

Underemployment and Job Mismatch in Sub-Saharan Africa

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Traditional labor market indicators fail to capture the distinctive characteristics of low-income countries and the ways in which markets in those countries adjust. The absence of unemployment insurance, the importance of informal sector employment, and the weakness of state regulations, among other factors, reduce the relevance of quantity adjustments (measured by the unemployment rate) in these countries, where changes in the quality of employment seem to play an important role.

No official indicator captures this dimension. This chapter tries to fill this gap by focusing on the measurement of job mismatch and its consequences on revenues in Sub-Saharan Africa. The chapter posits that a key element of the adjustment of supply and demand is found in changes in the quality of employment. Individuals who are members of households that do not have the necessary resources to withstand extended unemployment are forced either to create their own jobs or to accept wage jobs whose remuneration, skills match, social security, job security, and other features are often inferior to the features of the job they previously held. None of the labor market indicators captures this situation.

The chapter is organized into seven sections. The first section describes the limitations of traditional unemployment and underemployment indicators given the characteristics of the labor markets in developing countries in general and in Sub-Saharan Africa in particular. The second section examines the literature on “overeducation” and discusses the measurement of job mismatch. The third section presents estimates on the extent of job mismatch and identifies its determinants. The fourth section examines the impact of job mismatch on earnings, both in developed countries and in Sub-Saharan Africa. The fifth section examines nonwage compensation for overeducation and undereducation. The sixth section examines wage downgrading as a pathway out of unemployment and economic inactivity. The last section summarizes the main findings and analyzes their implications.

The Inadequacy of Standard Unemployment Indicators in Sub-Saharan Africa

Although work-related issues are central to economic policy debates and to African households' concerns, no regional labor market diagnoses had been conducted until recently (see the overview for a review). The dearth of regional studies mainly reflects gaps in primary data. Very few African countries have employment indicators (the International Labour Organization [ILO] LABORSTA database presents unemployment rates for just 10 African countries). Where these indicators do exist, differences in operational definitions, coverage, period, and type of primary source (surveys, censuses) make the indicators hard to compare across countries. As a result, different sources produce conflicting diagnoses of employment. For example, the *World Development Report 2013: Jobs* (World Bank 2013) sets the youth unemployment rate in Sub-Saharan Africa at less than 10 percent, the second-lowest in the world (after South Asia). The *Economic Report on Africa 2005* paints a totally different picture, estimating youth unemployment at about 18 percent (UNECA 2005). The ILO's regional report (ILO 2006) also paints a bleak picture of youth unemployment.

There is a huge gap between the classic measure of unemployment on the one hand and underemployment and the reality of the situation as perceived by households in developing countries, in Africa in particular, on the other. The forms of labor market imbalances in Sub-Saharan Africa should no longer be assessed solely on the basis of the level of unemployment and the number of hours worked: the specificities of labor markets in Africa call for the use of indicators that address both the quantity and quality of jobs.

The unemployment rate in Sub-Saharan Africa, as in many other developing countries, is relatively low, comparable to the rate in developed countries. In addition, despite wide macroeconomic fluctuations, unemployment rates remain fairly stable. African labor markets thus do not appear to adjust either solely or primarily quantitatively.

Unemployment benefits exist in only a few African countries, and earnings levels are relatively low. As a result, during downturns, households depend on other households—something traditional measures do not capture. The traditional underemployment indicator shows that the employment problem cannot be characterized by the existence of a large contingent of individuals working fewer hours than the statutory working week. In fact, on average, the number of weekly hours actually exceeds the statutory working week.

If the unemployment and underemployment rates in Sub-Saharan Africa are relatively low and stable, why does employment appear to be one of the main challenges perceived by households? How and through what mechanisms do labor markets adjust in Sub-Saharan Africa?

Serious doubts have been raised about the relevance, accuracy, and comparability of the classic indicators of unemployment in Sub-Saharan Africa.¹ The notion of unemployment as defined in the developed countries is not applicable in Sub-Saharan Africa because labor market characteristics there differ. If the ILO definition of unemployment is expanded to include extended unemployment, including discouraged workers (people who are no longer actively seeking a job because they fear they will not find one), the unemployment rate in Sub-Saharan Africa rises by half to some 16 percent (see chapter 1).

Unemployment and time-related underemployment rates (using the ILO definition) are relatively low in urban Sub-Saharan Africa: in the commercial capitals of the countries in the West African Economic and Monetary Union (WAEMU), unemployment averages 11.4 percent and time-related underemployment 14.3 percent (see chapter 1).² However, polls of households reveal that lack of work is their main problem, and more than 40 percent of employed workers in West Africa report being dissatisfied with the job they hold (see chapter 3).

