An examination of underemployment in South Africa

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Abstract

Despite the prevalence of underemployment in South Africa, relatively little empirical and policy attention has been devoted to this phenomenon. To help expand the research on underemployment, this study examines its nature, extent and incidence in South Africa based on both the time-related definition (measured as those who currently work less hours but desired and are available to work additional hours) and the inadequate employment situations definition (that is, underemployment due to skills underutilisation and the inadequacy of income earned). This study thus analyses the profile of the three main groups of the underemployed, namely, time-related; skills-related and income-based underemployed. The characteristics of underemployed persons are examined while a comparative analysis is also made to determine how the trends in underemployment differ across the different forms of underemployment. Among the characteristics analysed are age, gender, race, qualification, industry type, settlement type, and province.

JEL: J00, J20, J30

Keywords: Underemployment; Overeducation; Time-related underemployment; Income-related underemployment; South Africa

1. Introduction

An efficient labour market ensures that a country's human resources are employed in the most effective manner to bring about the achievement of full employment, if possible. Full employment entails the use of available labour resources in the most efficient way possible. Such efficiency can be achieved by matching workers with the most suitable jobs for their skillset as well as making the most productive use of their labour hours. The full employment of labour leads to the creation of a decent society where there are jobs with decent wages and better working conditions. Moreover, the enhancement in labour income improves the standard of living and lowers the poverty rate. On the other hand, the underutilisation of labour resources in the form of unemployment and underemployment negatively affect earnings and consequently the standard of living.

Underemployment constitutes an important aspect within the quality of work framework since it identifies workers who are inadequately employed. For many workers, the problem is not the lack of employment possibilities but rather the absence of adequate employment opportunities. The study of underemployment thus helps to analyse the ability of the economy to provide full employment opportunities to the labour force (Brown and Pintaldi, 2006:43).

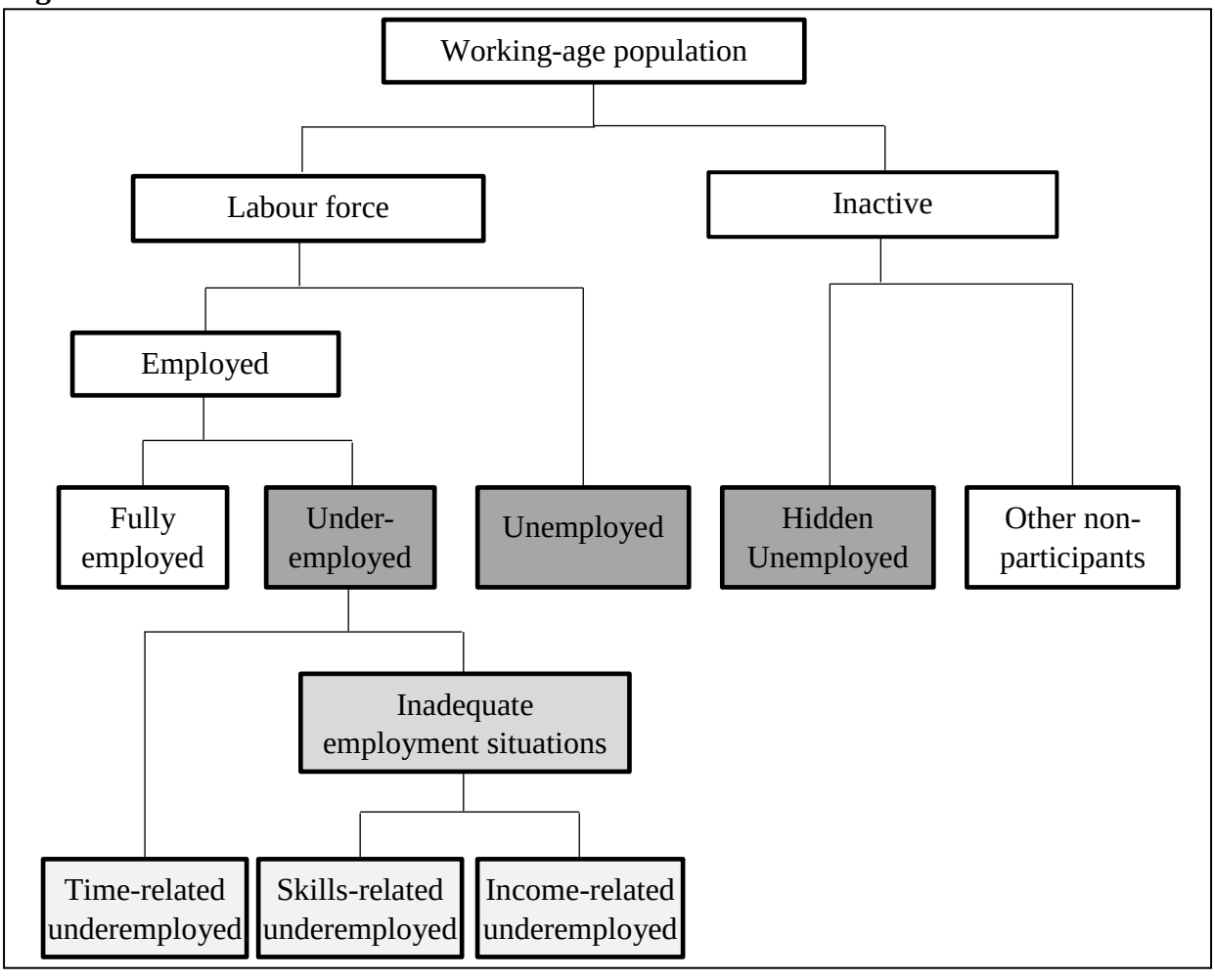
In most labour markets, available human capital is usually underutilised because of the persistent imbalances between demand for and supply of labour (Wilkins and Wooden, 2011:13). Labour economists in South Africa have undertaken numerous studies to understand the extent of the imbalances within the labour market and devise policy measures to address such disparities. Nonetheless, these studies have largely focused on unemployment, while those that have dealt with employment levels have mostly focused on the profile and characteristics of the employed with little emphasis on underemployment. This paper examines the nature, extent and incidence of underemployment in South Africa based on both the time-related and the inadequate employment situations definitions.

The remainder of the study is structured as follows: Section 2 reviews the underemployment literature with emphasis on the types of underemployment, underlying theories, and past empirical local studies. After discussing the methodology and data in Section 3, Section 4 provides an explanation of the empirical results while Section 5 concludes the study.

2. Literature Review

Underemployment is primarily defined by economists and sociologists in terms of lower wages, overeducation, and intermittent employment (Lee, 2005:174). The concept of underemployment came up for discussion for the first time in 1925 during the 2nd International Conference of Labour Statistician (ICLS). However, the first international statistical definition was only adopted in 1957 (Brown and Pintaldi, 2006:43). As pointed out by Wilkins (2004:4), a formal resolution to clarify the definition of underemployment was later adopted in 1966 during the 11th ICLS. In 1998, a more comprehensive measurement of underemployment was the subject of discussion at the 16th ICLS (Greenwood, 1999:1). Consequently, the international standards for the statistical measurement of underemployment were revised at the 16th ICLS with the hope of making underemployment easily identifiable. Figure 1 gives an illustration of the conceptual framework pertaining to the underutilisation of labour.

Figure 1: Labour force underutilisation framework



Source: Adapted from Wilkins and Wooden (2011:15)

As the figure depicts, the three main groups that constitute labour underutilisation are the unemployed, the underemployed and the hidden unemployed. The hidden unemployed, although not in the labour force like the unemployed and the underemployed are, still form part of the labour underutilisation framework because of their desire for work. The underemployed, on the other hand, do participate in the labour force but they either work fewer hours or employ in inadequate situations which they desire to change for reasons that their capabilities are not fully applied and their well-being is not maximise. Some studies (e.g. Ruiz-Quintanilla (1994:10) and Findeis, Shields and Shrestha (2009:9)) consider the underemployed as those individuals who are unemployed but looking for work.

2.1 Types of Underemployment

The 16th ICLS in 1998 categorises underemployment into time-related definition and inadequate employment situations. Prior to 1998, time-related underemployment was regarded as visible underemployment while inadequate employment situations were termed as invisible underemployment (Brown and Pintaldi, 2006:44). While time-related underemployment refers to a case of insufficiency in the volume of work due to limited hours, inadequate employment situations entail a variety of other limitations in the labour market (Wilkins and Wooden, 2011:15).

