CHAPTER 12

Education and skills mismatch in the South African labour market

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While a number of chapters in this volume have explored the labour market outcomes associated with the completion of various types of training and education, this chapter offers a broader picture of the match between education and employment. Matching the skills of the workforce with the needs of the labour market is an imperative in all countries but arguably even more so in South Africa, where the official unemployment rate stands at approximately 26.7% (Statistics South Africa [Stats SA] 2018). In the context of such high structural unemployment alongside concerted government efforts to support human capital development across the life cycle, the extent to which there is alignment between available qualifications and skills possessed by the labour force and those demanded by employers is critical.

This last empirical chapter complements the main theme on pathways through and transitions out of post-school education by examining the correspondence between the qualifications and skills obtained through various elements of the PSET system and the requirements of the job market. As highlighted in a number of chapters in this volume, South Africa is affected by considerable skill shortages due to persistent inequalities in access to higher education, vocational training and the labour market. The existing but somewhat limited evidence, to date, suggests that both educational and skills mismatch need to be considered in the South African context as both appear to be prevalent (Beukes et al. 2016; Daniels 2007; Mncwango 2016; Reddy et al. 2016; Schoeman et al. 2010). With respect to skills specifically, shortages are likely to be present in both low- and high-skilled professions in South Africa and may be absolute (lack of workers with specific skills) or relative (skilled workers exist but do not meet the employment criteria) (see Daniels 2007). This chapter also offers evidence for the importance of post-school education, work-based learning, on-the-job training and other modes of skills development contributing to lifelong learning, in particular when the skills or education of the worker do not match those needed for the job. As discussed in Chapter 11, craft and related trade professions are essential for economic growth in South Africa and learnerships and apprenticeships can improve, upgrade and complement the existing skills and education of workers. As we show in this chapter, work-based learning or on-job-training is not only an effective solution against job mismatch but also a remedy for job dissatisfaction and, therefore, should become an important aspect of future policies.

Occupational or job mismatch is a broad term which describes the excess or lack of formal qualification, skills or both that a particular worker might experience in her/his job (see also Rogan, this volume). The imbalance between formal qualifications (education) of the worker and the required qualifications for the job is defined in the literature as over- or under-education. On the other hand, a worker

might possess the required education but be lacking or have a surplus of specific skills, defined as skill deficit and skill under-utilisation (SUU) or over-skilling respectively. Quintini (2011b) provides a detailed overview of these definitions as they are used in the literature from OECD countries. Skills and qualification mismatches affect societies at both the micro- and macro-economic levels. Over-education often means lower returns on investment in education, and therefore results in lower earnings relative to well-matched workers with similar years of training or education. Moreover, over-education is often associated with low levels of job satisfaction. On the other hand, under-qualified employees are often less productive and are at a greater risk of losing their jobs. For firms, both over- and under-education in the workforce lower the chances of growth, inhibit productivity and innovation and are linked with higher staff turnover. At the macro level, and particularly in developing and middle-income countries, a poorly educated or under-skilled workforce tends to compromise economic growth and development. For both developed and developing countries, occupational mismatch is therefore indicative of labour market inefficiencies which lead to higher unemployment, reduced economic growth and decreased productivity.

The main aim of this chapter is thus to identify the prevalence of and the factors associated with occupational mismatch in the South African labour market. Using new data that allow the measurement of both qualification and skills mismatches, we attempt to quantify the extent of occupational mismatch among South African workers, as well as to investigate its consequences in terms of job satisfaction and participation in further training and education. The data used in this chapter are from the 2013 edition of the South African Social Attitudes Survey (SASAS) (Human Sciences Research Council [HSRC] 2013) and allow us to examine not only the links between job mismatch and job satisfaction, but also the relationship between job mismatch and participation in training in South Africa. The remainder of the chapter is structured as follows. We begin with a brief overview of theoretical and empirical literature on occupational mismatches globally and in South Africa. Following this, we discuss data and methods employed and then present results of a comparison between several definitions of occupational mismatch measures as well as the way they are associated with participation in on-the-job training and job satisfaction. Finally, we conclude by considering some of the implications of the study results for education and training in South Africa.

International experiences of job mismatch

In the international literature, studies of occupational mismatch tend to be concerned primarily with identifying the determinants of over-qualification as this is the phenomenon most often observed in developed countries. Given the 'massification' of higher education in a number of countries, a large section of this work focuses on university graduate over-education (Green & McIntosh 2007) and the majority of these studies explore only educational mismatch and not skills mismatch. A few studies find weak associations between over-education and individual characteristics such as gender, age or race. However, there is no clear direction of the association between gender and over-education, with some studies showing a higher prevalence for women but others not. Green and McIntosh (2007) found that apart from age, which is negatively associated with over-qualification, all other significant factors are job- or degree-specific (part- or full-time job, size of the firm, type of degree and university). Quintini (2011a, 2011b), however, also suggests that ethnicity and migration status seem to be important determinants of over-education in the literature from developed countries.

One of the key studies (Green & McIntosh 2007) that explores the determinants of skills mismatch found that non-prime age workers and those in unstable jobs are more likely to be over-skilled. Green and McIntosh (2007) also report that being a graduate and over-qualified does not necessarily translate into over-skilling. Relatedly, there has been a particular concern in this strand of the literature with

the relationship between qualification and skills mismatch. A relatively consistent finding (Allen & Van Der Velden 2001; Allen & De Weert 2007) has been that although the two mismatch types (that is, education and skills) might be related or weakly correlated, one does not necessarily imply the other (see also Rogan, this volume).