Several particularities of the African economies may explain why the standard unemployment indicator is not a useful measure in Sub-Saharan Africa:

- Three-quarters of jobs are concentrated in the informal sector. These jobs typically are highly insecure. They provide no social security coverage and poor working conditions.
- The absence of unemployment benefits and the predominance of family and social networks in job-seeking alters the approach to prospecting. Job-seeking often means getting together enough capital to start up a small informal, own-account business, generally with the help of family and friends.
- The scale of unpaid family and child labor makes it hard to distinguish between work and nonwork.
- Education plays a different role in access to employment. Unlike in developed countries, the level of education and the unemployment rate are inversely related in Sub-Saharan Africa (see chapter 5).
- The seasonal nature of many jobs in Sub-Saharan Africa raises a reference period problem.

These features of African labor markets make the classic labor market evaluation indicators unsuitable. There is a pressing need for better indicators that more fully and accurately cover the reality of African employment problems.

Measures of underemployment do a better job of capturing labor market imbalances. They aim to quantify the number of people who are forced to work fewer hours or take a less skilled job in a less productive economic unit to avoid unemployment and who therefore earn less than they could normally earn (Borgen, Amundson, and Harder 1988; Hecker 1992; ILO 1997).³

The 16th International Conference of Labour Statisticians (ILO 1998) decided that underemployment reflects the underutilization of the productive capacity of the employed population. It is to the labor force what the underuse of capital is to business. Time-related underemployment reflects the quantity of work rather than its quality.

On average, time-related underemployment remains low in Sub-Saharan Africa: 14.3 percent of employed workers in the WAEMU capitals spend less than 35 hours a week at their main job when they would prefer to work more.⁴ Another 43 percent of employed workers work more than 48 hours a week (48 percent among informal sector workers).

The first limitation of this standard time-related underemployment indicator is that people may work a second job to supplement their main job. Only 5.9 percent of workers across the West African capitals hold a second job in addition to their main job, however. This low rate explains why including hours worked in the second job does very little to change the rate of time-related underemployment, which falls just 0.1 percent on average across WAEMU (0.2 percent in Cotonou, where the rate of multiple jobholding is at the highest, at 9.2 percent).

This notion of time-related underemployment therefore needs to be expanded to include measures of the quality of the work, characterized by such factors as low hourly earnings, the underutilization of professional skills, and low labor productivity resulting from the misallocation of labor resources or a fundamental imbalance between labor and other factors of production.⁵ When long hours are made necessary by abnormally low labor productivity or hourly earnings, they may also reflect invisible underemployment.

Minimum wage regulations are generally not relevant in Sub-Saharan Africa. Measuring invisible underemployment in terms of underpayment calls for hourly income norms by type of occupation, rather than just a legal minimum income that is uniform for all individuals.

Invisible underemployment measures the shortfall in productivity, which can be measured at the worker level: individuals may work at jobs that do not require them to use their skills or human capital (Becker 1975). Professional match analysis compares job quality with individuals' expectations and characteristics.

Job Mismatch

Job mismatch is the deviation between a worker's skill level and the level required by the job. It covers two situations. The terms *skill-related underemployment*, *downgrading*, and *overeducation* refer to workers who are forced to accept jobs for which they are overqualified or that do not match their skills or training. The terms *underqualification* and *undereducation* refer to workers

who hold jobs for which they are not qualified enough: in a dysfunctional labor market, applicants may be hired based on their social network rather than their abilities. Both concepts are based on norms that may change over time and space.

The Economic Literature on Overeducation

Job mismatch exists in developed economies, where many people have many years of education. In France, for example, nearly one in five employees reported that their education did not match their job in 1996, a consequence of the flood of graduates (Bodier and Crenner 1997).

Many economists have addressed overeducation. Freeman (1976), one of the earliest, endeavored to explain the downgrading of graduates in the United States by the oversupply of graduates, challenging the principle of an automatic link between qualifications and economic success.