Time-related underemployment refers to a situation where an employed person's actual hours of work are insufficient relative to the number of hours that individual is willing and available to work (Hussmanns, 2007:18). Time-related underemployment is also sometimes referred to as quantitative or visible underemployment. Hussmanns (2007:18) as well as Wilkins and Wooden (2011:15) explain that for individuals to be considered as time-based underemployed during a particular reference period, they must satisfy the following conditions, as outlined by the ILO, simultaneously: (1) they were willing to work additional or extra hours; (2) they were available to work for those additional hours; and (3) they had worked fewer hours relative to a predetermined threshold. Statistics South Africa (Stats SA), on the other hand, define the time-related underemployed as workers who (Yu, 2009:20): (1) are willing and available to work extra hours; (2) during the reference week worked less than 35 hours; and (3) can start an extra work in the next four weeks if the additional work is available.

The Stats SA definition incorporates all the conditions outlined by the ILO, and even adds another dimension which entails the ability of the underemployed worker to take up an extra job in the next four weeks if the job became available. Stats SA also specifies the reference threshold of adequate work hours, which the ILO left open for national statistical agencies to decide (35 hours in the case of South Africa). Stats SA's definition of time-related underemployment only became available in 2008 after the Quarterly Labour Force Survey (QLFS) was adopted.

Inadequate employment situations are defined by the ILO as any situation where workers have a desire and are available to change their current work situation because it limits their capabilities and well-being. This type of underemployment is also regarded as qualitative or invisible underemployment. The two essential elements of the inadequate employment situations definition are: (1) the willingness to change work situations; and (2) the presence of a reason why individuals are not able to either fully use their capabilities or maximise their well-being. The three sub-categories of inadequate employment situations are skills-related underemployment, income-related underemployment, and excessive working hours. This study focuses on the first two sub-categories; the excessive working hours category is a direct opposite of time-related underemployment and hence is not explored further.

Skills-related underemployment is defined as an involuntary employment condition where the skills of workers, regardless of whether they work full-time or part-time, are underutilised and consequently undervalued relative to what is earned by other individuals who have made similar investment in developing their skills (Glyde, 1977:246). Overeducation[1], a term which is often used to describe skills-based underemployment, is extensively discussed in the underemployment literature. Rubb (2003:389) defines overeducation as a situation where an individual has a higher educational attainment than the qualification that is required to perform in his/her job. Employees are regarded as overeducated if the skills they have acquired exceed the skills needed to perform their current jobs (Dekker, De Grip and Heijke, 2002:112; Büchel and Van Ham, 2003:483; Kazan, 2012:1).

The methods used in the measurement of overeducation can be grouped into two, namely, the subjective approach and the objective approach. Under the subjective approach (referred to as

[1] Overeducated workers are regarded as underemployed based on the skills-related definition. Thus, overeducation is used interchangeably with skills-related underemployment throughout this paper.

the self-assessment method), workers can either be asked to make a comparison between their own assessment of the minimum requirements of their jobs and their educational qualifications (McGuinness, 2006:396) or asked to state directly whether they perceive themselves to be underemployed (Wilkins and Wooden, 2011:26). The objective methods, on the other hand, rely on objective measures such as comparing workers' actual level of educational attainment with the specified requirements of the job or with the qualifications attained by peers employed in the same occupation.

The objective approach can further be divided into the normative (job analysis method) and statistical methods (Guironnet, 2008:3). The job analysis method uses the evaluation of occupations which is provided by expert job analysts (Tsai, 2010:607; Leuven and Oosterbeek, 2011:11). In this approach, the worker's employment situation is compared with the standard match specified by professional job analysts. With regards to the statistical method, the measurement of required education is derived from the general or usual educational attainments of workers within a certain occupation. Educational mismatch is measured by comparing a worker's level of education to the mean or mode of the educational attainment of workers in the same occupation (Hartog, 2000:132; Tsai, 2010:609; Morgado, Sequeira, Santos, Ferreira-Lopes and Reis, 2016:163). As Verdugo and Verdugo (1989:632) and McGuinness (2006:396) accentuate, an overeducated worker is someone whose education is more than one standard deviation above the mean level of education in his/her occupation. Likewise, a worker is overeducated if he/she has more amount of schooling than the mode of completed education within his/her occupation (Leuven and Oosterbeek, 2011:11).

Income-related underemployment captures individuals who are willing and available to change their current work situation to increase their income (Sauders, 2015:19). Wilkins and Wooden (2011:16) state that per the ILO's definition, income-related underemployment is only possible when an employed person's income is lower than it would otherwise be because of certain arrangements at the workplace. Wilkins and Wooden (2011:16) emphasise that income-related underemployment has been scarcely researched.

Brown and Pintaldi (2006:55) claim that there is the need for an adequate income threshold, an objective measure, below which individuals can be regarded as being income-related underemployed. Findeis, Shields and Shrestha (2009:11) measured income-related

underemployed as those workers whose previous year's earnings were less than 125 percent of the individual poverty threshold. Some economists on the other hand prefer the use of a relative measure where the key variable is income loss relative to the individual's previous income[2] (Sauders, 2015:19). For example, Feldman (1996:388) suggests that one of the dimensions of underemployment is categorised as individuals who earn 20 percent or less than what they received in their previous job. For new graduates, the earning should be 20 percent or less than the average income of graduating cohort in same major or occupation.

2.2 Theoretical Literature

The theories that underpin the study of underemployment include, amongst others, the dual labour market hypothesis, human capital theory, career mobility theory, job competition theory, assignment theory, and the concept of person-job (P-J) fit.

First, the concept of a dual labour market is based on the hypothesis that the labour market is made up of two separate parts, namely the primary segment with good jobs and the secondary segment with bad jobs[3] (McNabb and Psacharopoulos, 1981: 442; Dekker et al., 2002: 107). Golub and Hayat (2015:141) rather classify the two segments as the formal sector and the informal sector. While underemployment can exist in both sectors, it is relatively more prevalent in the informal sector, which is characterised by the preponderance of bad jobs associated with shorter work hours, low wages and skills underutilisation.

Olaniyan and Okemakinde (2008:479) define human capital as the personal investment which individuals make in themselves to enhance their future economic productivity and returns thereof. The human capital theory suggests that workers are paid their marginal productivity by employers who fully utilise such productivity (Tsai, 2010:607). Therefore, overeducation leads to an inefficient outcome because the capabilities of the affected workers are underutilised. Traditionally, underemployment has been regarded as an exception to the human capital theory due to its failure to adequately reward the investment in education. Recent literature (such as Leuven and Oosterbeek, 2011), however, stipulates that the human capital theory is valid in explaining underemployment. Hartog (2000:140) argues that from a human capital perspective, overeducation may be the outcome of a deliberate choice by a worker when a low-level job is potentially a worthwhile investment opportunity. Caroleo and

[2] Panel data is required for this type of analysis.
[3] Acemoglu (2001:2) refers to good jobs as high-wage jobs and bad jobs as the low-wage ones.

Pastore (2013:2) also assert that the lack of work related skills of graduates as well as the inability of the school-to-work transition system to harness the skills demanded by employers may be the reason for the existence of overeducation.

The career mobility theory justifies the existence of overeducation. Sicherman and Galor (1990) emphasise that the reward for human capital investment can be in the form of an upward career mobility. Investment in human capital can raise the future earnings of individuals indirectly through the improvement in individuals' career path (Sicherman and Galor, 1990:172). In other words, the returns to schooling may be in the form of a higher probability of advancing to occupations that pay higher wages. According to this theory, individuals may use their first job as a stepping stone to a better position in the future. Baert, Cockx and Verhaest (2013:124) explain that an individual's current job, although might make him temporarily overeducated, could be the shortest pathway to a future job that matches his/her attained educational credentials.

The job competition theory by Thurow (1975) suggests that within a particular job queue, workers are ranked according to the likely training costs for the firm and the costs are assumed to be lower for workers with higher education. Individuals compete for jobs opportunities in the labour market based on their relative training costs. The model suggests that job characteristics may be the only determinants of earnings, thus the marginal product of labour is linked to the job rather than to individual characteristics (McGuinness, 2006:391). Muysken and Ter Weel (1999:18) explain that, based on Thurow's theory, education is one of the most essential attributes that is needed to increase employment opportunities. The theory also suggests that wages are solely decided by the demand side of the labour market (Tsai, 2010:607). Tsai (2010:607) elaborates that, based on the job competition theory, overeducation in the labour market is an outcome of an increase in workers' educational attainment.

