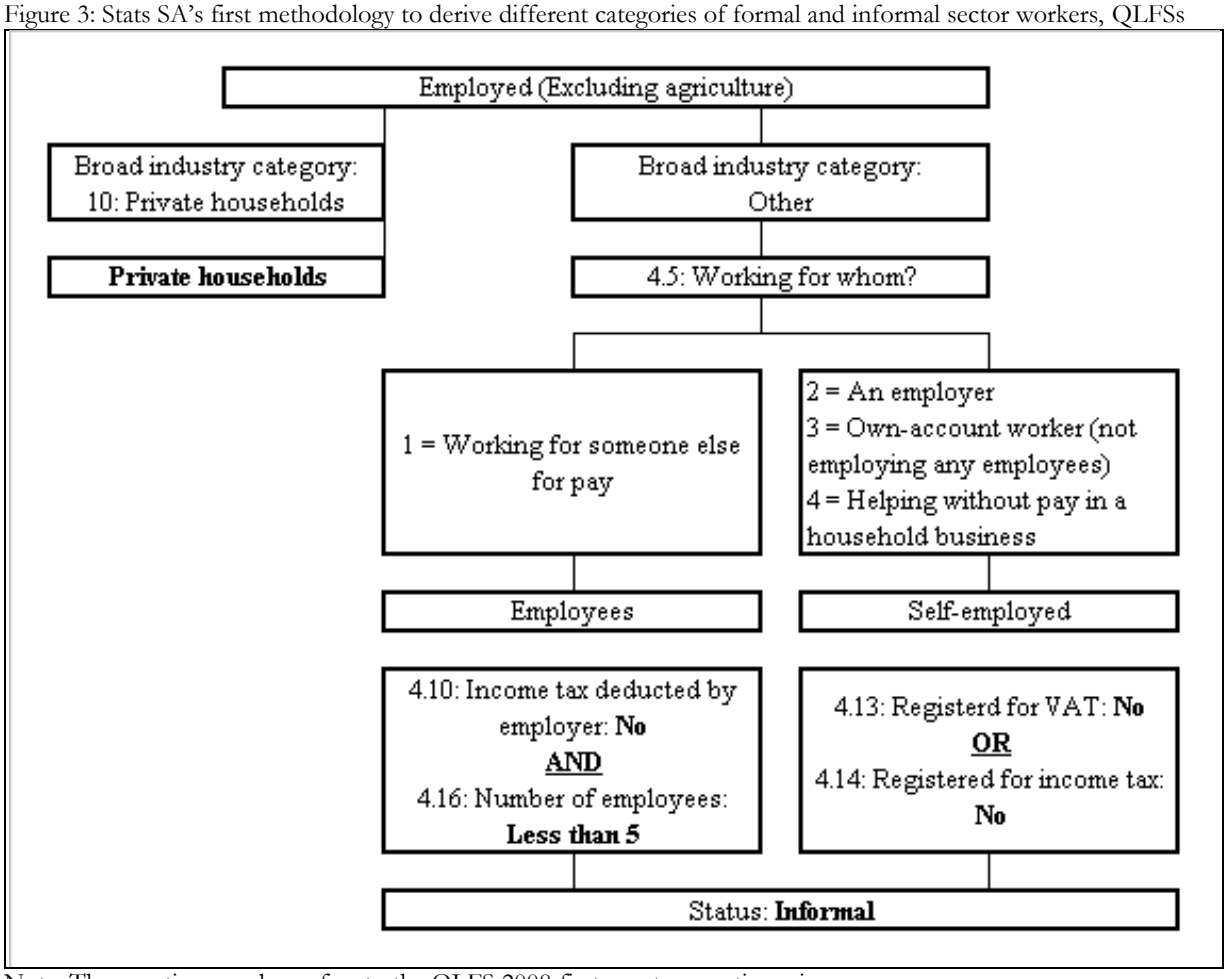
Note: The question number refers to the LFS 2007 September questionnaire.

2.2 South African methodologies, 2008 -

2.2.1 Stats SA's first methodology

With the inception of the QLFS in 2008, Stats SA adopted two new methodologies to define informal employment. In the first methodology, informal employment only included those working in the informal sector (i.e., the enterprise approach was still adopted), but the questions considered to define such informal employment were very different from the 1995-2007 methodology; the methodology is summarized in Figure 3 below. The enterprise approach adopted in the 15th ICLS was still adopted, but the direct, self-perception question on the formal/informal sector status[14] was completely abandoned when distinguishing the informal sector workers. Other questions relating to the registration status of the enterprise were adopted when deriving informal employment.

Figure 3: Stats SA's first methodology to derive different categories of formal and informal sector workers, QLFSs



Note: The question number refers to the QLFS 2008 first quarter questionnaire.

[14] In the QLFS, this question was asked in Question 4.17 (the question number refers to the 2008 first quarter questionnaire of 2008) as "Is your place of work: 1 = In the formal sector, 2 = In the informal sector, 3 = Private households, 4 = Don't know". The question included the following footnote: "Formal sector employment is where the business, institution or private individual is registered in someway with the government or statutory bodies to perform the activity. Registration may involve collecting taxes (e.g. PAYE), making UIF contributions or having a business licence. Informal sector employment is where the business or private individual is not registered with government or any statutory body in any way." However, as in the OHSs and LFSs, the questionnaire did not clearly instruct the interviewer to read the footnote to the respondents during the interview.

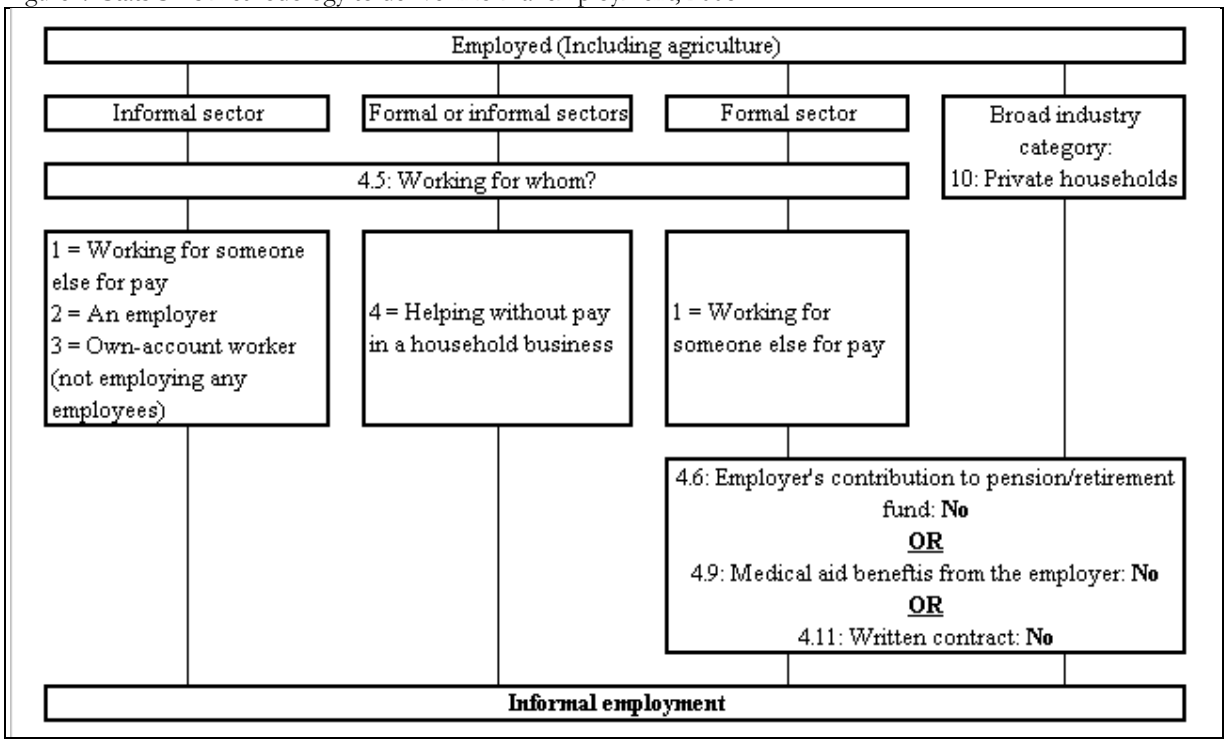
First, private households[15] and agricultural workers were excluded. In addition, the employees[16] were classified as informal workers if income tax (PAYE/SITE) was not deduced from their salary/wage and the number of employees at the place of work was fewer than 5. Next, employers, own-account workers and those who were unpaid in household business were classified as informal workers if they were not registered for either income tax or VAT.

For the remainder of the paper, such methodology to capture informal employment is referred to as "Stats SA 2008a".

2.2.2 Stats SA's second methodology

In the second approach by Stats SA to define informal employment, the methodologies adopted in both the 15th and 17th ICLS were considered, as informal employment included those working in the informal sector as well as those displaying informal characteristics working in the formal sector (See Figure 4). First, all the informal sector workers as defined in Figure 3 were included as being informal employment[17]. Next, all remaining people who were unpaid in household business but were not defined as informal sector workers were also included, i.e., all workers involved in household business, regardless of sector status as defined under the first methodology, were considered as informal workers under the second methodology.

Figure 4: Stats SA's methodology to derive informal employment, 2008 –



Note: The question number refers to the QLFS 2008 first quarter questionnaire.

[15] More than 80% of the employed in private households are domestic workers, in all the 2008-2009 QLFSs under study. On the other hand, the broad industry category of nearly 99% of domestic workers is private households in these QLFSs.

[16] In the QLFSs, there were four categories of the employed (See question 4.5 of the questionnaire): "working for someone else for pay", "an employer (employing one or more employees)", "own-account worker (not employing any employees)" and "helping without pay in a household business", and people choosing the last three options were classified as self-employed.

[17] In other words, all the self-employed and employees in the informal sector as defined by the Stats SA 2008a methodology would also be defined as those involved in informal employment by Stats SA under the Stats SA 2008b methodology, but the opposite might not happen.