Human capital theory posits that workers are paid commensurate with their level of productivity, which is directly dependent on the level of human capital (education, work experience, training, seniority, skills, and all other unobservable competencies) (Becker 1975). In a flexible labor market, overeducation would be a purely transitional phase of adaptation, during which individuals need to compensate for their lack of other human capital endowments (that is, the lack of experience of young graduate workers) (Groot 1996). Sicherman (1991) finds that overeducated workers change jobs more often, suggesting that overeducation is part of a phase of adaptation to the first stages of a career. Rubb (2003a) posits that overeducation may be a short-run phenomenon for individuals but a long-run phenomenon for the economy. Individuals who take a break in their careers, such as women who have children, are more likely to hold a job for which they are overeducated because of their lack of experience (Groot and Maassen van den Brink 2000). Older workers offset their lack of training with more experience.

The job competition model (Thurow 1975) posits that an individual's employability is inversely proportional to the training costs required after his or her recruitment. He believes that employers' decisions to hire one individual over another are dictated by the training costs they will have to pay to make the individual operational. The more educated individuals are at the point of hiring, the lower these costs will be and the greater their chances of being hired. From this point of view, employers may end up hiring individuals with higher levels of education than strictly required for the position; workers therefore find themselves overeducated for their jobs. Candidates in the queues for each job in an environment of high unemployment have to choose between being unemployed and reducing their reservation wage. Professional downgrading (overeducation) is therefore a defense against unemployment and the decision to remain unemployed a defense against downgrading. The lengthening of education is therefore making education an essentially defensive investment to keep one's place in the queue for the desired job. Overeducation in this model

is therefore associated more with macroeconomic circumstances and long-run disequilibria than the human capital life cycle.

Empirical research in developed countries has shown that overeducated individuals earn more than their counterparts with appropriate qualifications doing the same job but less than similarly educated individuals employed in jobs for which they are not overqualified (Sicherman 1991; Cohn and Khan 1995; Verdugo and Verdugo 1989; Groot and Maassen van den Brink 2000). As Rubb (2003b p. 621), notes, "On average, the literature finds that the premium paid for overeducation is about equal to the penalty for undereducation, but lower than the returns associated with an increase in required education."

Very little research has been conducted in developing countries, especially Africa, on job mismatch and overeducation. The only empirical studies are by Simon and Stark (2007) on overqualification as a result of international migration, by Herrera (2005) on Peru, and by Esteves and Martins (2007) on Brazil.

Measuring Job Mismatch

The literature identifies four main ways of measuring the level of education required for a given job (and therefore overeducation and undereducation) (Hartog 2000). "Subjective" methods are based on workers' self-assessment. "Objective" methods are based on experts' job analysis or realized matches.⁶ Realized matches measure the difference between the education attained and the dominant level of education observed for the studied worker's occupation. It can be defined in terms of years of education (a method developed by Clogg [1979] and Clogg and Shockey [1984], called the *Clogg indicator*) or education levels (an approach developed by de Grip, Borghans, and Smits [1998], called the *de Grip indicator*). Individuals are overeducated if the number of years (level) of education is greater than or equal to the central value that defines the norm. Individuals have an inadequate match if the observed number of years of education is more than one standard deviation from the mean or two standard deviations from the median number of years of education observed in the occupation for the reference population. In the case of education levels, the norm is defined in terms of the dominant level of education for each occupation.⁷

Each method has advantages and drawbacks. Self-assessment by workers has the advantage of providing education norms directly at the local level. However, individuals tend to subjectively inflate the level required for their job and overestimate the level of their position.

The choice of method is dictated above all by the availability of data. Many authors rely on experts' analysis of job qualifications, which provides an objective, clear, and fairly unbiased measurement of the levels of education required by firms for a given position. No such evaluations exist in developing countries. The method based on realized matches yields the balance between labor

supply and demand; it does not measure the level of education required by firms (Hartog 2000). In general, endogenous measurements based on the general trend (such as the modal, median, and mean values) do not reflect each job's required level of education when the economy (or sector) is in a situation of underemployment or overemployment (ILO 1997).

Constructing a Job Mismatch Indicator

The compilation of surveys conducted in the capitals of nine African countries covering more than 100,000 people allows for the first-ever large-scale estimation of empirical educational norms at a detailed (three-digit) occupational classification level and a robust deduction of the job mismatch level and profiles. The data come from the 1-2-3 surveys conducted in seven West African countries (Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal, and Togo) between 2001 and 2002; in the administrative capital (Yaoundé) and economic capital (Douala) of Cameroon (2005); and in the capital of Madagascar (Antananarivo 2001–04).⁸ The questionnaires used were identical, and the same collection methodology, data processing, and variable coding were used to facilitate their compilation and consolidate the estimates.