The assignment theory by Sattinger (1993) deals with the assignment of heterogeneous workers to heterogeneous jobs (Hartog, 2000:140). The theory suggests that the productivity of workers is positively correlated with their level of education and that wages are influenced by the characteristics of workers and jobs (Tsai, 2010:607). Hartog (2000:140) states that the worker's attributes do not always align with the level required in the job. Therefore,

overeducation arises because of a bad match between the qualification of the worker and the requirements of the job.

Person-job (P-J) fit is regarded as the degree of congruence between an individual's ability and the demands of his/her job (Lauver and Kristof-Brown, 2001:445; Sekiguchi, 2004:179; and Mckee-Ryan and Harvey, 2011:971). P-J fit researchers assert that to achieve a good fit between individuals and their environment, individuals must have self-awareness and environmental awareness (Singh and Greenhaus, 2004:202). That is, individuals must be aware of their abilities, values, and beliefs while also being cognisant of the demand, opportunities, and constraints within the environment. Underemployment occurs as a result of the lack of person-job fit.

2.3 Review of Past Local Empirical Studies

Despite the prevalence of underemployment in South Africa, relatively little empirical and policy attention has been devoted to this phenomenon. This section reviews the few South African studies on underemployment. First, while Altman (2003) mainly analyses whether South Africa experienced jobless or job-creating growth between 1994 and 2001, she also briefly examines underemployment. Altman (2003) measures the underemployed as those employed in the informal sector and the domestic services industry as well as those engaged in subsistence agriculture. Altman (2003:9) states that the prevalence of underemployment can be used to measure the quality of work because the underemployed usually desire to work longer hours and prefer enhanced contract flexibility with improved remuneration and benefits. The percentage of workers who are underemployed according to this approach increases from 14 in 1994 to 21 in 2001 (Altman, 2003:17).

Moleke (2005) investigates the employment experiences of South African graduates from 1990 to 1998 using a follow-up postal survey of 2 672 respondents. Underemployment is measured using the overeducation approach. The findings indicate that 33.3 percent of graduates are in jobs that require lower-level ability and out of this number, 42.7 percent come from the Humanities and Arts faculty while the Economic and Management Sciences Faculty and the Natural Sciences Faculty contribute 39.4 and 36.5 percent respectively (Moleke, 2005:7). Moleke (2005:8) also explains that graduates from these three fields of study are most likely to be skills-based underemployed because they are not necessarily trained for a profession or a specific career. The results, however, show that

underemployment is a short-term phenomenon since most of the respondents who were initially underemployed in their first jobs changed jobs to move to higher level positions.

Altman and Potgieter-Gqubule (2009) analyse the status and policy challenges of the youth labour market in South Africa. Using the QLFS data for the third quarter of 2008, Altman and Potgieter-Gqubule (2009:28) observe that the categories of individuals who are more likely to be time-related underemployed are women, Africans, and young workers between the ages of 15 and 24. Also, KwaZulu-Natal is the province with the highest proportion of time-related underemployed workers while this share is the lowest in Gauteng (Altman and Potgieter-Gqubule, 2009:28). Moreover, the rate of underutilised labour, measured as the sum of the time-related underemployed, unemployed and discouraged workseekers, is 23.7 percent in 2008 (Altman and Potgieter-Gqubule, 2009:28).

The descriptive statistics derived by Yu (2009:21), using 2008 QLFS data, shows that out of approximately 4.5 percent of the employed in South Africa who are considered to be underemployed based on the time-related definition, 85 percent of them are blacks. In relation to education, persons with higher formal educational attainments are less likely to be time-related underemployed compared to those with lower levels of education or unskilled labour (Yu, 2009:21). This study only focuses on descriptive statistics and does not make use of any econometric model estimation.

Mathebula (2013) adopts a multivariate logistic regression to analyse the determinants of time-related underemployment in South Africa using QLFS data for the third quarter of 2012. He finds that the probability of experiencing this type of underemployment is relatively higher for the employed who live in urban areas, have low level of education and work in sectors such as community; social and personal services; insurance; financial intermediation; real estate; and business services (Mathebula, 2013:3). Mathebula (2013:3) also argues that the likelihood of underemployment is 1.59 times higher for women relative to men. This study only relies on data from one quarter and therefore fails to provide a more comprehensive view of the underemployment phenomenon in South Africa by incorporating data from other quarters and years.

Niyimbanira (2016) adopts logistic regression to analyse the demographic characteristics of time-related underemployment, focusing on the Bushbuckridge municipality in the

Mpumalanga province of South Africa. The results indicate that women are more likely to be underemployed while workers who are younger than 30 years are relatively more susceptible to underemployment (Niyimbanira, 2016:126). This implies that underemployment declines with age and perhaps the accumulation of work-related experience may be a possible explanation for this observation. Niyimbanira (2016:127) also finds that the probability of becoming underemployed decreases with education since the likelihood of falling into the underemployment pool is greater for individuals with no formal education.

Beukes, Fransman, Murozvi and Yu (2016) conduct probit regression using QLFS data for the fourth quarters of 2008 and 2014 to analyse the extent of time-related and skills-based underemployment (measured as a level of education which is more than one standard deviation above the mean of the broad occupation category). It is found that the incidence of underemployment is significantly higher for workers who are African, females, reside in urban areas, employed in the informal and public sectors, and reside in the provinces of Gauteng, Kwa-Zulu Natal and Western Cape (Beukes et al., 2016:13-15).

In a follow-up study, Beukes et al. (2017:41) claim that the rate of time-related underemployment ranges between 2.7 to 6.2 percent during the 1995-2016 period while the rate of overeducation, based on the statistical approach, ranged between 6.5 and 15 percent. Moreover, a greater number of the underemployed are found in industries such as private households, community services, financial intermediation, manufacturing as well as wholesale and retail trade. The authors also conclude that workers coming from the Education, Training and Development; Business, Commerce and Management; Engineering and Health Care study fields are more susceptible to being underemployed.

Muller (2009) uses Labour Force Survey (LFS) data to investigate the wage differential between part-time and full-time female workers in South Africa, adopting the OLS regression approach. She uses the ICLS recommended definition to measure involuntary part-time workers. The results indicate that, on average, part-time female workers tend to be older and have significantly lower levels of education than their full-time counterparts (Muller, 2009:29). Muller (2009:30) also observes that more than 50 percent of women who work fewer hours can be found in the informal sector. Expounding on wage differentials, Muller (2009:32) argues that the monthly wages of full-time workers are two times more than that of part-time workers. Muller (2009:39) claims that part-time female workers in South Africa

receive a wage premium, which is contrary to many other studies on the earning function of part-time work (Muller, 2009:39). However, after estimating an OLS regression for the separate samples of part-time and full-time female wage workers, the result revealed a wage penalty for part-time workers.

Finally, Schoeman, Botha and Blaauw (2010) analyse the role that labour conflicts play in the persistence of macro underemployment in South Africa using a partial equilibrium analysis. Using the 2006 Blanchard and Phillipo (BP) as well as the 1997 Caballero and Hammour (CH) models, Schoeman et al. (2010:286) find a positive and significant relationship between the capital/output ratio (used as a proxy variable for underemployment) and relational conflict as well as the frequencies of strikes. This signifies that the switch to capital is more likely to occur as the frequency of strikes increases and this shift to capital-intensive technology leads to underemployment. In other words, underemployment occurs when labour is replaced with capital due to the persistence of labour conflicts. Also, it is difficult to switch back to labour once capital-intensive techniques have been adopted because of the fixed nature of capital (Schoeman et al., 2010:286). Hence, structural underemployment may persist in the long run. This study does not consider underemployment at the micro-level.

3. Data and Methodology

This study examines underemployment in South Africa based on the two main types of underemployment discussed in the previous section, namely, time-related underemployment and inadequate employment situations. The two sub-categories of inadequate employment situations, which are skills-related and income-related underemployment, will both be considered in this study. The study uses cross-sectional labour data from 1995 to 2016, namely, the 1995-1999 October Household Surveys (OHSs), the 2000-2007 Labour Force Surveys (LFSs) and the 2008-2016 Quarterly Labour Force Surveys (QLFSs) conducted by Stats SA. These surveys contain extensive information relating to individuals' employment status and earnings (Muller, 2009:6). It must, however, be emphasised that the information on earnings was not captured in QLFS 2008-2009. Moreover, the earnings information for all four quarters of 2016 is not available at the time of writing.