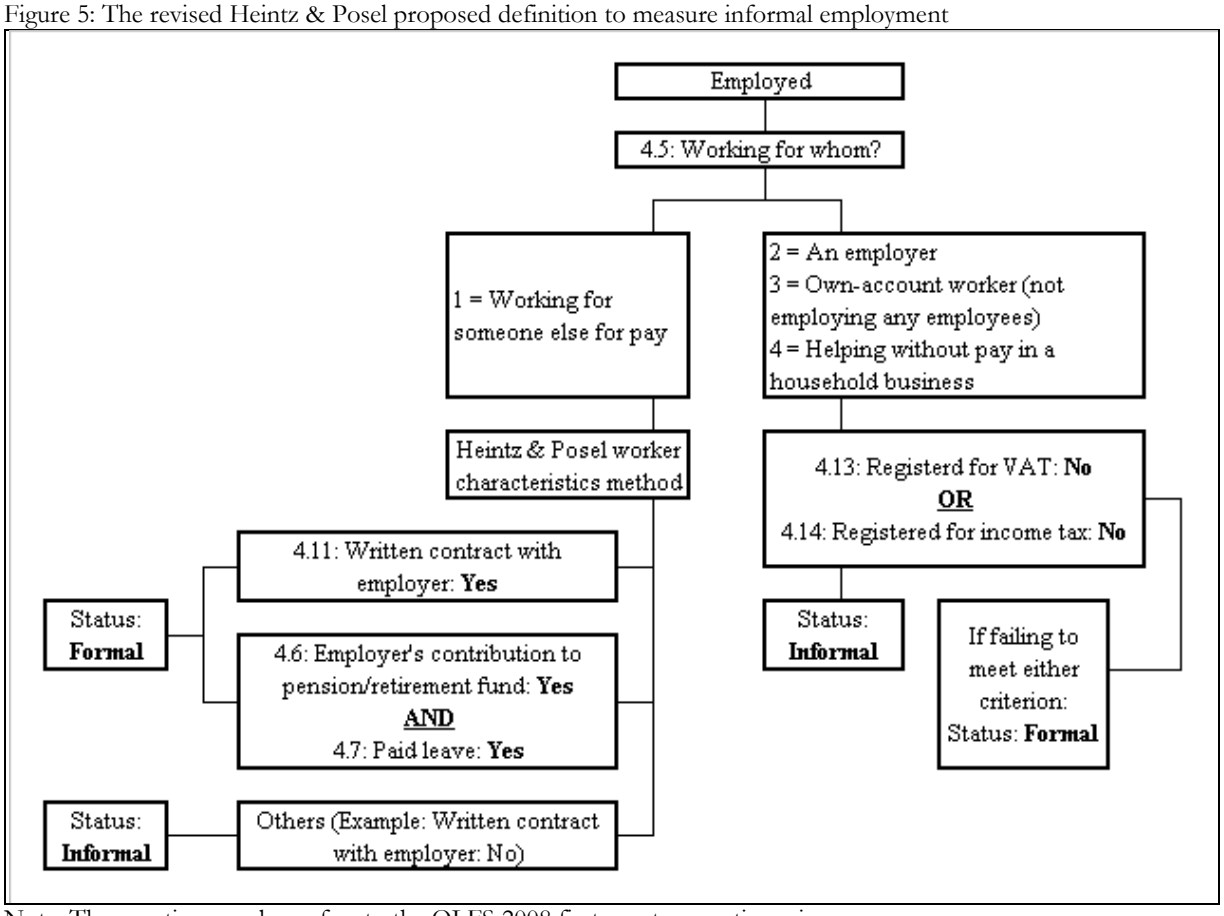
Furthermore, looking at the former sector employees and those whose broad industry category was private households, they were defined as informally employed if they were not entitled to medical aid, or pension funds, or did not have a written contract with the employer[18].

For the remainder of the paper, such methodology to capture informal employment is referred to as "Stats SA 2008b".

2.2.3 Other methodologies

As mentioned in Section 2.1, the company/close corporation registration question, one of the indicators used in the Heintz & Posel methodology, was no longer asked in the QLFS. Thus, it was decided to revise this methodology by adopting the Stats SA methodology in Figure 3 to capture the self-employed in the informal sector[19], while the Heintz & Posel methodology as presented in Figure 2 is still adopted to distinguish the employees in the informal economy, regardless of whether they work in the formal or informal sectors. The revised Heintz & Posel methodology is summarized in Figure 5.

Figure 5: The revised Heintz & Posel proposed definition to measure informal employment



Note: The question number refers to the QLFS 2008 first quarter questionnaire.

As far as the Devey *et al.* and Essop & Yu methodologies are concerned, seven questions used in both approaches are still asked in the QLFS. However, it was decided to include all of them

[18] Such approach (defining informal employment by including those working in the informal sector as well as those displaying informal characteristics working in the formal sector) was adopted in a recent study on Moldova (2004). However, the questions used to define informal employees outside the informal enterprises were employer's contribution to pension/retirement fund and possibility of paid leave. The former was one of the questions used in Stats SA 2008b methodology, as shown in Figure 4. In addition, these two questions were included by Heintz and Posel to define informal employees (Figure 2).

[19] Alternatively, it could be said that the company/close corporation registration question was replaced by the income tax registration question.

except the number of workers question for the so-called mini Devey e*t al.* index to measure the size of informal employment, since the number of workers question is enterprise-based rather than worker-based, as discussed in Section 2.1. Such mini Devey *et al.* index would have a maximum score of six for the workers displaying the strongest formal characteristics (Table 3) and zero for the workers showing the strongest informal characteristics.

Table 3: The indicators used to derive the mini Devey *et al.* formal-informal sector index for the employees

Question number	Index = 1	Index = 0
4.6: Employer contributes to pension or retirement fund	(1): Yes	(2): No (3): Don't know
4.7: Paid leave	(1): Yes	(2): No (3): Don't know
4.8: Employer makes UIF deductions	(1): Yes	(2): No (3): Don't know
4.9: Medical aid benefits	(1): Yes	(2): No (3): Don't know
4.11: Written contract with employer	(1): A written contract	(2): A verbal agreement
4.12: Permanence of work	(2): Permanent nature	(1): Limited duration (3): Unspecified duration

Note: The question number refers to the QLFS 2008 first quarter questionnaire.

The measurement of informal employment under the revised Heintz & Posel and mini Devey *et al.* approaches as well as the two Stats SA 2008 approaches will be looked at in Section 3.

Table 4: Summary of the different methodologies to measure informal employment

Enterprise-based vs. Employment-based definition of informal employment		
Production units	**Type of employment**	
	Formal	**Informal**
Formal enterprises	[1]	[2]
Informal enterprises	[3]	[4]
(A) Enterprise-based definition of informal sector: [3] + [4] (B) Employment-based definition of informal sector: [2] + [4]		
Definition used in each method		
	Definition used to define informal employment	
Methodology	**Self-employed**	**Employees**
Approaches until 2007		
Stats SA (1995-2007):	(A), using the direct question	(A)
Heintz & Posel index	(A), using the direct question and other questions	(B), using 3 indicators
Devey *et al.* index	Not applicable to self-employed	(B)#, using 13 indicators
Essop & Yu index	Not applicable to self-employed	(B)#, using 13 indicators, with one of them being different from the one used in the Devey *et al.* index
Approaches since 2008		
Stats SA 2008a – employment in informal sector	(A), using questions other than the direct question	(A), using questions other than the direct question
Stats SA 2008b – informal employment	(A)	(A) + (B)
Revised Heintz & Posel index	(A), adopting the Stats SA 2008a approach	(B), adopting the Heintz & Posel approach
Mini Devey *et al.* index	Not applicable to self-employed	(B) – using 6 indicators

It is argued that three indicators (company/close corporation registration, VAT registration, and number of regular workers) are enterprise-based rather than employment-based, and thus, strictly speaking, these two formal/informal indices adopt both enterprise-based and worker-based criteria to identify informal workers, though the latter carry a much greater weight (See the discussion before Table 2).

Table 4 summarizes the Stats SA methods, recently proposed methods by researchers as well as the two newly proposed methods to define informal employment in South Africa. It is expected that the size of informal employees would be much greater under the Stats SA 2008b methodology, as it includes informal employment both within and outside the informal enterprises, i.e., (A) + (B).

2.3 Alternative method to define informal employment: The worker's professional status approach

The South African methodologies discussed in Sections 2.1 and 2.2 adopted either the enterprise approach or the labour approach, or a combination of both to define informal employment. The indicators used in each approach (i.e., registration status and the size of employment of the firm in the enterprise approach, as well as the social protection and job security of the workers in the labour approach) are, in general, the economic criteria adopted to define informal employment in less developed countries (Gërxhani, 2003: 272-274). However, few recent international studies also looked at the skills level as well as the professional status of the workers to distinguish informal employment[20].

A study by Gasparini and Tornarolli (2007: 2-4) used two methodologies to define informal employment, namely productive definition as well as legalistic or social protection definition. The productive view argues that informal workers are engaged in low-productivity jobs in marginal small-scale and often family-based activities. In addition, the activities generate low income (Gërxhani, 2003: 275). Under this approach, the self-employed are defined as informal workers if they were unskilled workers, which stands for all individuals without a tertiary education qualification. On the other hand, employees were defined as informal workers if they were salaried workers (i.e., earning non-zero income) in a small private firm with less than 5 employees, or if they were zero-income workers. In contrast, the legalistic or social protection definition was concerned with labour protection, and the employees with non-zero income were defined as informal workers if they did not have the right to a pension linked to employment when retired. Thus, it can be seen that the legalistic definition adopted by Gasparini and Tornarolli is similar to the Heintz and Posel approach, focusing on labour protection, despite the fact that only one question (i.e., pension) was considered in the former.

Next, a study by Henley *et al.* (2008: 996) on the Brazilian economy adopted three different measures to distinguish formality and informality. The contract status approach defined workers as formal if they had a signed labour card in any employment, while the social security status approach defined workers as formal if they made contributions to a social security institute in respect of any employment. Thus, it is obvious that these two approaches are related to the labour approach as adopted in the 17th ICLS by focusing on the job-related characteristics to distinguish the formal workers from the informal workers. In addition, the formal sector activity approach, the third approach, defined the employees as formal workers if they were employed in an establishment of more than five employees, while the self-employed were classified as formal if their occupation was "creative and technical" or "administrative" (so as to capture professional activities). The rest were considered as informal workers. Thus, it can be seen that such approach is similar to the productive definition of the Gasparini and Tornarolli approach above, as the enterprise characteristic (firm size) was adopted when defining informal employees, while professional status (occupation or educational attainment) was the criterion adopted in the case of the self-employed.

[20] Hart (1970, 1973), in his study on the informal activities of Ghana, adopted such an approach to define informal workers as "the sum of the self-employed, family workers and domestic servants". However, such professional status criterion was not popular for a while before being used again in the early 1990s (e.g., Charmes, 1990).

With regard to the application of these definitions to the South African LFS/QLFS data, the productive definition recommended by Gasparini and Tornarolli could be adopted in South Africa until 2007, while the main concern regarding its application to the QLFS data is that the earnings from the main job question is no longer asked since the introduction of this survey in 2008[21]. On the other hand, it is difficult to adopt the activity approach by Henley *et al.* on the South African data, since the methodologies to classify occupations between Brazil and South Africa are quite different.

Therefore, when the productive definition is adopted to capture the size of informal employment in South Africa, the Gasparini & Tornarolli approach will be adopted unchanged on the 1995-2007 data, while the following revised Gasparini & Tornarolli approach will be adopted from 2008: The self-employed are still defined as informal workers if they were involved in unskilled occupations, while the employees were defined as informal workers if they worked in a small private firm with less than 5 employees.

2.4 Conclusion on the methodologies to define informal employment

This section has reviewed the South African methodologies to define informal employment, and it can be seen that, in the case of self-employed, definitions of informally self-employed still stressed the enterprise characteristics, despite the fact that different questions were used in recent methodologies. In addition, in the case of employees, recent approaches proposed that the labour-based approach should be adopted, focusing on employment arrangements that are not subject to social and/or legal protections. Finally, some recent international studies suggested that the productive approach, focusing on the professional status of the workers, could also be used to distinguish informal employment.