The economic and monetary integration of the WAEMU countries studied guarantees strong homogeneousness within the population concerned, worker mobility in the region, and, therefore, the relevance of the norms and indicators developed throughout the region in this study. It allows analysis of questions regarding the impact of the job mismatch on earnings.

The focus in this chapter is on employed workers 15 and older living in urban areas. However, it is useful to restrict the reference population to adults old enough to have finished their schooling (that is, people 25–44). The restricted sample includes 18,000 paid workers, representative of about 3.6 million people after weighting. The occupations are aggregated into 70 categories covering all the jobs on the labor market in the cities concerned.

The realized matches method was used to measure overqualification or underqualification by profession (that is, the distribution of levels of education by occupation was used to estimate an endogenous qualification norm for each of the professions). Doing so entailed first estimating the reference qualification norm for each type of profession. The overqualification indicator is measured by the proportion of workers with a qualification level greater than the normative threshold estimated for the profession concerned.

Estimating the Extent of Job Mismatch

For all professions and all cities together, 14.8 percent of workers 15 and older are undereducated based on Clogg's continuous indicator (25.0 percent based

Table 2.1 Clogg and de Grip Measures of Job Mismatch in 10 Cities in Sub-Saharan Africa
(percent)

Discrete indicator (de Grip)	Continuous indicator (Clogg)					All
	Job mismatch					
	Job match	Undereducation		Overeducation		
		Undereducation	Extreme undereducation	Overeducation	Extreme overeducation	
Job match	47.9	1.6	0.0	4.1	0.1	53.7
Undereducation	11.5	11.9	1.4	0.3	0.0	25.0
Overeducation	5.1	0.0	0.0	13.4	2.7	21.3
All	64.5	13.4	1.4	17.9	2.8	100.0

Sources: Based on Phase 1 of the following 1-2-3 surveys: Cameroon 2005 (Développement, Institutions et Mondialisation [DIAL] and National Statistics Institute [NSI]); Democratic Republic of Congo 2005 (DIAL and NSI); Madagascar 2001 (DIAL and Institut National de la Statistique [INSTAT]); West African Economic and Monetary Union (WAEMU) 2001/02 (Observatoire économique et statistique d'Afrique Subsaharienne [AFRISTAT], DIAL, and NSI).

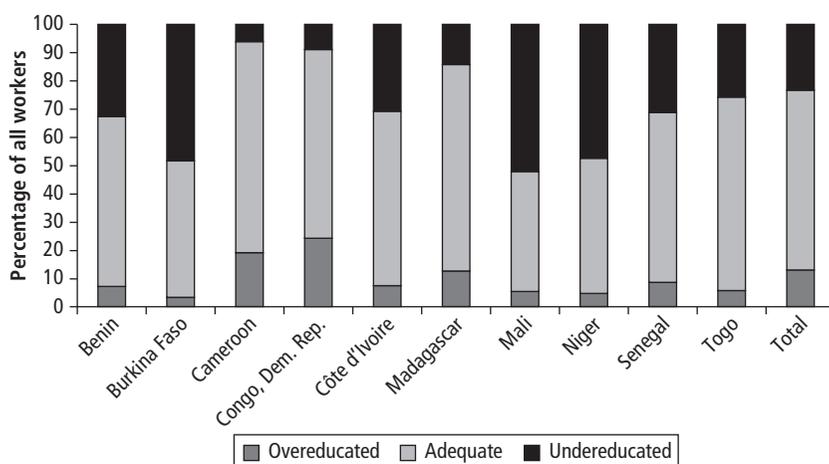
Note: Figures are for working individuals 15 and older.

on de Grip's discrete indicator) (table 2.1). The share of the labor force that is overeducated is 20.7 percent based on the continuous indicator and 21.3 percent based on the discrete indicator. For developed countries, Groot (1996) estimates undereducation at 21.8 percent and overeducation at 16.0 percent, Cohn and Khan (1995) estimate undereducation at 12 percent and overeducation at 13 percent, and Verdugo and Verdugo (1989) estimate undereducation at 9.9 percent and overeducation at 10.9 percent. A meta-analysis of the literature reveals an average incidence of 14.4 percent for undereducation and 23.3 percent for overeducation in Western Europe and the United States (Groot and Maassen van den Brink 2000). The estimate for Sub-Saharan Africa using the Clogg method is similar.⁹

The Clogg and de Grip measures of overeducation are similar (20.7 percent and 21.3 percent of occupied individuals). A larger discrepancy is evident in undereducation, where the indicators differ by about 10 percentage points (14.8 percent according to Clogg's indicator, 25.0 percent according to de Grip's indicator). The correlation coefficient between the two indicators is 0.77, which means that both indicators capture the phenomenon fairly well.¹⁰

The Clogg continuous indicator is more restrictive in its job mismatch measurement than the discrete indicator (figure 2.1). It estimates that 64.5 percent of people hold jobs that match their level of education. The de Grip measure estimates this figure at 53.7 percent.