An important consequence of occupational mismatch is lower job satisfaction, with a number of studies in the literature showing that this is associated with over-education (Allen & Van Der Velden 2001; Allen & De Weert 2007; Battu et al. 2000; Chevalier 2003; Green & Zhu 2010; Sloane 2003; Verhaest & Omey 2006a; Vieira 2005). In general, over-educated workers are found to be less satisfied with their jobs than well-matched workers, even among those with the same qualifications or in the same job. However, the effect of educational mismatch often becomes non-significant when analyses control for skills mismatch and/or other job characteristics.

From a skills development perspective, an important aspect of occupational mismatch is the opportunity to participate in additional training or education and whether this reduces the gap between possessed and required skill. Previous studies in the literature have attempted to determine whether education and on-the-job training may be substitutes or complements to one another (Alba-Ramirez 1993; Groot 1993; Van Smoorenburg & Van Der Velden 2000). Sloane et al. (1996), and Sloane (2003) argue that if they are substitutes, over-educated workers need less training than well-matched workers to perform their job because their education can replace training. While additional training would be less likely for over-educated workers because their education supplies them with different skills, under-educated individuals might desire and benefit from additional training in order to increase their experience or knowledge and subsequently become a better match for the job.

On the other hand, if education and training are complements, then training represents investment in human capital that adds to the initial education and enhances the already acquired skills of workers. This means that firms and employers in general would be inclined to invest in training for more educated workers as they might be able to learn new skills in less time. In contrast, however, Van Smoorenburg and Van Der Velden (2000) show that over-educated workers are less likely to participate in training than well-matched workers. Similarly, other work has found that under-qualified workers are the least likely to participate in training (Groot 1993). In general, the findings from the literature may vary considerably but seem to suggest that additional training is one of the remedies for dealing with mismatches (of all types) between jobs and workers.

Job mismatch in the South African context

Only a handful of studies from South Africa have examined the prevalence of and factors associated with occupational mismatch despite the fact that high unemployment is accompanied by both a shortage of key skills and a relatively high level of over-qualification (Daniels 2007; Mncwango 2016). In addition, there is no work which has investigated consequences such as the link to job satisfaction and participation in training. In a recent report based on the SASAS (Mncwango 2016), approximately 30% of employed individuals were found to be over-qualified according to a self-reported measure. The report also showed a higher prevalence of over-qualification among black Africans, women, workers between 25 and 34 years old as well as workers with only primary schooling, but the results are descriptive and no standard errors or confidence intervals were reported.

In perhaps the most detailed study of occupational mismatch, Beukes et al. (2016) used data from the Quarterly Labour Force Survey (QLFS) in order to derive two objective measures of over-qualification. The authors found that over-qualification varied from 15.7% to 27.9% (based on the normative method)

and from 6% to 15% (based on the statistical method) in the 2008-2014 period. Most recently, Reddy et al. (2016) analysed sectors and occupations where graduates are employed and found that less than half of people working in professions that require high qualifications (managers, senior officials, technicians and professionals) have a tertiary education, a situation which makes them substantially under-qualified. Moreover, nearly half of higher education graduates work in community, social and personal services sector, while some science and engineering graduates choose to work in the financial sector which may suggest some level of mismatch between skills and/or qualifications.

Beyond this small group of fairly recent studies, occupational mismatch has not received sufficient attention in South Africa. In particular, there has been no consideration of the different definitions of occupational mismatch or their determinants and consequences for job satisfaction, additional training and skills development. The remainder of the chapter now turns to an analysis of these aspects of occupational mismatch in South Africa based on a newly available source of data.

Data and methodology

The analysis in this chapter is based on the 2013 edition of the South African Social Attitudes Survey (SASAS) (HSRC 2013). The survey is a nationally representative, repeated cross-sectional survey and has been conducted annually by the HSRC since 2003. SASAS aims to capture public attitudes and changes in public attitudes towards cultural, social, political and economic issues in South Africa. The study uses a representative sample based on a sampling frame designed by the HSRC in 2002. The master sample contains 1 000 primary sampling units based on the 2001 population census estimates (Roberts et al. 2010). Face-to-face interviews were used to collect information and a total of 2 885 South Africans aged 16 years and older participated in the study in 2013. After excluding unemployed and economically inactive individuals, as well as a few observations with missing values for key variables, the dataset which we analyse contained 844 employed respondents (see sample characteristics in appendix Table 12A).

Although the SASAS questionnaire includes a number of fixed questions every year there is also a module on specific themes that differs from year to year. In 2013, this module was designed by researchers associated with the Labour Market Intelligence Partnership (LMIP) and was concerned with measuring attitudes towards the labour market. For the first time in South Africa, a number of questions which have been used to measure job matching in the international literature were included in the survey. In order to identify job mismatches, the analysis in this chapter makes use of several different measures from the SASAS to develop qualification and skills mismatch indicators.

Qualification mismatch measures

We present the results from two objective measures and a normative measure, the indirect self-assessment (ISA) measure (see Bauer 2002; De Oliveira et al. 2000; Flisi et al. 2017; Kiker et al. 1997; Verdugo & Verdugo 1989). The first objective measure is expert-driven and uses the job analysis (JA) method (see Quintini 2011b, Flisi et al. 2017). It is based on the South African Standard Classification of Occupations (SASCO) (Stats SA 2003)[1] list which classifies jobs into 10 major occupational groups (Table 12.1). According to the SASCO document 'a skill is defined as the ability to carry out the duties and tasks of a specific job' (HSRC 2003: 5). The skill level represents the range and complexity of the set

1 Although a more recent SASCO list exists, the 2003 version was used in SASAS (HSRC 2003) to classify occupations and therefore utilised for this analysis.