For time-related underemployment, the Stats SA definition, which is based on the three key criteria in the QLFS, is adopted. The three key questions were also asked in the LFS. It is therefore possible to derived time-related underemployment in the LFSs. However, the

question pertaining to the third criteria was framed differently in the two respective surveys. On the other hand, respondents in the OHS were asked: (1) how many hours they actually worked during the referent week; and (2) whether they would like to work more hours. Respondents were only supposed to answer the second question if they worked less than 35 hours during the last 7 days. It must be emphasised that the question on the third criterion was not asked in the OHSs. Thus, time-related underemployment can only be derived from the first two criteria, which makes it equivalent to the ILO definition. Beukes et al. (2017:41) state that this imperfect approach may overestimate the number of time-related underemployed in the OHSs.

With regards to skills-related underemployment, this study uses the statistical method. A drawback of the job analysis method in the context of South Africa is that the required qualifications in each occupation has not be revised or updated across all three surveys despite the increase in the educational attainments of the general population over the years. In relation to the statistical (realised matches) method, the study adopts the mean approach. It must be emphasised that it is not possible to use the self-assessment method because there is currently no national survey that subjectively ask respondents to state whether they are underemployed or perceive themselves to be underemployed.

The number of people who are income-related underemployed is derived using an objective approach where an individual's earnings is compared with a predetermine threshold of income deemed adequate. This study follows an approach similar to the one adopted by Findeis et al. (2009:11) to define the income-based underemployed as those whose income is below 125% of the poverty line. The poverty line for this study is calculated at December 2016 prices using the rebased lower bound poverty line derived from the Income and Expenditure Survey (IES) 2010/2011 (Stats SA, 2015:11). Individuals are deemed to be income-related underemployed if their monthly income is below R861.25 (see Table A3). It is worth mentioning that this approach may not adequately capture the income-based underemployed workers who are in skilled occupations because the earnings of such individuals are expected to be significantly above the poverty line. An alternative approach is to define the underemployed as those whose current earnings are 20 percent less than what they earned in their previous jobs or 20 percent less than the occupational average income for those in their first jobs. This approach, however, would need panel data such as the National Income Dynamics Study (NIDS), and this would require a separate study of its own.

Furthermore, probit regressions are conducted to analyse the likelihood of a worker being underemployed taking into consideration all three definitions of underemployment. Following Seagraves (2012) and Muller (2009), the probit model is estimated as:

$$\Pr(Y_i = 1|X_i) = \emptyset(X_i\beta)$$

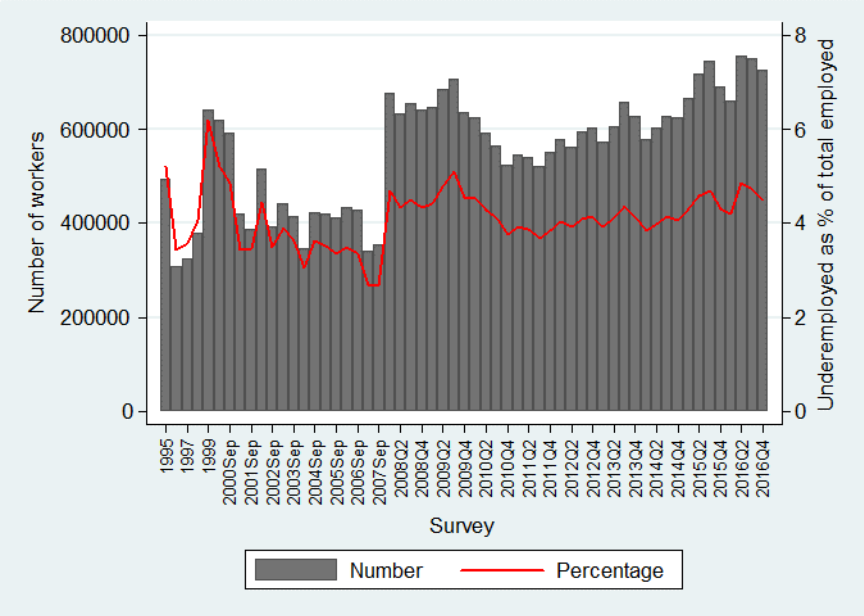
where, Y_i, the dependent variable, is a binary categorical variable which takes the value of 1 if the individual is underemployed and 0 if the individual is not underemployed. X_i is a vector of explanatory variables including age, gender, race, province, experience, industry type, etc. β is a vector of parameters and $\emptyset$ is the standard cumulative normal distribution.

4. Empirical Analysis

4.1 Descriptive statistics

The underemployment rate at the end of the fourth quarter of 2016 was about 12 percent[4] as shown in Table A1. Moreover, as indicated in Figure A1, the ratio of underemployed workers to the fully employed has decreased from about 22 percent in 1995 to approximately 19 percent in 2015. Figure 2 presents the number as well as the percentage of workers who are regarded as underemployed under the time-related definition in 1995-2016. For the period under consideration, the number of time-related underemployed workers ranges between 307 099 and 755 231, accounting between 2.7 percent to 6.2 percent of the total number of employed workers.

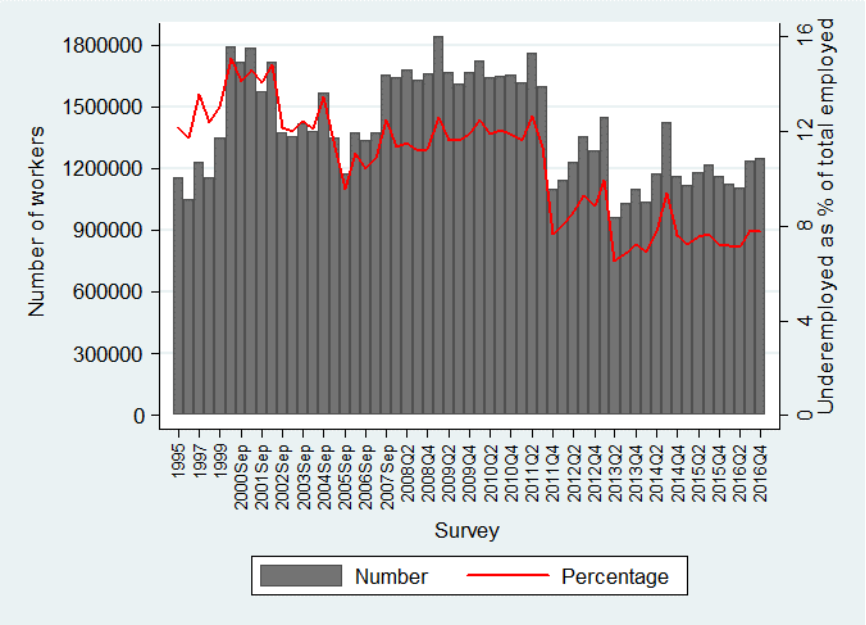
Figure 2: Number and percentage of time-related underemployed workers



[4] Time-related and skill-based underemployed only.

Figure 3 shows that the number of overeducated workers is significantly greater than the number of time-related underemployed workers, ranging between 964 485 to 1 841 750. The percentage of overeducated workers was highest in March 2002 (at 14.8 percent) and lowest during the second quarter of 2013 (at 6.6 percent). The proportion of overeducated workers has remained relatively stable from the first quarter of 2014 to the fourth quarter of 2016, ranging between 7.2 and 7.8 percent.