Table 5: Questions used to identify the employees in informal employment in each method

	Stats SA (1995-2007)	**Heintz & Posel**	**Devey *et al.***	**Essop & Yu**	**Stats SA 2008a**	**Stats SA 2008b**	**Revised Heintz & Posel**	**Mini Devey *et al.***	**Gaspa-rini & Torna-rolli**
Self-employed									
Formal/Informal sector direct question	✓	✓	Not applicable to self-employed					Not appli-cable to self-employed	
Company/CC registration		✓							
VAT registration		✓			✓	✓	✓		
Income tax registration					✓	✓	✓		
Educational attainment									✓
Number of questions used in the definition	***1***	***3***			***2***	***2***	***2***		***1***

[21] Stats SA was contacted in this regard, and the author was told that the earnings question would be asked for the first time in QLFS 2010. However, it is not known how frequently this question will be asked and if the question will be asked in exactly the same way as in the LFSs (i.e., respondents given the option to declare either the exact earnings amount or the relevant earnings category).

Table 5: Continued

	Stats SA (1995-2007)	**Heintz & Posel**	**Devey *et al.***	**Essop & Yu**	**Stats SA 2008a**	**Stats SA 2008b**	**Revised Heintz & Posel**	**Mini Devey *et al.***	**Gaspa-rini & Torna-rolli**
Employees									
Formal/Informal sector direct question	✓								
Pension fund		✓	✓	✓		✓	✓	✓	
Paid leave		✓	✓	✓			✓	✓	
UIF			✓	✓				✓	
Medical aid			✓	✓		✓		✓	
Income tax									
Written contract		✓	✓	✓		✓	✓	✓	
Job permanence			✓	✓				✓	
Firm size			✓	✓	✓	✓			✓
Payer of wages			✓	✓					
Trade union membership			✓	✓					
Location of work			✓	✓					
Number of employers			✓						
Work hours flexibility				✓					
Company/CC registration			✓	✓					
VAT registration			✓	✓					
Income tax registration					✓	✓			
Earnings from the main job									✓
Number of questions used in the definition	***1***	***3***	***13***	***13***	***2***	***5***	***3***	***6***	***2***

Table 5 reviews the questions used to capture informal employment in each approach. It can be seen that, in the case of self-employed, although the enterprise approach was still preferred, questions other than the direct, self-perception formal/informal sector question were used to capture informally self-employed more accurately. In addition, the focus has shifted from the enterprise approach to the labour approach to measure informal employment in the case of employees. However, the indicators used as well as the number of indicators used in each methodology differ, ranging from one indicator in the 1995-2007 Stats SA methodology to thirteen indicators used in the Devey *et al.* and Essop & Yu approaches.

Will informal employment be measured more accurately if specific indicators are included, and will informal employment be captured better if more indicators are used? Will the productive approach capture the size and profile of informal workers differently compared with the enterprise and labour approaches? These questions will be addressed in Sections 3 and 4.

3. The size of informal employment in South Africa under different approaches

The size of the informal employment is always of particular interest to economic policy makers concerned so as to promote the development of the micro-entrepreneurial sector. In this section, the informal employment trends in South Africa using various methodologies from Section 2 are looked at. In addition, whether the different measures captured the same group of informal workers will be analyzed.

3.1 Informal employment trends until 2007

The informal employment trends between LFS 2001 September and LFS 2007 September[22] using the following four methodologies will be looked at: (1) Stats SA methodology (Figure 1), (2) Heintz & Posel approach (Figure 2), (3) Essop & Yu approach[23] (Table 2), and (4) Gasparini & Tornarolli approach. The original Devey *et al.* approach (Table 1) will be excluded due to the various problems of such methodology as discussed in Section 2.1. In addition, domestic workers as well as agricultural workers are excluded from the analysis.

First, Table 6 details the number as well as the proportion of employees classified as informal under each measure. The Heintz & Posel approach resulted in the highest estimate of the rate of informality at between 17% and 27% of all employees during the period under study. On the other hand, the Stats SA methodology (using the direct, self-perception question to identify employees in informal sector) resulted in the lowest incidence of informality. The Gasparini & Tornarolli productive approach resulted in approximately 1 million of employees being defined as informal throughout the years, while the numbers were even slightly lower under the Essop & Yu approach.[24].

For the self-employed, the rates of informality were the highest under the Gasparini & Tornarolli approach (slightly above 90% of self-employed were defined as informal), while such rates were also quite high under the Stats SA and Heintz & Posel methodologies (approximately 70% were classified as informal).

[22] The questions to define informal employees for the two Devey *et al.* approaches were asked together for the first time in LFS 2001 March. However, since the categorization of the options in the location of work question in LFS 2001 March was significantly different from the other surveys, it was decided to exclude that survey from the analysis. Further, due to the coding error problem in the question on the number of regular workers in the enterprise in LFS 2004 September (Yu, 2007: 23), while such question was adopted in the two Devey *et al.* approaches as well as the Gasparini & Tornarolli approach, the LFS 2004 September results will also be excluded.

[23] Although it was discussed in Section 2.1 that three of the thirteen indicators used for deriving the formal/informal index were enterprise-based but not employment-based, it is decided to use the index as it is to define informal employees for the remaining of the paper. In addition, the employees are categorized into the following groups: "High degree of informality" (Essop & Yu formal/informal index score between zero and four), "Moderate degree of informality" (index score between five and eight) and "Low degree of informality" (index score between nine and thirteen). Workers from the first group are then defined as informal employees.

[24] If the assumption on employees with low degree of informality was relaxed to include employees with the formal/informal index score of five as informal employees, the number of employees defined as informal was ranged between 1.1 and 1.3 million during the period under investigation, which was still lower than the number estimated by the Heintz & Posel method.

Table 6: Informal employment (weighted, 1000s), LFS 2001 September – LFS 2007 September

	Stats SA	Heintz & Posel	Essop & Yu	Gaspa-rini & Torna-rolli	Stats SA	Heintz & Posel	Essop & Yu	Gaspa-rini & Torna-rolli
Employees								
	Number of informal employees				**As % of all employees**			
2001 Mar	777	1 928	N/A#	940	10.6%	26.4%	N/A#	12.9%
2001 Sep	633	1 967	887	928	8.7%	27.0%	12.2%	12.7%
2002 Mar	586	1 664	803	976	8.1%	22.9%	11.0%	13.4%
2002 Sep	553	1 573	740	860	7.6%	21.6%	10.2%	11.8%
2003 Mar	620	1 577	784	899	8.4%	21.3%	10.6%	12.1%
2003 Sep	625	1 433	729	911	8.3%	19.1%	9.7%	12.1%
2004 Mar	576	1 346	719	837	7.6%	17.9%	9.5%	11.1%
2004 Sep	619	1 477	N/A##	N/A##	7.9%	18.9%	N/A##	N/A##
2005 Mar	757	1 521	844	980	9.5%	19.1%	10.6%	12.3%
2005 Sep	870	1 743	1 013	1 087	10.4%	20.8%	12.1%	13.0%
2006 Mar	712	1 610	864	1 076	8.6%	19.5%	10.5%	13.0%
2006 Sep	794	1 696	959	1 045	9.2%	19.6%	11.1%	12.1%
2007 Mar	754	1 752	924	1 097	8.7%	20.2%	10.7%	12.7%
2007 Sep	668	1 609	819	1 004	7.3%	17.5%	8.9%	10.9%
	Stats SA	**Heintz & Posel**	**Essop & Yu**	**Gaspa-rini & Torna-rolli**	**Stats SA**	**Heintz & Posel**	**Essop & Yu**	**Gaspa-rini & Torna-rolli**
Self-employed								
	Number of informally self-employed				**As % of all self-employed**			
2001 Mar	2 059	1 970	N/A###	2 381	81.4%	77.9%	N/A###	94.2%
2001 Sep	1 331	1 254		1 684	73.5%	69.2%		93.0%
2002 Mar	1 234	1 189		1 562	72.5%	69.8%		91.7%
2002 Sep	1 225	1 176		1 575	71.1%	68.2%		91.4%
2003 Mar	1 208	1 168		1 579	70.7%	68.4%		92.5%
2003 Sep	1 276	1 239		1 646	71.1%	69.1%		91.8%
2004 Mar	1 188	1 159		1 582	68.5%	66.8%		91.2%
2004 Sep	1 325	1 286		1 684	71.5%	69.4%		90.9%
2005 Mar	1 311	1 276		1 733	69.5%	67.7%		91.9%
2005 Sep	1 590	1 551		1 984	75.0%	73.1%		93.5%
2006 Mar	1 476	1 434		1 902	73.3%	71.2%		94.5%
2006 Sep	1 582	1 530		2 028	73.4%	71.0%		94.1%
2007 Mar	1 376	1 334		1 836	70.7%	68.6%		94.4%
2007 Sep	1 416	1 339		1 834	71.0%	67.2%		92.0%

Categorization problem in the work location question in LFS 2001 March.
Coding error in the number of regular workers question in LFS 2001 September.
The Essop & Yu approach could only define informal employees.

Next, Table 7 reports the pairwise correlation coefficients for various measures in LFS 2007 September. In the case of employees, the strongest correlation is observed between the Stats SA and Essop & Yu approaches, but the correlation is, strictly speaking, not too strong (0.6556). On the other hand, looking at the approaches to define informally self-employed, the Stats SA and Heintz & Posel approach have a correlation of just above 0.9, which suggests a very high correspondence between the two measures. However, such strong correlation is expected.

Table 7: Correlations of various measures of informal employment, LFS 2007 September

Employees				
	Stats SA	**Heintz & Posel**	**Essop & Yu**	**Gasparini & Tornarolli**
Stats SA	1.0000			
Heintz & Posel	0.4322	1.0000		
Essop & Yu	0.6556	0.5688	1.0000	
Gasparini & Tornarolli	0.4659	0.3564	0.4551	1.0000

Self-employed			
	Stats SA	**Heintz & Posel**	**Gasparini & Tornarolli**
Stats SA	1.0000		
Heintz & Posel	0.9139	1.0000	
Gasparini & Tornarolli	0.3411	0.3101	1.0000

Figures 6 and 7 as well as Tables 8 and 9 explore the correspondence between various measures further by showing whether different measures of informality are capturing the same groups of workers in LFS 2007 September. As far as the employees are concerned, Figure 6 and Table 8 show that only nearly a quarter of employees were defined as informal in at least one of the four measures under study. If one looks at these informal employees in greater detail, only slightly above 20% were defined as informal in all four approaches. On the other hand, approximately one-third were classified as informal only in the Heintz & Posel approach, which suggests that the Heintz & Posel methodology might have distinguished very different groups of informal employees compared to the other measures. A similar argument holds for the Gasparini & Tornarolli approach.