TABLE 12.1 *Occupation groups and skill levels*

Major occupation group	Education level	Skill level
1. Legislators, senior officials and managers	Tertiary	4
2. Professionals	Tertiary	4
3. Technicians and associate professionals	Diploma/certificate	3
4. Clerks	Secondary or equivalent	2
5. Service workers and shop and market sales workers	Secondary or equivalent	2
6. Skilled agricultural and fishery workers	Secondary or equivalent	2
7. Craft and related trades workers	Secondary or equivalent	2
8. Plant and machine operators and assemblers	Secondary or equivalent	2
9. Elementary occupations	Primary or less	1
10. Armed forces, occupations unspecified and not elsewhere classified and not economically active persons	Various	1 + 2 + 3 + 4

Source: Statistics South Africa 2003

of tasks or duties required for a job and is measured by means of formal education and experience (for the distribution of respondents across occupational groups see appendix Table 12B).

According to SASCO 2003, there are four major skill levels (Table 12.1). The first skill level is equivalent to primary education but might also include workers without any formal education, therefore it might be seen as conceptually combining skills and education. The second skill level represents secondary education which starts at the age of 13 or 14 and lasts for five years, as well as some apprenticeship or on-the-job training. SASCO defines the third skill level as education that starts at the age of 17 or 18, lasts between one and four years and leads to a qualification that is not equivalent to a university degree. Finally, the fourth skill level corresponds to education that begins at the age of 18 or 19, lasts for three or more years and results in a university degree (undergraduate or post-graduate). Note that for occupation groups 0 and 1, SASCO 2003 (Stats SA 2003) did not assign a skill level; hence, the relevant information was extracted from the description of occupation tasks if appropriate, or from SASCO 2012 (Stats SA 2012).

The second objective method which we use in this chapter is the statistical approach which uses the mean or the mode of the education level or years of schooling for each of the occupation groups (again based on SASCO). Educational mismatch is then defined as the deviation of an individual's education from the mean or mode in the specific occupation group. When using the mean, workers with educational attainment (in years of schooling) more or less than one standard deviation from the mean are defined as over-educated or under-educated, respectively. Workers with education within one standard deviation from the mean education of their occupation group are identified as educationally matched. The method is applied to the one- and two-digit levels of occupation codes as organised under the SASCO classification system (MEAN1 and MEAN2). Similarly, for the mode, workers are classified as over-educated when their educational attainment is greater than the modal value within the specific occupational group, under-educated if their education is below the mode and matched if it is equal to the mode. In this case, we use the education attainment variable (measured as the highest level reported) rather than the years of schooling, again at the one- and two-digit levels of occupation codes (MODE1 and MODE2).

The only subjective over-qualification measure available from the SASAS data is the indirect self-assessment (ISA) measure which is derived from the following question (see Dolton & Silles 2008; Dolton & Vignoles 2000):

What do you think should be the minimum level of education required to perform your job?

The response categories for this question are (1) none – no schooling required, (2) primary education, (3) some secondary education, (4) matric/grade 12 certificate, (5) certificate or diploma, (6) university degree, (7) university degree with a higher qualification. The answers are recoded into five categories and then compared to the individuals' education level in order to obtain the ISA measure (see also Rogan, this volume). Based on this recoding, workers are classified as over-educated if the required education is less than their actual education, matched if it is equal and under-educated if it is higher.

Skills mismatch measures

Defined in terms of SUU (over-skilling), skill deficit or skill irrelevance, skill mismatch is measured using two subjective questions. The first question is a statement about utilisation of skills:

The work that I do makes full use of my knowledge and skills.

The respondent is asked to choose one of the following: strongly agree (1), agree (2), neither agree or disagree (3), disagree (4), strongly disagree (5) or can't choose (8). Allen and Van Der Velden (2001) define SUU as the extent to which an individual agrees with the above statement: strong if one replies 4 or 5 and none if one chooses 1–3 answers (see also Rogan, this volume).

A second question used to create a skills relevance (SR) variable is worded as follows (Allen and Van Der Velden 2001):

To what extent is your expertise relevant to what you do in your job every day?

The list of possible responses include: completely relevant (1), to a great extent (2), to some extent (3), not at all relevant (4), Have not received any training or qualification (5) and dont know (8). A new variable is created to represent skill relevance with 'strong' assigned to responses 1 and 2 and 'weak' to answers 3–5 (see Allen & Van Der Velden 2001).

Statistical analysis

Using the methods to obtain the mismatch measures explained above, we present descriptive statistics to identify the prevalence of occupational mismatch and then estimate a series of regressions to explore the relationship between occupational mismatch and job satisfaction as well as participation in training.[2] Population weights provided in the dataset are used, where indicated, in order to account for sampling bias. The analysis is presented in two parts. Firstly, we identify the prevalence of occupational mismatch using the different measures described above. We then investigate the correlation and correspondence between measures, as well as the differences in prevalence by measure for three

2 For the complete analysis which also includes factors associated with the mismatch measures, see Grapsa (2017).

factors: gender, race and area of residence.[3] Next, we discuss the prevalence of both educational and skills mismatch by occupational group and discuss the discrepancies. The analysis continues by examining whether occupational mismatch affects the likelihood of receiving additional training. Secondly, we present the results of two ordered logistic regression specifications which we use to estimate the relationship between occupational mismatch and participation in further training and job satisfaction, respectively.