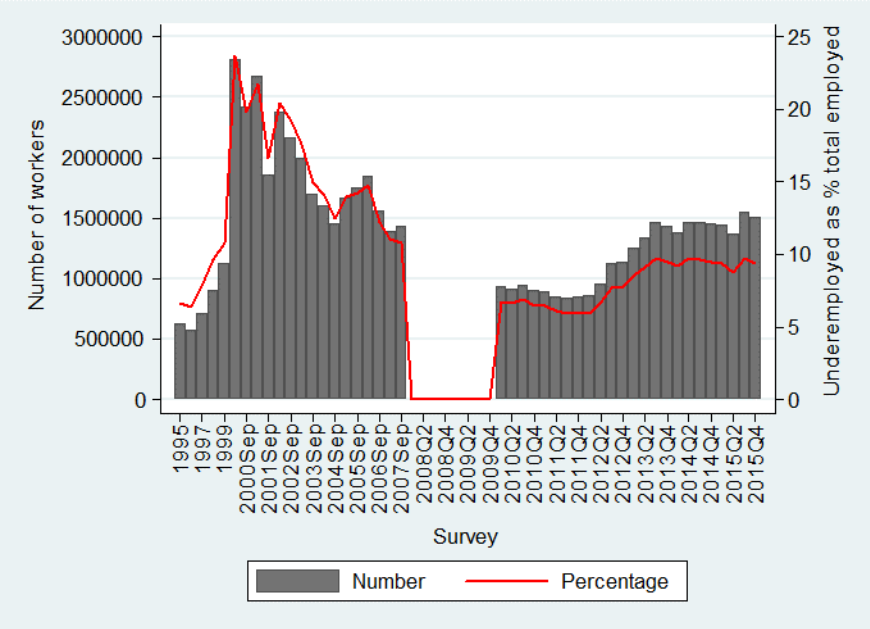
Figure 3: Number and percentage of overeducated workers (statistical method)



For comparative analysis, the number and percentage of overeducated workers based on the job analysis approach is provided in the appendix. Figure A2 shows that the number as well as the percentage of overeducated workers based on the later approach is much higher, with the percentage ranging between 13.8 to 28.7 percent. The figure indicates a rising trend in overeducation from 1995 to 2016 and this could be due to the fact that the occupational classification has remained the same across the years (see Table A2), despite the general increase in educational attainment.

As far as the income-based approach is concerned, the number of underemployed workers ranges between 575 962 and 2 810 520, representing between 5.9 to 23.7 percent during the 1995-2015 period. In Figure 4, the proportion of income-based underemployed workers is higher across the LFS data compare to the other two datasets.

Figure 4: Number and percentage of income-based underemployed workers



Figures A3 and 5 respectively show the number and percentage of the various categorisation of underemployment. It can be observed that the prevalence of overeducation and income-based underemployment is higher than that of the time-related classification. Furthermore, a number of workers fall under two classifications at the same time while a few others are affected by all three types of underemployment.

Figure 5: Various categories of underemployment (as percentage of total employed)

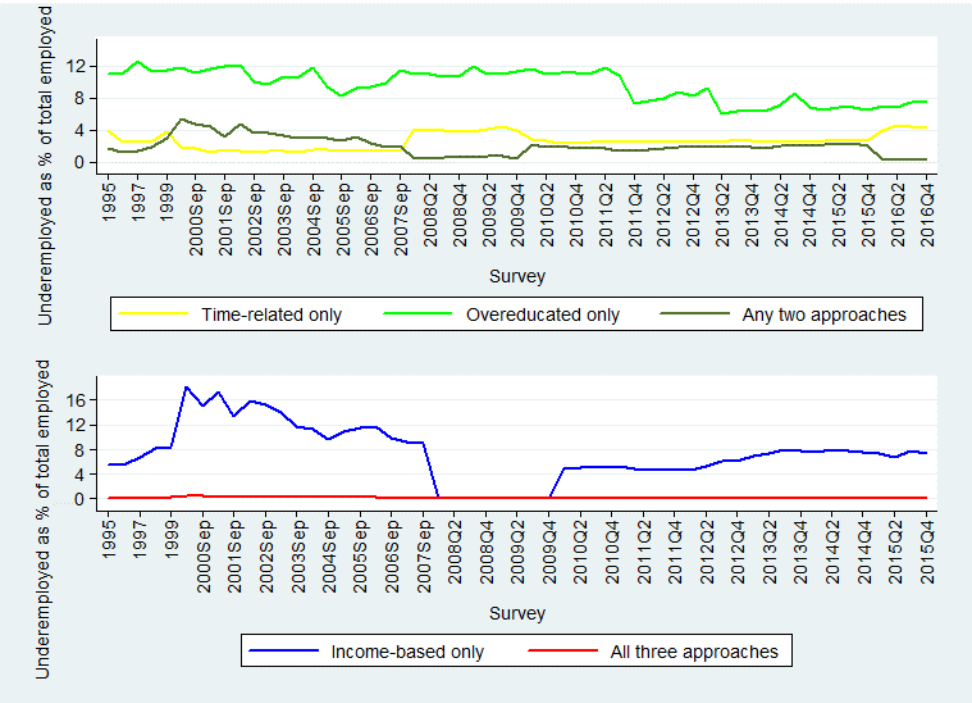


Table 1: Demographic characteristics of the underemployed (%), selected years

	Time-related				Overeducation				Income-based			
Variable	1995	2002	2009	2016	1995	2002	2009	2016	1995	2002	2010	2015
Race												
Black	0.674	0.859	0.863	0.864	0.611	0.630	0.595	0.601	0.883	0.931	0.940	0.839
Coloured	0.106	0.086	0.095	0.101	0.093	0.080	0.064	0.059	0.098	0.050	0.048	0.084
Indian	0.026	0.008	0.005	0.006	0.036	0.044	0.046	0.052	0.003	0.004	0.002	0.015
White	0.194	0.047	0.037	0.030	0.260	0.243	0.296	0.288	0.017	0.015	0.009	0.062
Gender												
Male	0.392	0.413	0.372	0.404	0.591	0.601	0.551	0.497	0.301	0.403	0.351	0.454
Female	0.608	0.587	0.628	0.596	0.409	0.399	0.449	0.503	0.699	0.597	0.649	0.546
Age												
15 to 24 years	0.108	0.175	0.110	0.102	0.165	0.149	0.095	0.042	0.193	0.171	0.101	0.084
25 to 34 years	0.335	0.318	0.312	0.297	0.445	0.463	0.325	0.294	0.296	0.277	0.297	0.281
35 to 44 years	0.290	0.256	0.310	0.300	0.251	0.238	0.338	0.344	0.264	0.249	0.259	0.284
45 to 54 years	0.170	0.186	0.214	0.220	0.106	0.106	0.170	0.209	0.169	0.188	0.231	0.236
55 t0 65 years	0.097	0.065	0.054	0.081	0.034	0.043	0.072	0.111	0.078	0.116	0.112	0.115
Mean	*37.46*	*36.06*	*37.54*	*38.47*	*33.46*	*33.76*	*37.54*	*40.05*	*35.92*	*37.47*	*39.08*	*39.65*
Province												
Western Cape	0.125	0.105	0.134	0.103	0.155	0.153	0.137	0.149	0.063	0.033	0.059	0.065
Eastern Cape	0.160	0.235	0.106	0.163	0.069	0.087	0.082	0.071	0.175	0.223	0.166	0.156
Northern Cape	0.028	0.011	0.018	0.015	0.015	0.019	0.016	0.010	0.042	0.024	0.018	0.022
Free State	0.072	0.059	0.079	0.094	0.056	0.052	0.050	0.029	0.265	0.112	0.098	0.082
KwaZulu-Natal	0.198	0.155	0.226	0.150	0.207	0.207	0.154	0.133	0.122	0.219	0.215	0.205
North West	0.096	0.094	0.037	0.037	0.059	0.060	0.051	0.039	0.112	0.082	0.059	0.052
Gauteng	0.190	0.170	0.263	0.238	0.341	0.302	0.375	0.444	0.074	0.098	0.132	0.230
Mpumalanga	0.046	0.094	0.087	0.095	0.054	0.068	0.069	0.051	0.075	0.077	0.100	0.076
Limpopo	0.085	0.078	0.051	0.106	0.044	0.051	0.066	0.075	0.071	0.132	0.153	0.112
Education												
None	0.108	0.107	0.070	0.048	0.000	0.000	0.000	0.000	0.254	0.180	0.087	0.053
Primary	0.195	0.307	0.246	0.236	0.000	0.000	0.000	0.000	0.523	0.418	0.319	0.215
Matric	0.447	0.525	0.617	0.646	0.614	0.678	0.382	0.106	0.213	0.383	0.539	0.625
Certificate/diploma	0.169	0.038	0.044	0.039	0.238	0.072	0.108	0.181	0.006	0.007	0.020	0.056
Degree	0.075	0.012	0.015	0.024	0.147	0.250	0.510	0.713	0.002	0.004	0.012	0.041
Other/Unspecified	0.006	0.011	0.009	0.009	0.000	0.000	0.000	0.000	0.002	0.008	0.024	0,011
Mean	*9.08*	*7.72*	*8.58*	*8.99*	*12.07*	*12.63*	*14.01*	*15.04*	*4.72*	*6.11*	*7.86*	*9.23*
Area type												
Urban	0.620	0.549	0.000	0.694	0.771	0.730	0.000	0.908	0.268	0.332	0.532	0.667
Rural	0.380	0.451	0.000	0.306	0.229	0.270	0.000	0.092	0.732	0.668	0.468	0.333

Table 1 above presents the demographic profile of the underemployed in selected years. Among the four racial groups, the black population remains the most underemployed across all the three definitions. However, the proportion of underemployed black workers was relatively lower under the overeducation approach, averaging 60 percent, and higher under

the income-based method, at about 90 percent. The white population were more susceptible to overeducation than the other two types of underemployment but less prone to income-based underemployment. Based on gender, the proportion of female underemployed workers were relatively higher at about 60 percent and between 60 to 70 percent under the time-related and income-based definitions respectively across all four periods. However, men were comparatively more overeducated than women in 1995, 2002 and 2009, which could be due to the fact that the former are more educated than the later.