Figure 6: Coincidence of various definitions of informal employment – employees, LFS 2007 September

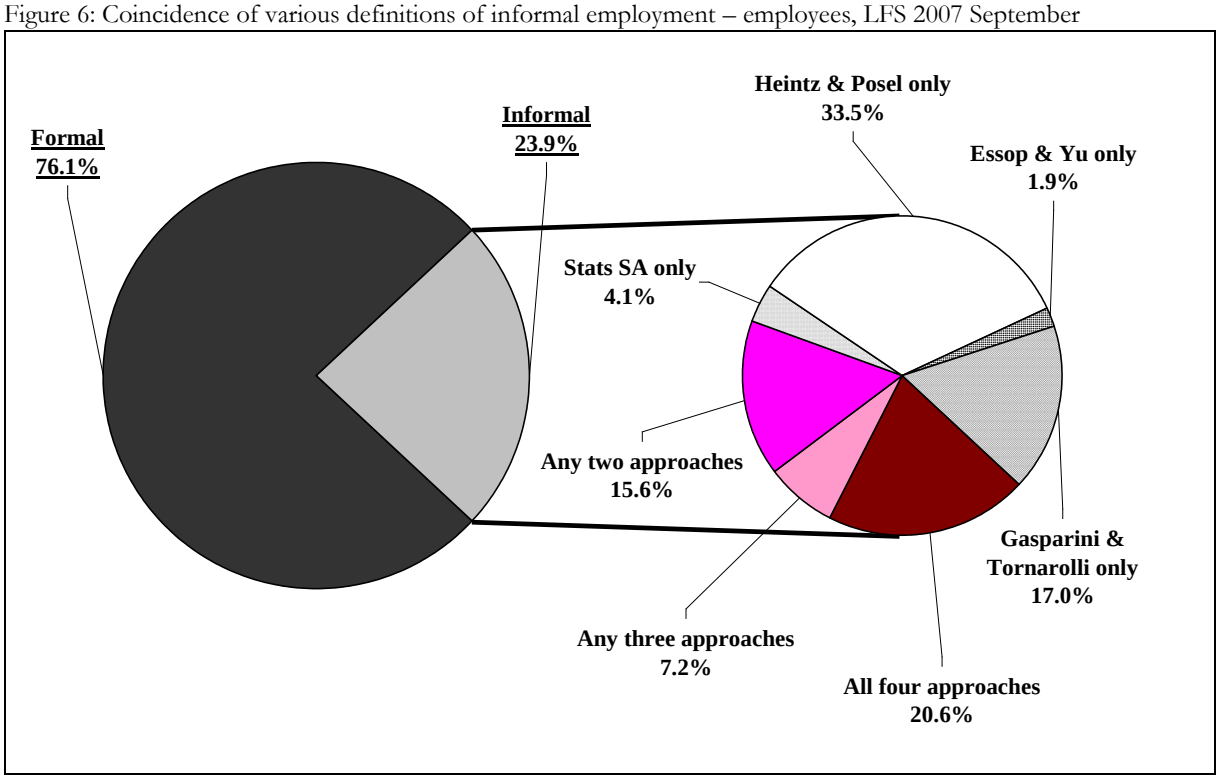


Table 8: Coincidence of various definitions of informal employment – employees, LFS 2007 September

	Number	Percentage
Formal – in any approach	7 000 026	76.1%
Informal – in all four approaches	454 299	4.9%
Informal – in any three approaches	158 587	1.7%
Informal – in any two approaches	344 369	3.7%
Informal – Stats SA approach only	89 355	1.0%
Informal – Heintz & Posel approach only	738 265	8.0%
Informal – Essop & Yu approach only	42 147	0.5%
Informal – Gasparini & Tornarolli only	374 679	4.1%
All employees	9 201 727	100.0%

Figure 7 and Table 9 show that 93.5% of the self-employed were defined as informal in at least one of the three measures adopted. Looking at these informally self-employed, nearly two-thirds were classified as informal from all three measures, while nearly a quarter were defined as informal only when the Gasparini & Tornarolli approach was adopted. This implies that the Gasparini & Tornarolli methodology, using the educational attainment criterion, might have identified a different group of informal workers compared to the other measures, and explained the greater number of informally self-employed, as shown in Table 6.

Figure 7: Coincidence of various definitions of informal employment – self-employed, LFS 2007 September

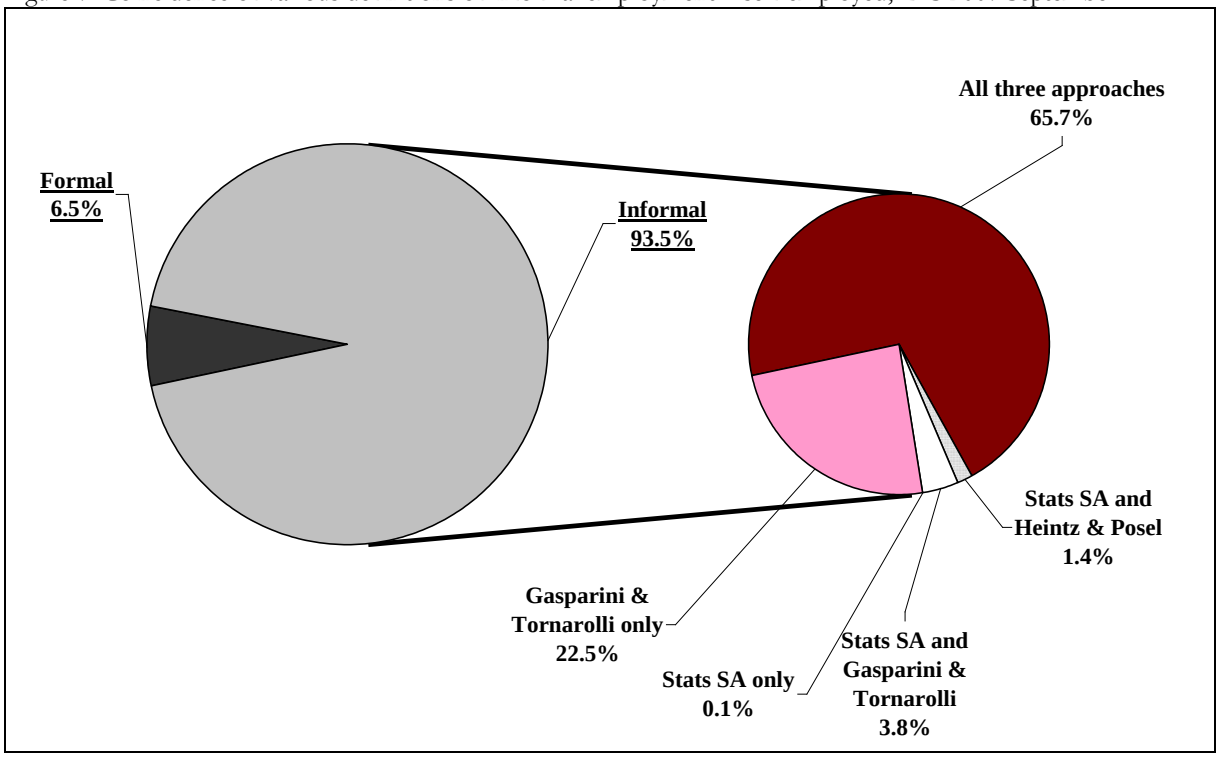


Table 9: Coincidence of various definitions of informal employment – self-employed, LFS 2007 September

	Number	Percentage
Formal – in any approach	130 071	6.5%
Informal – in all three approaches	1 310 935	65.7%
Informal – Stats SA and Heintz& Posel approaches	28 468	1.4%
Informal – Stats SA and Gasparini & Tornarolli approaches	75 437	3.8%
Informal – Stats SA approach only	1 204	0.1%
Informal – Gasparini & Tornarolli approach only	447 975	22.5%
All self-employed	1 994 090	100.0%

Finally, Table 10 provides some descriptive statistics on the demographic and educational attainment characteristics of informal workers under each methodology in LFS 2007 September. In the case of employees, the Black share is clearly lower in the Gasparini & Tornarolli methodology, while the female share as well as the mean years of education are higher under the Heintz & Posel as well as Gasparini & Tornarolli methodologies. On the other hand, the Black and female shares are lower but the mean years of educational attainment are higher in the Gasparini & Tornarolli methodology when looking at the self-employed. These results suggest that the Gasparini & Tornarolli might have captured certain non-Blacks and/or male informally self-employed.

Table 10: Descriptive analysis by informal employment definition – gender, race and education, LFS 2007 September

		Black share	Female share	Mean years of education
Employees	**Stats SA**	88.2%	21.3%	8.3
	Heintz & Posel	84.7%	31.1%	9.0
	Essop & Yu	87.5%	27.3%	8.2
	Gasparini & Tornarolli	79.8%	32.0%	9.1
Self-employed	**Stats SA**	89.3%	51.1%	7.8
	Heintz & Posel	89.2%	52.6%	7.9
	Gasparini & Tornarolli	79.8%	46.8%	8.5

3.2 Informal employment trends since 2008

Similar analyzes as in Section 3.1 will be conducted in the QLFS data in this sub-section. The informal employment trends between QLFS 2008Q1 and 2009Q4 using the following five approaches will be looked at: (1) Stats SA 2008a methodology (Figure 3), (2) Stats SA 2008b methodology (Figure 4), (3) Revised Heintz & Posel approach (Figure 5), (4) Mini Devey *et al.* formal/informal index approach[25] (Table 3), and (5) Revised Gasparini & Tornarolli approach. In addition, private households as well as agricultural workers are excluded from the analysis.

First, Table 11 presents the number as well as the proportions of employees classified as informal under each measure. The Stats SA 2008b methodology resulted in the highest estimate of the rate of informality at approximately two-thirds (more than 6 million) of all employees during the period under investigation. This is followed by the mini Devey *et al.* approach, which estimated that more than a quarter of employees (between 2.5 and 3.0 million during the period under study) were informal. The rates of informality were relatively lower in the revised Heintz & Posel as well as the revised Gasparini & Tornarolli approaches.

Looking at the self-employed, similar findings are observed as in the LFSs, as the rates of informality were quite high under the two Stats SA and the revised Heintz & Posel methodologies (approximately 70% of self-employed were defined as informal), but such rates were even higher under the revised Gasparini & Tornarolli approach (slightly above 90%).

As far as the pairwise correlation coefficients for various measures are concerned, the QLFS 2009Q4 results are presented in Table 12. In the case of employees, the strongest correlation takes place between the Stats SA 2008a and revised Gasparini & Tornarolli approaches (0.8269), followed by the mini Devey *et al.* and the revised Heintz & Posel approaches (0.6009). On the other hand, looking at the approaches to define informally self-employed, as expected (See footnote 17), the two Stats SA approaches have a very high correlation of just above 0.95.

[25] Employees with the index score between zero and two are assumed to be informal employees.