Occupational mismatch in South Africa

The prevalence of occupational mismatch

Table 12.2 shows the prevalence of education and skills mismatch in the SASAS sample according to the measures discussed above. The statistical approach using the mean at the two-digit occupational group level produces the highest percentage of matched individuals (72%), while the remaining measures suggest that, for approximately half of the sample, their education matched the required education for the job. However, there are differences in the prevalence of the over- and under-education by measure, with the subjective measure (ISA) giving the highest over-education rate and the MEAN2 giving the lowest. This is consistent with the broader literature which suggests that subjective measures tend to over-estimate over-education (Hartog 2000, Verhaest & Omey 2006a). Under-education appears to be highest when using the MODE2 measure and lowest with the MEAN2 measure.

TABLE 12.2 *Occupational mismatch in the sample*

Educational mismatch			
Measure	**Matched**	**Under-qualified**	**Over-qualified**
Objective			
JA	377 (49)	210 (27)	189 (24)
MODE2	375 (48)	239 (31)	162 (21)
MEAN2	596 (72)	111 (14)	118 (14)
Subjective			
ISA	388 (50)	152 (20)	236 (30)
Skills mismatch			
		Strong	**None**
Skill under-utilisation (SUU)		151 (19)	625 (81)
		Weak	**Strong**
Skill relevance (SR)		348 (45)	428 (55)

Source: SASAS 2013
Notes: Data are unweighted. Percentages in parentheses.

3 It has been previously shown that measures differed by gender and geographic type and we also decided to explore differences by race as black African workers appeared more likely to be over-educated in the analysis by Mncwango (2016).

Several reasons have been suggested in the literature to explain the variation among qualification mismatch measures or the reasons for its over- or under-estimation by certain approaches (Hartog 2000, Verhaest & Omey 2006a). Apart from measurement error resulting from data collection, each measure suffers from specific disadvantages. On the one hand, objective measures often collapse a wide range of occupations into specific categories which are assigned the same required education. Subjective measures, on the other hand, may be biased by poorly informed individuals who are not able to evaluate their job requirements accurately.

Misidentification of the appropriate concept for occupational mismatch also contributes to the disagreement between measures. Often the acquired qualifications do not represent the skills that individuals possess or are required to perform a job. Hence a number of studies have focused instead on skills mismatch (Allen & Van Der Velden 2001; Green & McIntosh 2007; Mavromaras et al. 2007). An important observation in previous studies has been that often there is a weak link between skills mismatch and education mismatch, which suggests significant skill diversity among workers with the same qualifications. Allen and Van Der Velden (2001), for example, demonstrated that a match in qualification does not imply utilisation of skills. Examining skill imbalances (Table 12.2) in the SASAS data, we see that 19% of all workers in the sample report strong under-utilisation of skills (SUU) (over-skilling), and 45% report weak skills relevance in their current occupations.

Correlation and correspondence between measures

Given the large differences both between and across measures of qualification matching, Table 12.3 presents the proportion of workers that are classified as well matched by the different measures. For example, a value of 0.62 for the correspondence between the JA and MODE2 measure means that the classification of 62% of the workers is the same with both measures. In other words, if one respondent is classified as over-educated with the JA measure, s/he is also classified as over-educated using the MODE2 measure. The subjective indicator (ISA) has the lowest correspondence with any other measure. Interestingly, we find that while all workers are over-educated according to at least one measure, only 4% (not shown in table) of are over-educated with every measure (similar findings are reported in Verhaest & Omey 2006b). Similarly, we find 15% of workers classified as well-matched and 4% as under-educated by all measures (not shown in table).

The few studies which have identified the correlation between measures (Battu et al. 2000; Verhaest & Omey 2006b) have found that occupational mismatch measures tend to be weakly correlated. Similarly, when we obtain the Spearman rank correlation coefficient between all measures, we see that although there is correlation between them, it is not strong. The highest correlation coefficient is between the normative measure and the statistical measure using the mode (0.34). The two skills

TABLE 12.3 *Proportion of correspondence between educational mismatch measures*

Measure	JA	MODE2	MEAN2	ISA
JA	1	0.62	0.54	0.48
MODE2	0.62	1	0.62	0.49
MEAN2	0.54	0.62	1	0.48
ISA	0.48	0.49	0.48	1

Source: SASAS 2013
Notes: Data are unweighted.

TABLE 12.4 *Percentages of over- and under-educated workers by gender, race and area of residence*

Variable	JA		ISA		MODE2		MEAN2	
	Over	Under	Over	Under	Over	Under	Over	Under
Male	21	28	30	23	23	32	13	14
Female	28	26	32	16	19	30	16	13
Black African	24	28	38	19	19	36	11	18
Coloured	26	24	28	22	19	31	9	13
Indian/Asian	15	30	21	21	24	23	18	3
White	30	27	25	18	29	19	29	6
Urban	25	27	26	21	21	29	16	11
Rural	24	28	52	13	19	40	10	24

Source: SASAS 2013
Notes: Data are unweighted.

assessment measures have the second largest correlation of 0.32. Interestingly, very low correlation coefficients appear and are even negative among some variables, for example, the skills relevance and the ISA measure. This suggests that educational and skills mismatch in South Africa may be weakly correlated, a result consistent with previous findings in developed countries. Further investigation by gender, age and area of residence helps explain some of these differences (see Table 12.4).