The average age of underemployed workers for the periods under consideration ranged between 34 and 40 years across all the three types of underemployment. As can be deduced from Table 1, a higher proportion of the underemployed were between the ages of 25 to 44, followed by those in the 45 to 54 years cohort. Many of the time-related underemployed and overeducated workers were found in urban areas and resided in Gauteng, KwaZulu-Natal, Western Cape and Eastern Cape. The income-based underemployed were primarily from KwaZulu-Natal, Eastern Cape, Limpopo and Gauteng while many of them resided in rural areas except in 2015. Among the three types of underemployment, the overeducated had the highest average years of education, ranging between 9 to 15 years while the income-based underemployed had the lowest mean years of education. Moreover, workers with primary and secondary education constituted the highest proportion of the underemployed across all three definitions and all the observed periods except in 2009 and 2016 where degree holders made up 50 and 70 percent of overeducated workers respectively.

The summary statistics pertaining to the work characteristics of the underemployed is presented in Table 2. With regards to the type occupation, workers involved in elementary jobs and domestic work had the highest proportion of both time-related and income-based underemployed workers. As far as overeducation is concerned, elementary occupations again together with managers had the highest share of overeducated workers while professionals had the lowest proportion of underemployment across all the three approaches. In relation to industry type, community services, private households, and wholesale and retail trade were the industries that had the highest share of time-related underemployed workers. Likewise, overeducated workers were mostly found in manufacturing, community services, private households, and wholesale and retail sectors while private households and wholesale and retail had the most income-based underemployed workers. Compared to the public sector, the private sector had a vast majority of underemployed workers across all the three definitions

(between 76 and 98 percent). The average tenure for underemployed workers was highest (between 5 to 9 years) under the overeducation approach across the four periods. Overall, workers with tenure between 10 to 15 years were less affected by underemployment.

Table 2: Work characteristics of the underemployed (%), selected years

	Time-related				Overeducation				Income-based			
	1995	2002	2009	2016	1995	2002	2009	2016	1995	2002	2010	2015
Variable	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Occupation												
Managers	0.044	0.021	0.008	0.027	0.057	0.132	0.145	0.160	0.008	0.003	0.012	0.019
Professionals	0.066	0.008	0.009	0.013	0.000	0.000	0.102	0.152	0.001	0.001	0.011	0.004
Technicians	0.211	0.050	0.068	0.055	0.041	0.055	0.180	0.193	0.005	0.016	0.043	0.067
Clerks	0.106	0.058	0.031	0.019	0.117	0.031	0.049	0.097	0.013	0.019	0.026	0.065
Service workers	0.093	0.087	0.094	0.116	0.063	0.015	0.014	0.042	0.042	0.096	0.157	0.130
Skilled agriculture	0.011	0.195	0.005	0.000	0.008	0.093	0.005	0.007	0.011	0.206	0.007	0.010
Trade workers	0.077	0.136	0.081	0.089	0.055	0.039	0.060	0.115	0.033	0.081	0.101	0.095
Operators	0.049	0.021	0.024	0.030	0.166	0.169	0.025	0.052	0.025	0.040	0.040	0.069
Elementary occupation	0.194	0.221	0.352	0.422	0.388	0.344	0.344	0.069	0.393	0.324	0.382	0.417
Domestic workers	0.148	0.203	0.328	0.230	0.105	0.122	0.077	0.113	0.469	0.213	0.221	0.124
Other/Unspecified	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Industry												
Agriculture	0.081	0.170	0.010	0.036	0.069	0.121	0.027	0.014	0.321	0.341	0.057	0.044
Mining	0.012	0.001	0.000	0.001	0.037	0.036	0.022	0.035	0.001	0.003	0.003	0.030
Manufacturing	0.073	0.087	0.049	0.032	0.219	0.204	0.114	0.098	0.028	0.050	0.079	0.080
Electricity	0.002	0.000	0.000	0.003	0.012	0.007	0.012	0.026	0.001	0.000	0.003	0.003
Construction	0.033	0.068	0.077	0.111	0.032	0.027	0.051	0.053	0.013	0.042	0.093	0.089
Wholesale & retail trade	0.178	0.252	0.183	0.175	0.166	0.181	0.170	0.085	0.086	0.230	0.242	0.193
Transport	0.025	0.020	0.023	0.032	0.055	0.065	0.049	0.056	0.007	0.012	0.034	0.043
Financial intermediation	0.053	0.040	0.063	0.073	0.071	0.095	0.168	0.184	0.002	0.016	0.048	0.092
Community services	0.355	0.108	0.158	0.217	0.180	0.118	0.296	0.334	0.027	0.049	0.167	0.262
Private households	0.167	0.251	0.437	0.320	0.114	0.136	0.090	0.114	0.505	0.255	0.274	0.164
Others/Unspecified	0.020	0.003	0.000	0.000	0.046	0.008	0.002	0.000	0.010	0.002	0.000	0.000
Sector												
Private	0.838	0.962	0.913	0.831	0.838	0.921	0.781	0.756	0.977	0.988	0.868	0.794
Public	0.162	0.038	0.087	0.169	0.162	0.079	0.219	0.244	0.023	0.012	0.132	0.206
Tenure at current firm												
0 to 1 year	0.163	0.234	0.432	0.354	0.164	0.213	0.175	0.134	0.225	0.223	0.368	0.275
1 to 3 years	0.170	0.141	0.230	0.278	0.188	0.180	0.251	0.184	0.205	0.125	0.263	0.257
3 to 5 years	0.123	0.073	0.133	0.133	0.122	0.130	0.136	0.145	0.105	0.070	0.102	0.129
5 to 10 years	0.185	0.055	0.128	0.149	0.261	0.111	0.209	0.225	0.210	0.068	0.122	0.180
10 to 15 years	0.102	0.019	0.033	0.052	0.100	0.058	0.091	0.122	0.094	0.039	0.068	0.069
More than 15 years	0.256	0.478	0.044	0.034	0.165	0.308	0.137	0.189	0.161	0.475	0.078	0.090
Mean	*6.84*	*2.64*	*3.35*	*3.70*	*5.82*	*4.93*	*6.85*	*8.62*	*5.73*	*4.13*	*4.53*	*5.29*

Finally, the results of the probit regressions are presented in Table 3. Holding all other variables constant, it can be deduced that age has a significant positive relationship with underemployment. However, the likelihood of being underemployed declines as one gets older, which is an indication that the relationship between the two variables is a concave one. Controlling for other variables, females are significantly more likely than males to be underemployed. The probability of a female worker being underemployed, however, decreased from 7 percent in 2005 to 3.7 percent in 2015. The average marginal effects estimates for both 1995 and 2005 show that blacks are about 5 percent more likely to be underemployed compared to whites. Indians, on the other hand, have a relatively lower probability of being underemployed. It can also be inferred from the results that underemployment significantly declines with experience but the effect diminishes as a worker accumulates more experience.

Based on geographical location, workers who reside in the Eastern Cape, Northern Cape, Free State, KwaZulu-Natal, North West, Mpumalanga, and Limpopo have a higher likelihood of experiencing underemployment compared to their counterparts in the Western Cape. On the contrary, workers in the Gauteng province, relative to those in the Western cape, are significantly less likely to be underemployed. As far as the industry of employment is concern, workers in the mining, manufacturing, water and electricity, wholesale and retail, construction, communication, finance, and community services industries have a significantly lower probability of being underemployed compared those who work in the skilled agricultural sector. Workers in the private households industry are, however, more likely to fall into underemployment based on the estimates from the 1995 and 2005 data.