Table 11: Informal employment (weighted, 1000s), QLFS 2008Q1 – QLFS 2009Q4

	Stats SA 2008a	Stats SA 2008b	Revised Heintz & Posel	Mini Devey *et al.*	Revised Gaspa-rini & Torna-rolli	Stats SA 2008a	Stats SA 2008b	Revised Heintz & Posel	Mini Devey *et al.*	Revised Gaspa-rini & Torna-rolli
Employees										
	Number of informal employees					**As % of all employees**				
2008 Q1	852	6 633	1 646	2 957	1 229	8.8%	68.8%	17.1%	30.7%	12.8%
2008 Q2	786	6 647	1 581	2 955	1 167	8.1%	68.5%	16.3%	30.5%	12.0%
2008 Q3	707	6 479	1 442	2 795	1 082	7.4%	67.5%	15.0%	29.1%	11.3%
2008 Q4	709	6 454	1 423	2 831	1 008	7.3%	66.6%	14.7%	29.2%	10.4%
2009 Q1	675	6 264	1 286	2 670	979	7.1%	65.7%	13.5%	28.0%	10.3%
2009 Q2	664	6 218	1 238	2 630	975	7.0%	65.6%	13.1%	27.7%	10.3%
2009 Q3	680	6 068	1 243	2 542	997	7.4%	65.6%	13.4%	27.5%	10.8%
2009 Q4	660	6 084	1 250	2 634	935	7.1%	65.4%	13.4%	28.3%	10.0%
Self-employed										
	Number of informally self-employed					**As % of all self-employed**				
	Stats SA 2008a	**Stats SA 2008b**	**Revised Heintz & Posel#**	**Mini Devey *et al.***	**Gaspa-rini & Torna-rolli**	**Stats SA 2008a**	**Stats SA 2008b**	**Revised Heintz & Posel**	**Mini Devey *et al.***	**Revised Gaspa-rini & Torna-rolli**
2008 Q1	1 443	1 479	1 443	N/A##	1 861	71.2%	72.9%	71.2%	N/A##	91.8%
2008 Q2	1 512	1 547	1 512		1 914	72.9%	74.6%	72.9%		92.3%
2008 Q3	1 406	1 448	1 406		1 852	69.1%	71.2%	69.1%		91.0%
2008 Q4	1 500	1 534	1 500		1 921	71.2%	72.8%	71.2%		91.1%
2009 Q1	1 455	1 497	1 455		1 884	70.1%	72.1%	70.1%		90.7%
2009 Q2	1 441	1 477	1 441		1 844	72.1%	73.9%	72.1%		92.2%
2009 Q3	1 296	1 335	1 296		1 666	71.0%	73.1%	71.0%		91.3%
2009 Q4	1 402	1 434	1 402		1 774	72.7%	74.4%	72.7%		92.0%

The Stats SA 2008a approach was also adopted to define informally self-employed.
The mini Devey *et al.* approach could only define informal employees.

Table 12: Correlations of various measures of informal employment, QLFS 2009Q4

Employees

	Stats SA 2008a	Stats SA 2008b	Revised Heintz & Posel	Mini Devey *et al.*	Revised Gasparini & Tornarolli
Stats SA 2008a	1.0000				
Stats SA 2008b	0.2011	1.0000			
Revised Heintz & Posel	0.4246	0.2866	1.0000		
Mini Devey *et al.*	0.3380	0.4437	0.6009	1.0000	
Revised Gasparini & Tornarolli	0.8269	0.1707	0.3412	0.2574	1.0000

Self-employed

	Stats SA 2008a	Stats SA 2008b	Revised Gasparini & Tornarolli
Stats SA 2008a	1.0000		
Stats SA 2008b	0.9576	1.0000	
Revised Gasparini & Tornarolli	0.2900	0.3000	1.0000

Next, Figures 8 and 9 as well as Tables 13 and 14 explore whether different measures of informality are capturing the same groups of workers. Looking at Figure 8 and Table 13, in the case of employees, two-thirds of employees were defined as informal in at least one of the five measures under study. Such proportion is much greater than was observed when looking at the

four approaches to define informal employees in LFS 2007 September (Figure 6). Looking at the informal employees in greater detail, only 6.9% were defined as informal in all five approaches. In addition, slightly about half of them were distinguished as informal only under the Stats SA 2008b methodology. This suggests that such a methodology might be too broad a measure to capture the informal employees.

Figure 8: Coincidence of various definitions of informal employment – employees, QLFS 2009Q4

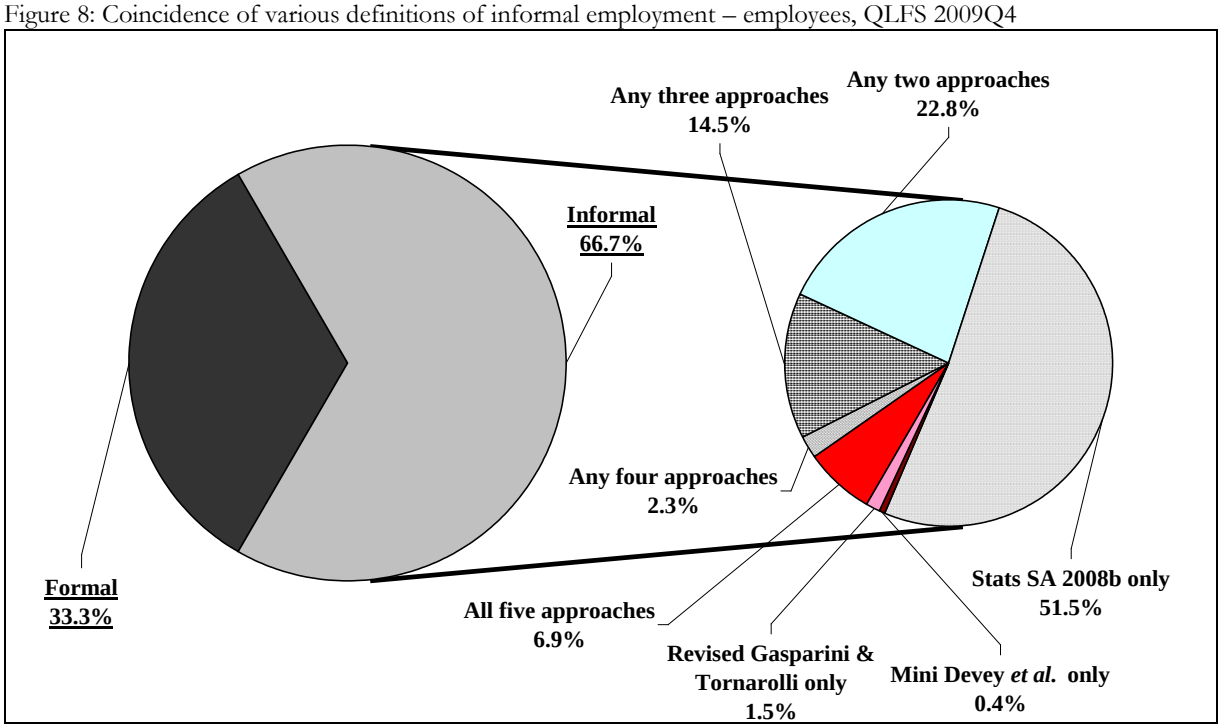


Table 13: Coincidence of various definitions of informal employment – employees, QLFS 2009Q4

	Number	Percentage
Formal – in any approach	3 099 168	33.3%
Informal – in all five approaches	427 875	4.6%
Informal – in any four approaches	142 512	1.5%
Informal – in any three approaches	901 882	9.7%
Informal – in any two approaches	1 415 003	15.2%
Informal – Stats SA 2008b approach only	3 198 169	34.4%
Informal – Mini Devey *et al.* approach only	25 159	0.3%
Informal – Revised Gasparini & Tornarolli only	94 626	1.0%
All employees	9 304 394	100.0%

As far as the self-employed are concerned, Figure 9 and Table 14 show that 94.4% of self-employed were defined as informal in at least one of the three measures under study. Looking at these informally self-employed in greater detail, about 70% of them were defined as informal under all three approaches, while 20% were defined so only under the revised Gasparini & Tornarolli productive approach.

Figure 9: Coincidence of various definitions of informal employment – self-employed, QLFS 2009Q4

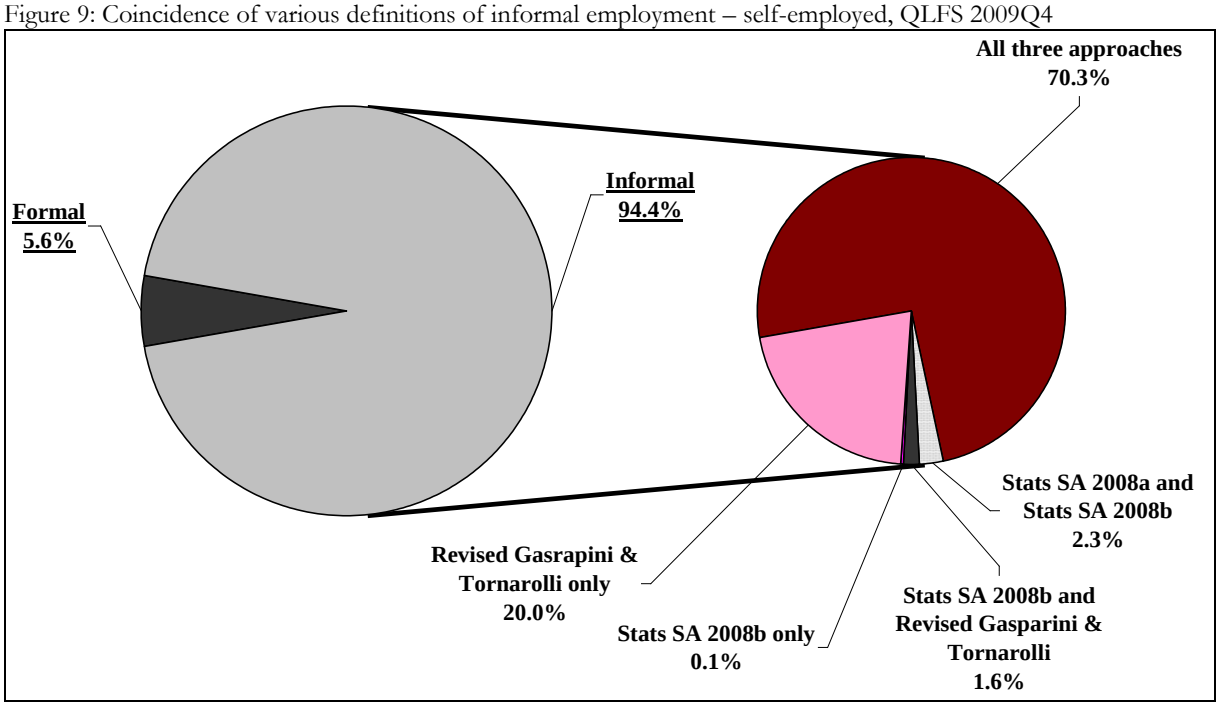


Table 14: Coincidence of various definitions of informal employment – self-employed, QLFS 2009Q4

	Number	Percentage
Formal – in any approach	108 534	5.6%
Informal – in all three approaches	1 356 672	70.3%
Informal – Stats SA 2008a and Stats SA 2008b approaches	44 981	2.3%
Informal – Stats SA 2008b and revised Gasparini & Tornarolli approaches	30 881	1.6%
Informal – Stats SA 2008b approach only	1 689	0.1%
Informal – Revised Gasparini & Tornarolli only	386 069	20.0%
All self-employed	1 928 826	100.0%

Finally, Table 15 conducts the same descriptive statistics as on Table 10 under each methodology in the QLFS 2009Q4. Looking at the informal employees, the Black share is lower but the mean years of educational attainment is higher when the Stats SA 2008b methodology is adopted. The results suggest that most of the informal employees outside the informal enterprises/sector (which are not captured by the Stats SA 2008a methodology) are non-Blacks and more educated. Similar findings are observed when looking at the informal employees derived from the revised Gasparini & Tornarolli approach. On the other hand, as far as the informal self-employed are concerned, the Black share and female share are clearly lower for those defined as informal from the revised Gasparini & Tornarolli approach.