All measures show a lower level of under-qualification for women but the opposite for over-qualification (apart from the MODE2 measure). The ISA gives the highest over-qualification prevalence for black African workers (38%), which suggests that an upwards bias is greater in this population group. Moreover, the prevalence of under-education obtained by all objective measures is higher than over-education, but lower using the ISA. Among white workers, the findings reveal that over-education appears to be under-estimated when using the ISA compared with all other measures. Over-education is highest among coloured workers with the ISA, and among Indians/Asians with the MODE2 measure. Exploring differences by area of residence, the subjective measure is again the only measure showing a higher likelihood of being over-educated for workers in rural than in urban areas, and the opposite for the likelihood of under-education.

The remaining analysis in this chapter focuses on the objective JA measure as the preferred educational mismatch measure in order to complement existing work (see Mncwango 2016) which was based on the subjective ISA measure. An additional objective is to investigate the SUU indicator, and to juxtapose it with the JA measure in order to identify conceptual differences. We choose the SUU versus the SR measure as it is used more often in the broader literature.

Over-education and skills under-utilisation

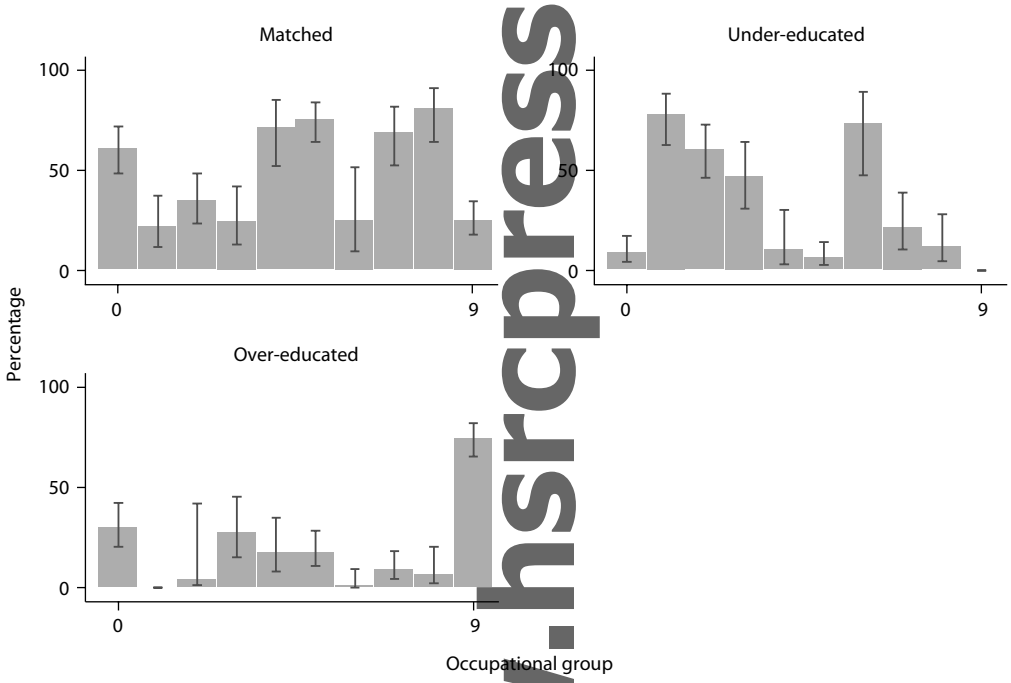
The analysis begins by examining the association between education level and qualification mismatch (Table 12.5). As expected, we find that over-education is non-existent within the lowest education levels (no schooling and primary), and reaches 39% for workers with some type of tertiary education. Although under-qualification is higher among workers with basic education, it persists for those with

TABLE 12.5 *Qualification mismatch (JA) by education level*

Variable	% matched (CI)	% under-qualified (CI)	% over-qualified (CI)
No schooling	50.5 (24.5, 76.1)	49.5 (23.9, 75.5)	–
Primary	38.6 (26.9, 50.5)	61.4 (49.5, 73.1)	–
Some secondary	52.8 (43.9, 61.9)	15 (9.2, 23.3)	32.2 (24.2, 41.2)
NSC	50 (41, 58.5)	28.6 (21.2, 37.3)	21.4 (15.1, 30.1)
Tertiary	39.2 (29, 47.6)	22.3 (14, 32.1)	38.5 (31.6, 50)
Total	46.3 (41.2, 50.7)	27.3 (23, 31.8)	26.4 (22.8, 31.3)

Source: SASAS 2013
Notes: Data are weighted using populations weights.

FIGURE 12.1 *Qualification mismatch (JA) by occupation group (SASCO 2003)*



Source: SASAS 2013
Notes: Data are weighted using populations weights.

a National Senior Certificate (NSC) and tertiary education. Just over half of workers with some level of secondary education are well matched as are half of those with an NSC.

Figure 12.1 depicts qualification mismatch among the major occupational groups in SASCO. The percentage of under-qualified individuals is highest (78%) among occupation group 1, which consists of legislators, senior officials and managers. The majority of skilled agricultural and fishery workers also appear to be under-qualified (73%). The groups with the highest prevalence of well-matched workers are group 8 (plant/machine operators and assemblers) with 81%, group 5 (service

TABLE 12.6 *Skill under-utilisation measure by education level (highest)*

Education level	% strong SUU (CI)
No schooling	43.8 (19.1, 72.1)
Primary	39.1 (26.8, 52.9)
Some secondary	26.9 (19, 36.6)
NSC	16.9 (10.8, 25.4)
Tertiary	5.3 (2.5, 10.8)

Source: SASAS 2013
Notes: Data are weighted using populations weights.

and shop sales workers) with 75% and group 4 (clerks) with 71%. Approximately 75% of workers in elementary occupations are classified as over-qualified, suggesting that individuals may be choosing these occupations out of necessity and despite having more qualifications than required for the job. Technicians and associated professionals are the second most over-qualified profession. The lower rates of over-qualification are evident in occupational groups that require a high level of skill or qualifications such as professionals, legislators and skilled workers (see also Green & McIntosh 2007).