The results also show that self-employed individuals are significantly more likely to be underemployed than employees. Compared to individuals who are employed in the formal sector, informal sector workers are between 9 to 10 percent more likely to be underemployed. Moreover, public sector employees have a significantly higher probability of being in the underemployment pool relative to their counterparts in the private sector based on estimates from the 1995 and 2005 data[5].

[5] The opposite is however observed from the estimate derived from the 2015 data.

Table 3: Probit regressions on the likelihood of being underemployed

	Average marginal effects					
Explanatory variables	1995		2005		2015	
Age	0.0345***	(0.0026)	0.0343***	(0.0029)	0.0607***	(0.0042)
Age squared	-0.0002***	(0.0000)	-0.0003***	(0.0000)	-0.0005***	(0.0000)
Female	0.0636***	(0.0053)	0.0705***	(0.0054)	0.0371***	(0.0062)
Black	0.0545***	(0.0067)	0.0496***	(0.0087)	-0.0346***	(0.0106)
Coloured	-0.0105	(0.0084)	-0.0204*	(0.0108)	-0.0396***	(0.0122)
Indian	-0.0484***	(0.0109)	-0.0671***	(0.0155)	-0.0549***	(0.0158)
Experience	-0.0361***	(0.0015)	-0.0353***	(0.0016)	-0.0434***	(0,0024)
Experience squared	0.0003***	(0.0000)	0.0004***	(0.0000)	0.0005***	(0.0000)
Eastern Cape	0.0530***	(0.0099)	0.1019***	(0.0119)	0.1032***	(0.0149)
Northern Cape	0.0717***	(0.0138)	0.0259**	(0.0122)	0.0554***	(0.0189)
Free State	0.0995***	(0.0114)	0.0547***	(0.0131)	0.0817***	(0.0173)
KwaZulu-Natal	0.0103	(0.0093)	0.0619***	(0.0108)	0.0444***	(0.0135)
North West	0.0191*	(0.0113)	0.0523***	(0.0132)	0.0080	(0.0165)
Gauteng	-0.0169*	(0.0091)	-0.0075	(0.0107)	0.0181	(0.0112)
Mpumalanga	0.0095	(0.0109)	0.0385***	(0.0130)	0.0481***	(0.0156)
Limpopo	0.0221*	(0.0123)	0.0621***	(0.0137)	0.0712***	(0.0158)
Mining	-0.1488***	(0.0074)	-0.1538***	(0.0109)	0.0469*	(0.0247)
Manufacturing	-0.0955***	(0.0071)	-0.1423***	(0.0073)	-0.0215	(0.0158)
Water & electricity	-0.0873***	(0.0174)	-0.0834***	(0.0231)	0.0035	(0.0349)
Wholesale & retail	-0.1185***	(0.0084)	-0.1265***	(0.0086)	0.0051	(0.0172)
Construction	-0.1351***	(0.0063)	-0.1504***	(0.0065)	-0.0442***	(0.0144)
Communication	-0.1306***	(0.0079)	-0.1778***	(0.0081)	-0.0418**	(0.0168)
Finance	-0.1426***	(0.0070)	-0.1783***	(0.0073)	-0.0267*	(0.0154)
Community services	-0.1052***	(0.0142)	-0.1710***	(0.0090)	0.0032	(0.0163)
Private households	0.2391***	(0.0160)	0.1218***	(0.0117)	0.2845***	(0.0226)
Employee	-0.0272***	(0.0101)	-0.3018***	(0.0097)	-0.0432***	(0.0108)
Informal	0.0924***	(0.0142)	0.1038***	(0.0087)	0.0937***	(0.0111)
Public	-0.0771***	(0.0143)	-0.0179*	(0.0106)	0.0529***	(0.0110)

*** Significant at 1% ** Significant at 5%. * Significant at 10%

Standard errors in parenthesis

Reference groups: male; white; Western Cape; skilled agriculture; self-employed; formal sector; private sector.

5. Conclusion

This paper provides a comprehensive analysis of underemployment as a labour market deficiency by incorporating all three dimensions of the underemployment, namely, time-related, overeducation, and income-based definitions. According to existing theories, underemployment arises because wages is neither solely dependent on the nature of the job (competition and the assignment models) nor on the investment in education and other human capital attributes (human capital model). While some authors question the adequacy of the human capital theory in explaining underemployment, others argue that the theory may still be consistent with the observed facts if overeducation proves to be a short-term phenomenon.

The overall rate of underemployment has declined from approximately 22 percent in 1995 to 12 percent in 2016. It was also observed that the prevalence of overeducation and income-based underemployment was higher than the incidence of time-related underemployment. Furthermore, a few workers are affected by more than one type of underemployment. The likelihood of experiencing underemployment was found to be higher for females, blacks, informal sector employees, workers in the private households industry, and the self-employed.

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Appendix

Table A1: Categorisation of underemployed workers

Period	Overeducation only	Time-related only	Income-based only	Any two approaches	All three approaches	Underemployed (Total)	Underemployment rate (%)
1995	1 048 622	377 657	523 804	156 208	5 708	2 111 999	22.23
1996	981 214	229 001	495 601	106 695	4 870	1 817 381	20.27
1997	1 141 942	239 146	614 326	122 712	8 706	2 126 832	23.39
1998	1 065 044	240 938	761 197	178 426	6 387	2 251 992	24.03
1999	1 190 902	388 590	867 853	303 429	20 076	2 770 850	26.76
2000a	1 389 976	214 655	2 163 376	639 415	58 875	4 466 297	37.61
2000b	1 371 282	206 925	1 839 771	576 808	54 966	4 049 752	33.13
2001a	1 419 503	151 317	2 143 198	536 439	31 675	4 282 132	34.93
2001b	1 340 292	178 118	1 504 937	361 173	24 548	3 409 068	30.53
2002a	1 397 837	171 554	1 834 563	541 073	41 291	3 986 318	34.35
2002b	1 119 995	131 542	1 733 036	414 517	39 710	3 438 800	30.48
2003a	1 089 689	159 553	1 567 214	416 878	47 240	3 280 574	29.04
2003b	1 216 849	160 095	1 340 294	381 533	19 366	3 118 137	27.32
2004a	1 189 566	132 253	1 279 444	328 291	24 531	2 954 085	25.96
2004b	1 379 888	187 194	1 122 878	344 073	20 864	3 054 897	26.27
2005a	1 121 676	183 146	1 294 342	363 767	35 603	2 998 534	25.21
2005b	1 004 328	172 500	1 419 721	336 261	23 777	2 956 587	24.06
2006a	1 145 695	172 464	1 467 821	391 225	28 268	3 205 473	25.77
2006b	1 200 218	196 040	1 254 263	312 327	16 527	2 979 375	23.30
2007a	1 236 707	175 079	1 164 791	240 404	17 768	2 834 749	22.44
2007b	1 512 814	182 203	1 204 145	257 624	13 025	3 169 811	23.85
2008Q1	1 571 056	606 376	-	71 124	-	2 248 556	15.56
2008Q2	1 609 508	563 021	-	70 566	-	2 243 095	15.36
2008Q3	1 543 005	566 160	-	88 183	-	2 197 348	15.09
2008Q4	1 581 939	560 965	-	81 374	-	2 224 278	15.04
2009Q1	1 740 808	546 947	-	100 942	-	2 388 697	16.33
2009Q2	1 570 202	584 832	-	101 285	-	2 256 319	15.70
2009Q3	1 510 468	606 640	-	98 672	-	2 215 780	16.01
2009Q4	1 589 426	561 083	-	75 831	-	2 226 340	15.92
2010Q1	1 600 197	385 739	687 609	289 612	11 932	2 975 089	21.53
2010Q2	1 524 302	377 530	710 444	255 692	9 406	2 877 374	20.80
2010Q3	1 526 452	331 039	715 981	277 790	10 325	2 861 587	20.94
2010Q4	1 545 337	327 039	699 598	235 213	14 504	2 821 691	20.28
2011Q1	1 525 185	342 740	701 681	235 511	7 163	2 812 280	20.21
2011Q2	1 640 069	349 661	654 203	238 762	11 610	2 894 305	20.77
2011Q3	1 516 590	347 023	665 549	206 551	8 342	2 744 055	19.42
2011Q4	1 052 451	356 495	672 017	202 824	5 677	2 289 464	15.95
2012Q1	1 096 602	369 583	661 685	219 061	5 153	2 352 084	16.45
2012Q2	1 149 229	362 592	754 318	240 433	4 051	2 510 623	17.50
2012Q3	1 278 431	366 814	884 488	264 402	4 869	2 799 004	19.19
2012Q4	1 200 918	386 676	883 823	268 003	6 599	2 746 019	18.88
2013Q1	1 349 576	358 726	1 011 134	267 676	7 036	2 994 148	20.55
2013Q2	896 823	362 485	1 092 262	267 372	7 807	2 626 749	17.86
2013Q3	957 391	412 895	1 211 663	276 010	8 263	2 866 222	19.03
2013Q4	997 502	395 310	1 173 528	288 947	5 775	2 861 062	18.83
2014Q1	955 636	370 598	1 135 478	265 798	3 414	2 730 924	18.12
2014Q2	1 081 444	373 756	1 191 078	293 459	5 697	2 945 434	19.49
2014Q3	1 307 786	411 498	1 186 291	295 006	6 151	3 206 732	21.17
2014Q4	1 047 468	387 714	1 161 365	311 319	8 595	2 916 461	19.00
2015Q1	1 012 024	415 163	1 143 943	330 531	1 471	2 903 132	18.74
2015Q2	1 078 728	425 262	1 062 478	334 412	12 846	2 913 726	18.59
2015Q3	1 089 261	445 883	1 220 723	369 371	6 294	3 131 532	19.74
2015Q4	1 051 074	425 282	1 193 027	331 688	9 542	3 010 613	18.76
2016Q1	1 085 302	617 543	-	41 721	-	1 744 566	11.12
2016Q2	1 065 416	715 026	-	40 205	-	1 820 647	11.69
2016Q3	1 192 459	705 169	-	44 078	-	1 941 706	12.24
2016Q4	1 204 217	678 030	-	47 041	-	1 929 288	11.99