Table 15: Descriptive analysis by informal employment definition – gender, race and education, QLFS 2009Q4

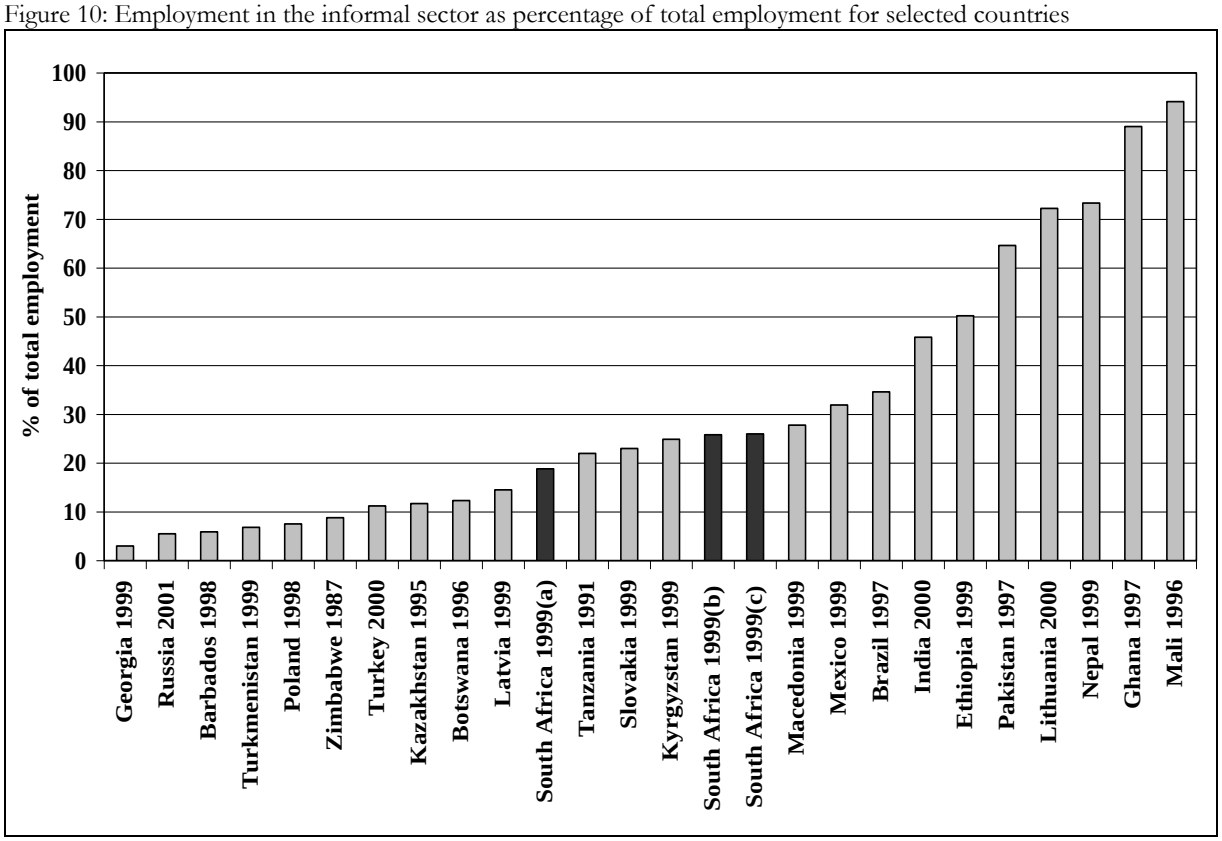
		Black share	Female share	Mean years of education
Employees	**Stats SA 2008a**	81.1%	38.4%	9.48
	Stats SA 2008b	71.2%	40.8%	10.31
	Revised Heintz & Posel	82.9%	30.3%	9.27
	Mini Devey *et al.*	81.3%	39.5%	9.83
	Revised Gasparini & Tornarolli	71.9%	42.0%	10.00
Self-employed	**Stats SA 2008a**	86.9%	48.3%	8.76
	Stats SA 2008b	86.0%	48.9%	8.82
	Revised Gasparini & Tornarolli	75.3%	43.5%	9.30

3.3 Is South Africa still an international outlier in the size of informal employment?

As Sections 3.1 and 3.2 looked at the rate of informality under various approaches, the following question arises: Is South Africa still an international outlier regarding the size of the informal economy in the other approaches[26]?

The two most recent studies that looked at the size of the informal economy internationally were conducted by the ILO (2002b) and Schneider (2002). First, the ILO study investigated the size of the employment in the informal sector (i.e., adopting the 15th ICLS approach), and the results, as presented in Figure 10 as well as Table A1 of the Appendix, indicate that South Africa's informal labour market is comparable to countries such as Slovakia and Macedonia, and appears to be much smaller than countries such as Pakistan, where over 60% of total employment occurs in the informal sector. A country with a similar economic structure to South Africa, namely Brazil, has a marginally larger informal sector. From this data, it can be tentatively concluded that South Africa's informal sector is within the mid-range size of informal markets in developing countries, neither excessively large nor small.

Figure 10: Employment in the informal sector as percentage of total employment for selected countries



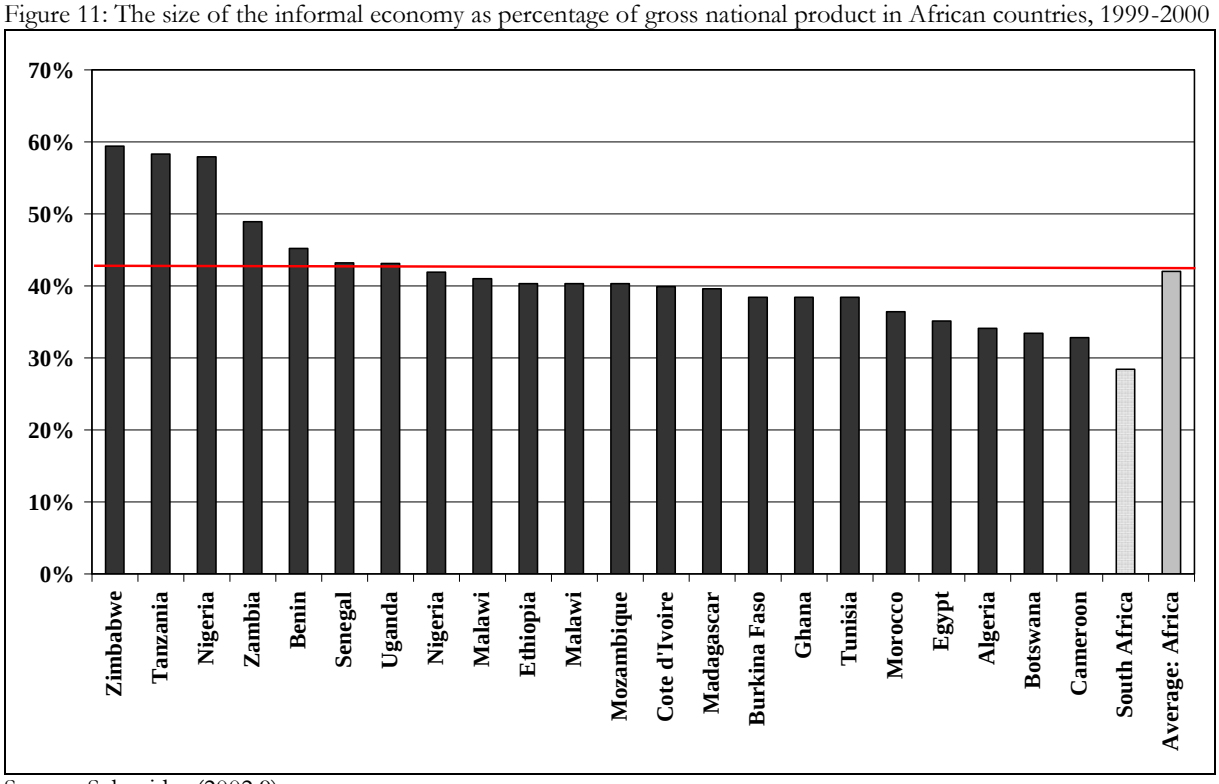
Source: ILO (2002b) and own calculations from OHS1999.

Note: Three different definitions for the South African informal labour market are used here. South Africa (a) excludes agricultural employment and domestic workers; South Africa (b) includes both of these groups of workers, whilst South Africa (c) excludes agricultural employment but includes domestic workers. See Table A1 for more detail.

[26] Kingdon & Knight (2004, 392), using 1990 statistics by Charmes (2000) on urban unemployment and informal sector employment (i.e., informal sector employment as percentage of non-agricultural employment), argue that South Africa has a very small informal sector (as indicated by a low employment rate in the informal sector), but widespread open unemployment. They contend that South Africa is an international outlier, as its tiny ratio of non-agricultural informal sector employment to urban unemployment is smaller than for other comparable countries. However, they (Kingdon & Knight, 2007: 824) also emphasize that the definition of informal sector used in South Africa is narrower than in other countries. Essop and Yu (2008a: 56), using more recent data, found Kingdon and Knight's contention that South Africa is an outlier less convincing.

In the study by Schneider, the physical input (electricity) method, the currency demand and the dynamic multiple indicator-multiple cause model (DYMIMIC) approaches[27] were applied to developing and transition countries to derive the size of the informal economy (as percentage of gross national product), while the size of the informal economy as percentage of gross domestic product was calculated in the case of the OECD countries. South Africa is ranked 65th out of the 104 countries (See Table A2 of the Appendix). In addition, if one only looks at the African countries, the size of the informal economy in South Africa is the smallest (Figure 11). This indicates that South Africa is a regional outlier.

Figure 11: The size of the informal economy as percentage of gross national product in African countries, 1999-2000

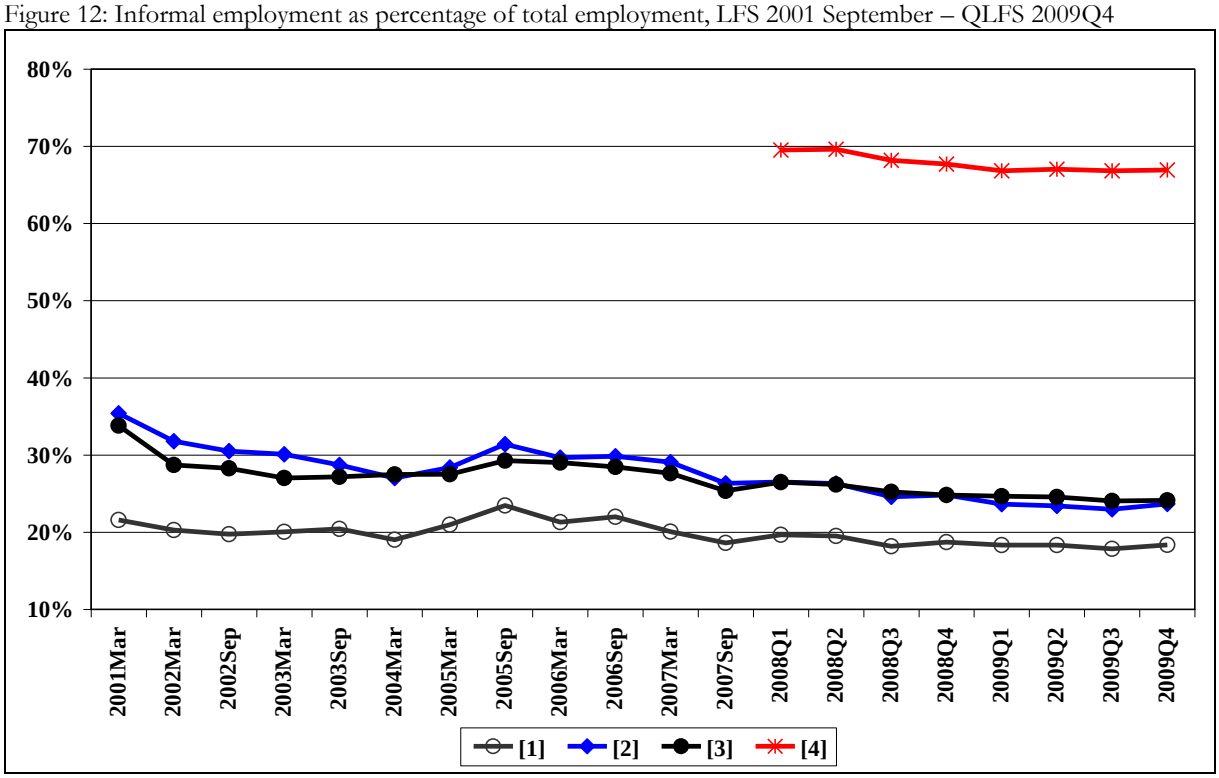


Source: Schneider (2002:9).