The prevalence of SUU or over-skilling is 20% for the South African workforce as a whole (weighted). The fact that SUU is higher among workers with no schooling (44%) than among workers with higher education (5%) suggests that, as expected, more educated workers tend to obtain jobs that better suit their skills (Table 12.6). Alternatively, higher education might improve people's chances to better utilise their skills even if they are over-qualified for a job (24% of over-qualified workers with secondary education are over-skilled versus 4% of over-qualified workers with an incomplete secondary education).

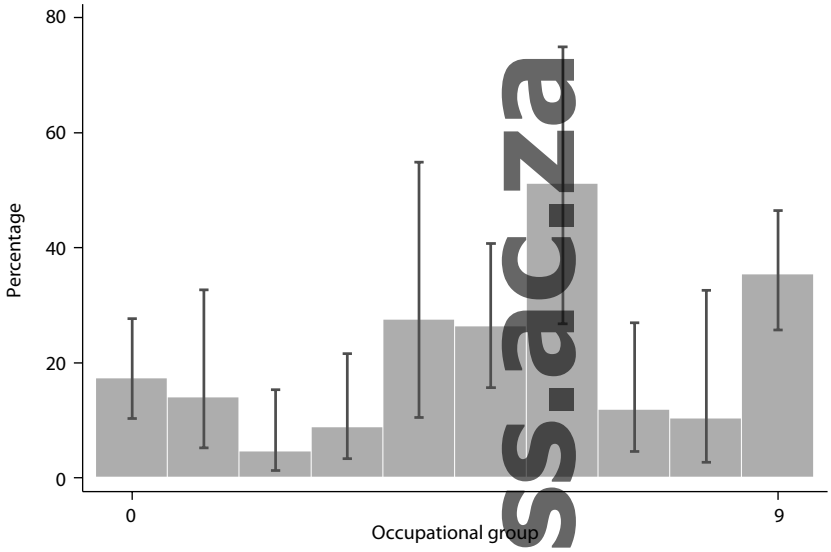
When SUU is disaggregated by occupation group (Figure 12.2) we find that over-qualification does not necessarily translate to over-skilling although it might mean so for some professions. The prevalence of under-education is 73% for skilled agricultural and fishery workers but over-skilling is the highest among this occupational group. Reported SUU in group 9 (elementary workers) is relatively high (35%) but it is lower than the prevalence of over-education for this group (75%). Disaggregating over-skilling by educational mismatch category in this group shows that education indeed plays a certain role, as workers who are over-educated report less over-skilling than those matched in elementary occupations (33% versus 42%).

Having explored various objective and subjective measures that can be considered to measure occupational mismatches in the South African labour market, in the next section of analysis we focus on the possible association between occupational mismatch and the extent of on-the-job training and job satisfaction.

Occupational mismatch and participation in training

As outlined earlier, a key interest in this chapter is whether levels of over-education and over-skilling are associated with participation in training and whether training functions as a complement or substitute to formal education.

FIGURE 12.2 *Skills under-utilisation by occupation group*



Source: SASAS 2013
Notes: Data are weighted using populations weights.

The following question in the 2013 SASAS asks whether an employed individual has received any additional training:

> *Over the past 12 months, have you had any training to improve your job skills (either at the workplace or somewhere else)?*

Of the workers in the sample, 40% reported that they had received training over the past 12 months. Participation in training is most often reported in the highest educational level with 66% of the workers with tertiary education reporting that they received training in the 12 months prior to the survey. However, the percentage of those having participated in training is also relatively high among workers with no schooling (44%).

In estimating the correlates of receiving additional training (Table 12.7) we find no significant correlation between gender, race, age or marital status and the likelihood of additional training. The relationship between having had on-the-job training and education appears to be positive with the odds of training increasing as the level of education increases. This result supports the hypothesis of education and training being complementary as more educated workers receive more training. On the other hand, under-qualified workers are three times more likely to receive additional training at work (OR = 3.104) than well-matched workers. The opposite holds for over-educated respondents but the coefficient is not significant. Having a part-time job reduces one's chance of having on-the-job training, perhaps because part-time jobs might also be temporary and employers might be unwilling to invest in providing training for temporary employees. Workers who report strong SUU have lower odds of participating in training than workers who report weak or no SUU. Finally, it is evident that on-the-job training often corresponds to workers' needs for training, as respondents who reported increased skill requirements since they started working in their job are also more likely to have had training in the past 12 months.

TABLE 12.7 *Logistic regression for participation in additional training*

Variable	Received training OR (standard errors)
Male	1
Female	0.806 (0.191)
Black African	1
Coloured	0.976 (0.383)
Indian/Asian	0.946 (0.484)
White	0.832 (0.306)
16–24 years	1
25–34 years	1.088 (0.510)
35–44 years	0.866 (0.453)
45–54 years	0.439 (0.240)
55+ years	0.480 (0.291)
Married	1
Previously married	1.325 (0.620)
Never married	0.965 (0.321)
Urban	1
Rural	0.832 (0.273)
Secondary or less	1
Matric or equivalent	1.785 (0.593)
Tertiary	8.411*** (4.195)
Matched	1
Under-qualified	3.104** (1.187)
Over-qualified	0.683 (0.257)
Full-time job	1
Part-time job	0.409** (0.117)
Weak SUU	1
Strong SUU	0.196*** (0.074)
Reported increased skill requirements: No	1
Reported increased skill requirements: Yes	2.443*** (0.649)
Observations	753

Source: SASAS 2013.
Notes: Data are weighted using populations weights. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The regression also controls for province and occupational group.