Figure A1: Fully employed versus underemployed

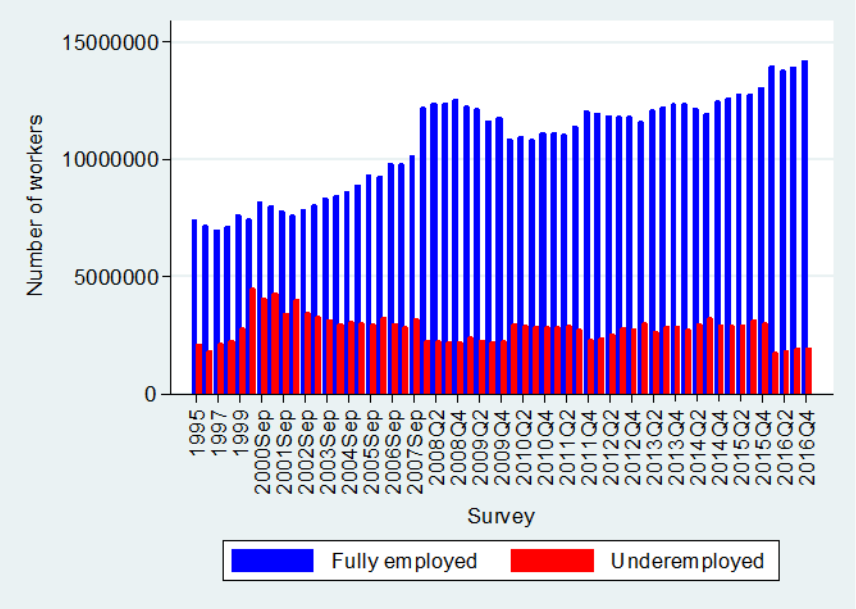

Table A2: Educational requirements of occupational classifications (for the job analysis approach)

Broad occupation category	Skills level	Education level required
Legislators, senior officials and managers	Most highly-skilled	Tertiary (Degree or above)
Professionals	Most highly-skilled	Tertiary (Degree or above)
Technicians and associate professionals	Highly-skilled	Tertiary (Not equivalent to degree)
Clerks	Semi-skilled	Secondary (Up to Matric)
Service workers and shop and market sales workers	Semi-skilled	Secondary (Up to Matric)
Skilled agricultural and fishery worker	Semi-skilled	Secondary (Up to Matric)
Craft and related trade workers	Semi-skilled	Secondary (Up to Matric)
Plant and machinery operators and assemblers	Semi-skilled	Secondary (Up to Matric)
Elementary occupations	Unskilled	Primary (Up to Grade 7)
Domestic workers	Unskilled	Primary (Up to Grade 7)

Figure A2: Number and percentage of overeducated workers (Job analysis approach)

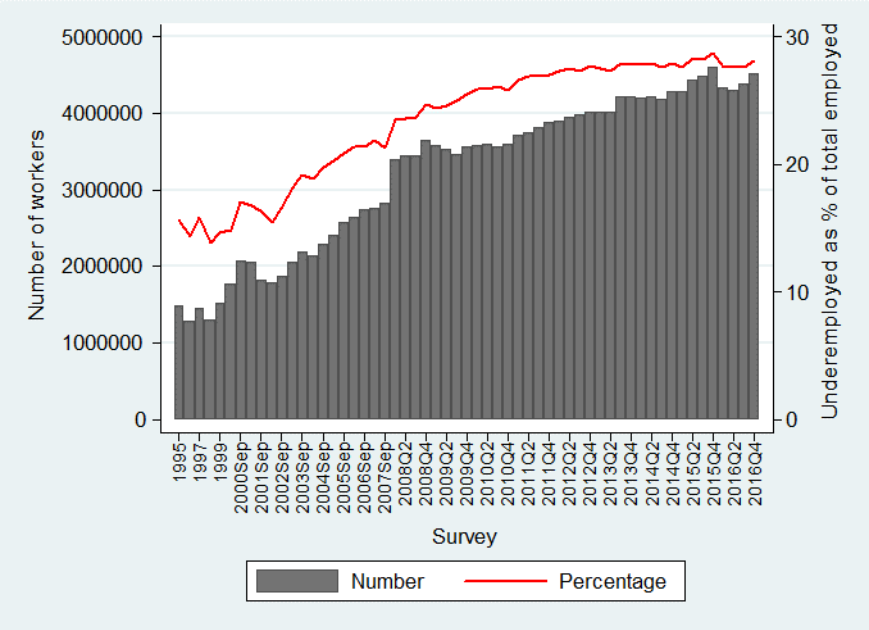

Figure A3: Number of the underemployed (under the various categories)

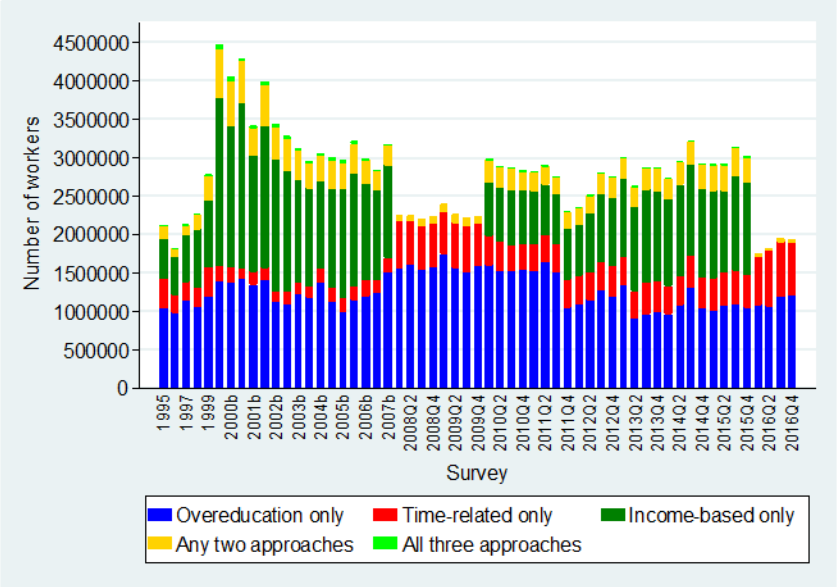

Table A3: Calculation of income threshold for income-related underemployment (based on IES 2010/2011)

Poverty line (per capita per month)	Amount (2011 Feb-Mar prices)	2011 Feb-Mar CPI	Amount (2016 Dec prices)	Income threshold (125%)
Food poverty line	335	72.75	460	575.00
Lower bound poverty line	501	72.75	689	861.25
Upper bound poverty line	779	72.75	1071	1338.75

Note: Dec 2016 = 100