Next, the size of informal employment as percentage of total employment since 2001 under various approaches is presented in Figure 12. It can be seen that the Stats SA 1995-2007 and 2008a approaches that only define informal employment in the informal sector provide the smallest measure of the rate of informality (about 20% throughout the years). On the other hand, the rates of informality are very close when comparing the Heintz & Posel and the Gasparini & Tornarolli approaches (hovering around the 25%-30% range since 2003). Finally, the size of the informal economy is much greater if the Stats 2008b methodology (which includes informal employment, regardless of whether it takes place in the formal sector or informal sector) is adopted (between 67% and 70% in all the QLFSs under investigation). If such methodology is adopted across all countries, will South Africa no longer be an international outlier with regard to its size of informal employment as percentage of total employment? Such statistics by country are not available at the time of writing, but the United Nations, in collaboration with other institutions such as the ILO, will conduct a study on the measurements of the informal sector and informal employment by country in late 2010. Only when these data are released could one make a more proper judgment on whether South Africa is indeed an international outlier.

[27] In general, there are three types of approaches to measure the size of the informal economy, namely the direct methods (which involves the use of household survey data to capture informal employment), indirect methods (which are macroeconomic in nature and combine various aggregate economic variables and certain assumptions to estimate the size of the informal economy as percentage of gross domestic product or gross national product) and the modeling approach (e.g., electricity consumption). In this paper, the focus is entirely on the direct methods adopted and proposed in South Africa.

Figure 12: Informal employment as percentage of total employment, LFS 2001 September – QLFS 2009Q4



[1]: Stats SA 1995-2007 (2001 – 2007) and Stats SA 2008a (2008 – 2009) approaches
[2]: Heintz & Posel (2001 – 2007) and revised Heintz & Posel (2008 – 2009) approaches
[3]: Gasparini & Tornarolli (2001 – 2007) and revised Gasparini & Tornarolli (2008 – 2009) approaches
[4]: Stats SA 2008b (2008 – 2009) approach
Note: It is not possible to derive the informal employment as percentage of total employment by using the Devey *et al.*, Essop & Yu and the mini Devey *et al.* approaches, since these approaches could only derive the informal employees.

3.4 Conclusion on the size of informal employment

This section looked at the size of informal employment and the rate of informality under various approaches. Before the introduction of QLFS, the Heintz & Posel approach resulted in a greater number of informal employees. Moreover, the QLFS informal employee figures are much greater under the Stats SA 2008b methodology, but such result is expected, since this methodology captures informal employment both inside and outside the informal enterprises. Finally, in the case of the self-employed, the Gasparini & Tornarolli approach resulted in a greater informal employment size.

4. Multivariate analysis of factors associated with informality

In this section, probit regressions are run so as to estimate the marginal effects of different potential influences on the likelihood of informality under each approach. The independent variables in the regressions include the demographic information (gender, race and age), educational attainment, geographical situation (province) as well as the occupations of the employed.

First, probit regressions using various approaches on the LFS 2007 September data are presented in Table 16. It can be seen that, being a female is associated with a smaller likelihood of being defined as informal in the case of employees under all four approaches under study, but exactly the opposite happens when looking at the self-employed. On the other hand, in the Black population, both the employees and self-employed are more likely to be defined as informal compared with other races under all approaches under investigation, but the probability of being distinguished as informal is clearly lower when the Gasparini & Tornarolli methodology is adopted. This might explain the lower Black share of informal workers from this approach, as shown in Table 10. As far as the age of the employed is concerned, in general, the employed from the younger age categories are more likely to be defined as informal. Finally, the more educated the employed are, the lower the probability of them being distinguished as informal workers, and this takes place in both the self-employed and employees under all approaches under study.

Table 16: Probit estimates of the likelihood of being considered informal, LFS 2007 September

	Employees				**Self-employed**		
	Stats SA	**Heintz & Posel**	**Essop & Yu**	**Gaspa-rini & Torna-rolli**	**Stats SA**	**Heintz & Posel**	**Gaspa-rini & Torna-rolli**
Gender							
Female	-0.0227	-0.0022	-0.0052	-0.0146	0.0740	0.0911	0.0028
Race (Reference group: White)							
Black	0.0479	0.0734	0.0575	0.0310	0.3301	0.3216	0.0424
Coloured	0.0624	0.0090	0.0644	-0.0084	0.0801	0.1129	0.0062
Indian	0.0153	0.0172	-0.0068	-0.0044	0.0810	0.0571	0.0034
Age category (Reference group: 35-44 years)							
15-24 years	0.0218	0.1606	0.0348	0.0255	0.0974	0.1439	0.0097
25-34 years	0.0095	0.0637	0.0098	0.0226	0.0073	0.0700	-0.0007
45-54 years	0.0015	-0.0258	-0.0085	0.0015	-0.0160	0.0267	0.0045
55-65 years	0.0221	-0.0297	0.0091	0.0302	-0.1498	-0.0828	0.0050
Educational attainment (Reference group: No schooling)							
Incomplete primary	-0.0062	0.0168	0.0103	-0.0110	-0.0482	0.1060	N/A
Incomplete secondary	-0.0260	-0.0433	-0.0207	-0.0476	-0.2055	-0.0082	
Matric	-0.0412	-0.1097	-0.0602	-0.0775	-0.3590	-0.1397	
Matric + Cert./Dip.	-0.0412	-0.1355	-0.0504	-0.0768	-0.4344	-0.1835	
Degree	-0.0369	-0.1304	-0.0418	-0.0835	-0.5982	-0.3791	

Note: Reported coefficients are the marginal effects (which in the case of binary variables are for a discrete change in the variable). In addition, all equations include broad occupational controls and provincial controls. All independent variables are significant at the 0.01 level.

Note: Due to the perfect collinearity between educational attainment and the likelihood of being informal (all self-employed without a degree are classified as informal), the educational attainment dummy variables are excluded in the probit estimates in the case of self-employed under the Gasparini & Tornarolli approach.

Table 17: Probit estimates of the likelihood of being considered informal, QLFS 2009Q4

	Employees					Self-employed		
	Stats SA 2008a	**Stats SA 2008b**	**Revised Heintz & Posel**	**Mini Devey *et al.***	**Revised Gasparini & Tornarolli**	**Stats SA 2008a**	**Stats SA 2008b**	**Revised Gasparini & Tornarolli**
Gender								
Female	0.0098	0.0719	-0.0085	0.0467	0.0179	0.0789	0.0890	0.0112
Race (Reference group: White)								
Black	0.0090	0.0119	0.0257	0.1014	-0.0293	0.2619	0.2296	0.0743
Coloured	0.0002	-0.1027	-0.0148	0.0076	-0.0407	0.0710	0.0489	0.0181
Indian	-0.0187	-0.0358	-0.0384	-0.0587	-0.0394	-0.0376	0.0076	0.0144
Age category (Reference group: 35-44 years)								
15-24 years	0.0305	0.2497	0.1275	0.3117	0.0323	0.0249	0.1172	0.0023
25-34 years	0.0149	0.1339	0.0454	0.1134	0.0161	0.0578	0.0595	0.0058
45-54 years	-0.0236	-0.1047	-0.0424	-0.0658	-0.0189	-0.0083	-0.0091	0.0086
55-65 years	-0.0087	-0.1350	-0.0523	-0.0954	0.0119	-0.0375	-0.0257	0.0111
Educational attainment (Reference group: No schooling)								
Incomplete primary	0.0358	0.0017	0.0246	-0.0165	0.0461	-0.1141	-0.0718	N/A
Incomplete secondary	0.0040	-0.0872	-0.0303	-0.1013	0.0060	-0.2385	-0.2096	
Matric	-0.0337	-0.2742	-0.1000	-0.2166	-0.0442	-0.3715	-0.3224	
Matric + Cert./Dip.	-0.0489	-0.4856	-0.0960	-0.2360	-0.0696	-0.4662	-0.4172	
Degree	-0.0586	-0.5264	-0.0966	-0.2304	-0.0782	-0.5674	-0.5361	

Note: Reported coefficients are the marginal effects (which in the case of binary variables are for a discrete change in the variable). In addition, all equations include broad occupational controls and provincial controls. All independent variables are significant at the 0.01 level. The only two exceptions are the Coloured dummy and the incomplete primary education dummy variables in the case of employees when the Stats SA 2008a and 2008b methodologies are adopted respectively, as these variables are insignificant at 0.10 level.

Note: Due to the perfect collinearity between educational attainment and the likelihood of being informal (all self-employed without a degree are classified as informal), the educational attainment dummy variables are excluded in the probit estimates in the case of self-employed under the Gasparini & Tornarolli approach.

Next, probit regressions using exactly the same independent variables are run on the QLFS 2009Q4 data by adopting various post-2007 approaches; the results are shown in Table 17. First, females are more likely to be defined as informal, except in the case of employees when the revised Heintz & Posel methodology is adopted. This might explain the much lower female share of informal employees from such an approach (30.3%, compared with about 40%-45% in the other approaches, as presented in Table 15). In addition, being Black is associated with a greater likelihood of being distinguished as informal under all approaches, with the only exception being Black employees if the revised Gasparini & Tornarolli approach is used. With regard to the age of the employed, in general, the employed from the younger age categories are more likely to be defined as informal. Finally, the more educated the employed are, the lower the probability of them being distinguished as informal workers for both the self-employed and employees under all approaches under study. However, the employees from the Stats SA 2008a as well as the revised Gasparini & Tornarolli methodologies and the self-employed are less likely to be classified as informal only if they have matriculated, while the same thing happens to employees from the Stats SA 2008b and the revised Heintz & Posel approaches only if they have completed their primary education.