Occupational mismatch and job satisfaction

In the final step of the analysis, we explore qualification and skills mismatching further by considering how they are associated with job satisfaction while controlling for a number of other factors in an ordered logit regression model (Table 12.8). Including both educational and skills mismatch in the regression, as well as measures for on-the-job training and increased skill requirements, provides

TABLE 12.8 *Ordered logit regressions for job satisfaction level*

Variable	Model 1	Model 2	Model 3	Model 4
Coloured	−0.146 (0.397)	−0.195 (0.371)	−0.187 (0.375)	−0.478 (0.340)
Indian/Asian	0.255 (0.400)	0.274 (0.400)	0.144 (0.421)	0.173 (0.460)
White	1.198*** (0.354)	1.284*** (0.373)	1.226*** (0.366)	1.120** (0.408)
25–34 years	0.326 (0.464)	0.389 (0.430)	0.376 (0.423)	0.419 (0.453)
35–44 years	0.049 (0.477)	0.166 (0.447)	0.188 (0.442)	0.612 (0.462)
45–54 years	0.203 (0.512)	0.174 (0.480)	0.275 (0.465)	0.822 (0.494)
55+ years	0.084 (0.581)	0.092 (0.575)	0.100 (0.573)	0.402 (0.611)
Previously married	0.149 (0.300)	0.294 (0.335)	0.148 (0.340)	0.012 (0.402)
Never married	−0.363 (0.267)	−0.166 (0.274)	−0.250 (0.266)	−0.061 (0.288)
Rural	−0.245 (0.280)	−0.186 (0.286)	−0.166 (0.286)	0.148 (0.333)
NSC or equivalent	0.012 (0.264)	−0.179 (0.261)	−0.389 (0.275)	−0.343 (0.284)
Tertiary	0.045 (0.472)	−0.169 (0.490)	−0.717 (0.502)	−1.032* (0.500)
Part-time job	−0.529* (0.256)	−0.619* (0.249)	−0.474 (0.260)	−0.246 (0.292)
Under-educated	−0.326 (0.343)	−0.176 (0.382)	−0.298 (0.375)	−0.035 (0.393)
Over-educated	0.613 (0.400)	0.471 (0.409)	0.586 (0.412)	0.831 (0.433)
Over-skilled	–	−1.723*** (0.289)	−1.496*** (0.293)	−0.332 (0.325)
Received training	–		0.605* (0.251)	0.609* (0.285)
Reported increased skill requirements	–	–	0.543* (0.258)	0.547 (0.289)
Secure job	–	–	–	0.882** (0.297)
High income	–	–	–	0.995** (0.333)
High opportunities for advancement	–	–	–	0.162 (0.278)

TABLE 12.8 *continued: Ordered logit regressions for job satisfaction level*

Variable	Model 1	Model 2	Model 3	Model 4
Interesting job	–	–	–	1.677*** (0.278)
Useful to society job	–	–	–	0.305 (0.284)
Chance to improve skills	–	–	–	−0.114 (0.300)
Fair pay and benefits	–	–	–	0.765** (0.278)
n	751	751	751	724

Source: SASAS 2013
Notes: Data are weighted using populations weights. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Also controlling for province and occupational group.

information on the net effect of each variable while conditioning on the others. Selected job characteristics such as job security, income, opportunities for advancement, having an 'interesting' job, a job that is useful to society, the chance for improving skills in the job, fair pay and benefits are included in the specification.[4]

In order to disentangle the effect of educational mismatch from the effect of skill mismatch, we run a model with only educational mismatch first (Model 1) and then add skill mismatch in the next specification (Model 2). The third model includes participation in training and perceived increased skill requirements, and then the remaining job characteristics enter the regression in Model 4.

Of the individual characteristics, only race appears to be consistently significant across the four models, with white workers being more likely to report higher job satisfaction even after controlling for all other factors. No significant differences are evident by gender, age group, geographical area and marital status. Education level is not significant in Models 1–3 but becomes so in Model 4, where having tertiary education is associated with less job satisfaction. Although education is positively associated with job satisfaction in Model 1, the relationship changes when SUU is added in the regression (Model 2), and becomes significant after including job characteristics (secure job, etc). Part-time employees are less satisfied with their jobs (Model 1–2) but the effect is not significant when we include participation in training and reported increase in skill requirements. Educational mismatch is not significantly related to job satisfaction; however, skills mismatch is associated with over-skilled workers being less satisfied with their jobs (Models 2–3). Nevertheless, it is the perceived job characteristics that matter the most when it comes to job satisfaction: workers that have training, a secure job, high income, an interesting job or fair pay and benefits are more satisfied that those who do not have a job with these quality indicators.

4 Approximately 66% of the workers in the sample report that their job is secure; 68% of them report that their job is interesting and 76% report that their job is useful to society; 40% claim that their opportunities for advancement are high in their current job; 68% that their job gives them a chance to improve their skills and 50% that the pay and benefits they receive are fair for the work they do. However, only 27% of the workers report that high income is a characteristic of their job.

Conclusions

This chapter addressed both educational mismatch and skills imbalances in the workforce based on a unique set of survey questions which were included in a nationally representative survey for the first time in South Africa. We find that the prevalence of educational mismatch is high in South Africa with more than half of the total workforce (53%) being identified as being either under-educated (27%) or over-educated (26%) while only 40% of workers with some level of tertiary education or training are well matched in their current occupations. In addition, we found that educational mismatch does not necessarily imply skills mismatch as 20% of workers are estimated to be over-skilled for their job, a level that is much lower than the percentage that is educationally mismatched. However, significant differences in SUU are observed among occupational groups, with the highest rate of over-skilling reported among skilled agricultural and fishery workers (51%), and the second highest among elementary occupations workers (35%). Since on-the-job training has been suggested as a solution to qualification mismatch, the chapter also explored the relationship between the two to find that indeed under-qualified workers are three times more likely to participate in training than well-matched workers. At the same time, highly educated workers were also more likely to receive workplace training. Our results suggest that both theories regarding formal education and training (complements or substitutes) are plausible, and that a certain overlap between them exists. Lastly, in line with the approach often used in the international literature, the chapter concluded by examining job satisfaction and its relationship with education levels, educational mismatch and skills mismatch. We showed that high job satisfaction is more likely to be observed among workers that are white or full-time employed. An interesting finding was that some level of tertiary education is negatively correlated with job satisfaction after controlling for employment characteristics which may be capturing some level of frustration with not being able find relevant or quality work after completing tertiary education. Finally, SUU is negatively associated with job satisfaction although the effect diminishes when other job characteristics are considered.

Over and above the issues of uneven access to education and training and the associated impact on the transition into employment identified in a number of other chapters, the analysis in this particular chapter suggests that a much greater focus on matching tertiary education (including universities and vocational education) completers with *relevant* employment in South Africa is required. The phenomenon of skills mismatch has important implications for the links between education and training in the labour market as it would seem, for example, that more than a third of workers in low paid occupations actually have skills which are not being used. Although qualification mismatch is prevalent in South Africa it may not necessarily be linked with skills mismatches. The difference in educational mismatch and skills mismatch prevalence suggests that over-qualification may conceal skills heterogeneity.

As education and training play an important role in labour market imbalances, a well-functioning education system incorporating adult education and training is a most important tool to tackle occupational mismatch. In addition to the policy recommendations identified in Reddy et al. (2016), the analysis in this chapter suggests that continued professional development and on-the-job training are potential remedies against occupational mismatch. Training should also target more educated employees as it might be considered a complement to their education and beneficial for their professional development. Moreover, training is effective against skill obsolescence even for over-skilled workers when their skills become outdated, a fact particularly relevant with the current rapid expansion of technology and skill specialisation in South Africa. As Lolwana suggests in Chapter 4, special attention should be given to the existing adult education and training programmes and institutions in order to link them to the rest of the post-school system and the labour market.

Under-qualified individuals in high-skilled positions such as those in occupational group 1 (legislators, senior officials and managers) also need to receive appropriate training but their work experience, on-the-job learning as well as other informal learning need to be taken into account when assessing their skills. Some over-qualified workers lack the skills corresponding to their qualifications which means they might have received a low quality of education or are skilled in other fields not required by their employer. Appropriate career guidance would be helpful for these workers in order to match their skills to specific jobs and to link labour market supply and demand more generally. On the whole, however, this chapter has suggested that there is still more work required to identify which types of tertiary education and training are not linked with *relevant* employment in the South African labour market and how this might impact on the ongoing expansion of the post-school education and training system.

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Appendix: Sample descriptives for variables of interest

TABLE 12A *Sample characteristics*

Variable	*n* (%)
Gender	
Male	432 (51)
Female	412 (49)
Missing	0
Race	
Black African	450 (53)
Coloured	156 (19)
Indian/Asian	86 (10)
White	150 (18)
Missing	2
Age	
16–24 years old	91 (11)
25–34 years old	237 (28)
35–44 years old	242 (29)
45–54 years old	162 (19)
55+ years old	107 (13)
Missing	5
Education	
No schooling	19 (2)
Primary or less	103 (13)
Some secondary	226 (27)
NSC or equivalent	279 (34)
Tertiary	199 (24)
Missing	18
Marital status	
Married	398 (48)
Previously married	110 (13)
Never married	329 (39)
Missing	7
Area of residence	
Urban area	676 (80)
Rural area	168 (20)
Missing	0
Personal income	
Less than R1 500	185 (28)
R1 501–R5 000	233 (35)
R5 001 or more	243 (37)

TABLE 12A *continued: Sample characteristics*

Variable	***n* (%)**
Missing	183
Job type	
Full-time	605 (72)
Part-time	239 (28)
Missing	0
Total	844

Source: SASAS 2013
Notes: Data are unweighted.

TABLE 12B *Major occupational groups*

Major occupation groups	***n* (%)**
1. Legislators, senior officials and managers	53 (7)
2. Professionals	122 (15)
3. Technicians and associate professionals	63 (8)
4. Clerks	61 (8)
5. Service workers and shop and market sales workers	100 (12)
6. Skilled agricultural and fishery workers	19 (2)
7. Craft and related trades workers	59 (7)
8. Plant and machine operators and assemblers	50 (6)
9. Elementary occupations	171 (21)
10. Armed forces, occupations unspecified and not elsewhere classified	109 (14)
Missing	37

Source: SASAS 2013
Notes: Data are unweighted.