5. Conclusion

This paper reviewed the Stats SA methodologies to measure informal employment before and after the introduction of the QLFS, as well as other recently proposed approaches, so as to investigate the congruence, if any, between the various measures of the rate of informality. Furthermore, econometric techniques are used to investigate commonalities and differences in the way in which the different measures of informality are associated with demographic and employment characteristics. The results suggest that informal employment is bigger if the Heintz & Posel and the Stats SA 2008b methodology are adopted in the LFSs and QLFSs respectively. Furthermore, the Gasparini & Tornarolli approach might have captured a slightly different group of informally self-employed, as the Black share and female share are clearly lower, but the mean years of educational attainment are higher. Finally, if the informal employment includes those working in the informal sector as well as those displaying informal characteristics working in the formal sector (i.e., the Stats SA 2008b methodology), the rate of informality (informal employment as percentage of all employed) becomes much greater. However, it is not known if South Africa will no longer be regarded an international outlier regarding the size of the informal economy if such broad definition of informal employment is adopted, until such data by country are available.

References

Bacchetta, M., Ernst, E. & Bustamante, J.P. (2009). *Globalization and informal jobs in developing countries*. Geneva: World Trade Organization and International Labour Office.

Flodman Becker, K. (2004). *The informal economy: Fact finding study*. Stockholm: Swedish International Development Cooperation Agency (SIDA).

Chen, M.A. (2007). *Rethinking the informal economy: Linkages with the formal economy and the formal regulatory environment*. DESA working paper no. 46. New York: Department of Economic and Social Affairs, United Nations.

Devey, R, Skinner, C and Valodia, I. (2006a). Definitions, Data and the Informal Economy in South Africa: A Critical Analysis. In Padayachee, V (ed.): *The development decade? Economic and social change in South Africa, 1994 – 2004*. Cape Town: Human Sciences Research Council Press: 302-323.

Devey, R, Skinner, C and Valodia, I. (2006b). *Second Best? Trends and linkages in the informal economy in South Africa*. DPRU working paper 06/102. Cape Town: Development Policy Research Unit, University of Cape Town.

Essop, H. & Yu. D. (2008a). *The South African informal sector (1997 – 2006)*. Stellenbosch economic working papers: 03/08. Stellenbosch: Stellenbosch University.

Essop, H. & Yu, D. (2008b). *Alternative definitions of informal sector employment in South Africa*. Stellenbosch economic working papers: 21/08. Stellenbosch: Stellenbosch University.

Gasparini, L. & Tornarolli, L. (2007). *Labour informality in Latin America and the Caribbean: Patterns and trends from household survey microdata*. CEDLAS working paper no. 46. La Plata: Centre for Distributive, Labour and Social Studies.

Gërxhani, K. (2004). The informal sector in developed and less developed countries: A literature survey. *Public Choice:* 120(3-4):267-300.

Heintz, J. & Posel, D. (2008). Revisiting informal employment and segmentation in the South African labour market. *South African Journal of Economics*: 76(1): 26-44.

Henley, A., Arabsheibani, G.R. & Carneiro, F.G. (2008). On defining and measuring the informal sector: Evidence from Brazil. *World Development*: 37(5): 992-1003.

Hussmanns, R. (2005). *Measuring the informal economy: From employment in the informal sector to informal employment*. Working paper no. 53. Geneva: Policy Integration Department, Bureau of Statistics, International Labour Organization.

International Labour Organization (2002a). *Decent work and the informal economy*. Report of the Director-General; International Labour Conference, 90th session; Report VI. Geneva: International Labour Organization.

International Labour Organization (2002b). *International informal sector statistics*.
Available: http://www.ilo.org/public/english/bureau/stat/papers/comp.htm

International Labour Organization (2004). *Employment in the informal economy in the Republic of Moldova*. Geneva: International Labour Organization.

Kingdon, G.G. & Knight, J. (2004). Unemployment in South Africa: The nature of the beast. *World Development*: 32(3): 391-408.

Kingdon, G.G. & Knight, J. (2007). Unemployment in South Africa, 1995 – 2003: Causes, problems and policies. *Journal of African Economics*: 16(5): 813-848.

Muller, C. (2003). *Measuring South Africa's informal sector: An analysis of national household surveys*. DPRU working paper 03/71. Cape Town: Development Policy Research Unit, University of Cape Town.

Perry, G.E., Maloney, W.F., Arias, O.S., Fajnzylber, P., Mason, A.D. & Saavedra-Chanduvi, J. (2007). *Informality: Exit and exclusion*. Washington: World Bank.

Schneider, F. (2002). *Size and measurement of the informal economy in 110 countries around the world*. Washington: World Bank.

Statistics South Africa (2006). *Statistical release P0210. Labour Force Survey, September 2006*. Pretoria: Statistics South Africa.

Statistics South Africa (2008). *Guide to the Quarterly Labour Force Survey*. Pretoria: Statistics South Africa.

United Nations (2010). *Interregional cooperation on the measurement of informal sector and informal employment*. Available: http://www.unescap.org/STAT/isie/index.asp.

Yu, D. (2007). *The Comparability of the Statistics South Africa O*ctober Household Surveys and Labour Force Surveys. Stellenbosch Economic Working Papers: 17/07. Stellenbosch: Stellenbosch University.

Appendix

Table A1: International informal sector employment statistics

	Last available year	% of total employment	Agricultural workers	Domestic workers	Age limit	Area
AFRICA						
Botswana	1996	12.3	Excluded	Included	12 and over	All
Ethiopia#	1999	50.2	Excluded	Excluded	Not explained	All
Ghana	1997	89.0	Included	Included	15 and over	All
Mali	1996	94.1	Excluded	Not explained	Not explained	All
Tanzania	1991	22.0	Excluded###	Included	10 and over (except operators: 15 and over)	All
Zimbabwe	1987	8.8	Included	Included	15 and over	All
South Africa (a)##	1999	18.8	Excluded	Excluded	15-65	All
South Africa (b)#3	1999	25.8	Included	Included	15-65	All
South Africa (c)##	1999	26.0	Excluded	Included	15-65	All
LATIN AMERICA						
Barbados	1998	5.9	Included	Included	15 and over	All
Brazil	1997	34.6	Excluded	Excluded	10 and over	Urban
Mexico	1999	31.9	Excluded	Included	12 and over	Cities with 100,000+ inhabitants
ASIA						
India#	2000	45.8	Excluded	Excluded	Not explained	All
Nepal	1999	73.3	Excluded	Included	15 and over	All
Pakistan	1997	64.6	Excluded	Not explained	Not explained	All
Turkey#	2000	11.2	Excluded	Excluded	Not explained	All
Turkmenistan	1999	6.8	Included	Excluded	Not explained	All
CENTRAL AND EASTERN EUROPE						
Georgia#	1999	3.0	Excluded	Excluded	Not explained	All
Kazakhstan	1995	11.7	Included	Included	None	All
Kyrgyzstan	1999	24.9	Excluded	Included	None	All
Latvia#	1999	14.5	Excluded	Excluded	Not explained	All
Lithuania	2000	72.2	Included	Included	15 and over	All
Macedonia	1999	27.8	Included	Included	15-80	Unspecified
Poland	1998	7.5	Included	Included	15 and over	All
Russia#	2001	5.5	Excluded	Excluded	Not explained	All
Slovakia	1999	23.0	Excluded	Excluded	None	All

Source: ILO (2002b) and own calculations from OHS1999.

The ILO harmonized definition of informal sector was applied in these countries. The harmonized definition of the informal sector covers 'private unincorporated enterprises (excluding quasi corporations), which produce at least some of their goods or services for sale or barter, have less than five paid employees, are not registered, and are engaged in non-agricultural activities (including professional or technical activities). Households employing paid domestic employees are excluded' (ILO 2002b). The harmonized definition aims at making internationally comparable data available (but the table above clearly shows that not all countries adopted this definition, i.e., the national definition of informal sector was adopted in other countries).

Refer to footnote under Figure 10.

Workers from the livestock and fishing industry were also excluded.

Table A2: The size of the informal economy as percentage of gross national product in all countries, 1999/2000

Rank	Country	Size	Rank	Country	Size
1	Georgia	67.3%	53	Venezuela	33.6%
2	Bolivia	67.1%	54	Croatia	33.4%
3	Panama	64.1%	54	Albania	33.4%
4	Azerbaijan	60.6%	54	Botswana	33.4%
5	Peru	59.9%	57	Cameroon	32.8%
6	Zimbabwe	59.4%	58	Turkey	32.1%
7	Tanzania	58.3%	58	Dominican Republic	32.1%
8	Nigeria	57.9%	60	Malaysia	31.1%
9	Thailand	52.6%	61	Lithuania	30.3%
10	Ukraine	52.2%	62	Mexico	30.1%
11	Guatemala	51.5%	63	Serbia and Montenegro	29.1%
12	Uruguay	51.1%	64	Greece	28.6%
13	Honduras	49.6%	65	South Africa	28.4%
14	Zambia	48.9%	66	Poland	27.6%
15	Belarus	48.1%	67	Slovenia	27.1%
16	Armenia	46.3%	68	Italy	27.0%
17	Russia	46.1%	69	United Arab Emirates	26.4%
18	Benin	45.2%	70	Costa Rica	26.2%
18	Nicaragua	45.2%	71	Argentina	25.4%
20	Moldova	45.1%	72	Hungary	25.1%
21	Sri Lanka	44.6%	73	Belgium	23.2%
22	Philippines	43.4%	74	India	23.1%
23	Kazakhstan	43.2%	75	Portugal	22.6%
23	Senegal	43.2%	75	Spain	22.6%
25	Uganda	43.1%	77	Israel	21.9%
26	Niger	41.9%	78	Chile	19.8%
27	Mali	41.0%	79	Indonesia	19.4%
28	Ethiopia	40.3%	79	Jordan	19.4%
28	Malawi	40.3%	81	Syria	19.3%
28	Mozambique	40.3%	82	Czech Republic	19.1%
31	Cote d'Ivoire	39.9%	82	Norway	19.1%
31	Latvia	39.9%	82	Sweden	19.1%
33	Kyrgyzstan	39.8%	85	Slovakia	18.9%
33	Brazil	39.8%	86	Mongolia	18.4%
35	Madagascar	39.6%	86	Saudi Arabia	18.4%
36	Colombia	39.1%	88	Finland	18.3%
37	Nepal	38.4%	89	Denmark	18.2%
37	Ghana	38.4%	90	Germany	16.3%
37	Burkina Faso	38.4%	91	Ireland	15.8%
37	Tunisia	38.4%	92	Vietnam	15.6%
41	Bulgaria	36.9%	93	Australia	15.3%
42	Pakistan	36.8%	93	France	15.3%
43	Morocco	36.4%	95	China	13.1%
43	Jamaica	36.4%	95	Singapore	13.1%
45	Bangladesh	35.6%	97	Netherlands	13.0%
46	Romania	34.4%	98	New Zealand	12.7%
46	Ecuador	34.4%	99	United Kingdom	12.6%
48	Kenya	34.3%	100	Japan	11.3%
49	Bosnia and Herzegovina	34.1%	101	Austria	10.2%
49	Algeria	34.1%	102	Switzerland	8.8%
49	Lebanon	34.1%	102	United States	8.8%
49	Uzbekistan	34.1%	104	Canada	3.0%
Weighted average: 33.0%					

Source: Schneider (2002).