Figure 2.1 Incidence of Job Mismatch (Clogg Indicator) for 10 Countries in Sub-Saharan Africa



Sources: Based on Phase 1 of the 1-2-3 surveys of selected countries (see table 2.1 for details).

Identifying the Determinants of Job Mismatch

A multivariate nonlinear econometric model is used to identify the effect of each explanatory variable on job mismatch after controlling for bivariate effects caused by the other explanatory variables observed. The specification of a multinomial or ordered logit model seemed most appropriate, because it can simultaneously estimate the probability of overeducation and undereducation. The choice of an ordered or unordered model depends on the type of dependent variable and whether there is a possibility of ranking the variable's categories. As there is no unequivocal order between the dependent variable's categories, an unordered model is used here.¹¹

The explanatory variables in the model cover individual characteristics, household characteristics, and characteristics of the business and the job held. The dependent variable is Clogg's continuous indicator. It was chosen in order to reduce the risk of endogeneity in the model introduced by the presence of qualitative education variables as explanatory variables (education dummy variable). This education variable sharply increases the model's explanatory power and reveals that the probability of being overeducated increases with the level of education.¹²

Table 2.2 presents the results of the multinomial model. In most cases, a significant variable for overeducation (such as the size of the business in which the

Table 2.2 Job Mismatch Modeling Results for 10 Cities in Sub-Saharan Africa
(*multinomial logit model*)

Variable	Undereducated	Overeducated
<i>Type of business (reference = self-employment [1 person])</i>		
Microbusiness (2–5 people)	1.34***	0.81***
Small business (6–20 people)	1.64***	0.43***
Large business (>20 people)	1.64***	0.41***
<i>Migrant status (reference = native)</i>		
Interurban migrant	1.26***	0.99
Rural migrant	1.12**	0.96
Foreigner	1.20***	1.04
<i>Jobholding and time-related underemployment</i>		
Multiple jobholder (reference = one job)	0.80***	1.18**
Time-related underemployment (reference = no time-related underemployment)	0.90***	0.92**
<i>Education (reference = no education or informal education)</i>		
Primary education	0.10***	0.13***
Lower-secondary education	0.01***	39.54***

(continued next page)

Table 2.2 (continued)

Variable	Undereducated	Overeducated
Upper-secondary education	0.01***	346.92***
Higher education	0.01***	726.20***
<i>Position in household (reference = head of household)</i>		
Head of household's spouse	1.01	1.04
Secondary household member	0.88***	1.06
<i>Marital status and gender</i>		
Couple (married or unmarried) (reference = single)	0.70***	1.04
Male (reference = female)	1.38***	1.21***
<i>Sector (reference = secondary sector)</i>		
Tertiary sector	1.80***	0.93
Primary sector	1.89***	1.28***
<i>Sector (reference = public sector)</i>		
Informal sector	0.86	1.48***
Formal private sector	0.83*	1.23***
<i>Age</i>		
Age	0.97***	1.07***
Age squared	1.001***	0.999***
<i>Cohort (reference = 50+)</i>		
Young cohort (10–29)	0.81**	1.01
Medium cohort (30–49)	0.98	1.03
<i>Religion (reference = other)</i>		
Christian	0.41***	2.33***
Muslim	0.43***	2.67***
<i>Seniority in the business</i>		
Seniority in the business	1.00	0.99***
<i>City (reference = aggregate of Douala and Yaoundé)</i>		
Abidjan	1.61***	0.53***
Antananarivo	7.19***	0.41***
Bamako	1.54***	0.38***
Cotonou	1.94***	0.47***
Lomé	0.87	0.93
Niamey	1.47***	0.33***
Ouagadougou	1.16	0.49***
Constant	1.60	0.001
Number of observations	61,984	61,984

Sources: Based on Phase 1 of the 1-2-3 surveys of selected countries (see table 2.1 for details).

Note: Figures are for working individuals 10 and older. Dakar was dropped because of collinearity.

* significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level.

individual works) is also significant for undereducation. A “confusion matrix” is used to evaluate the quality of the model by comparing the predicted values with the true values of the indicator. The correct classification rate—the ratio of the number of correct predictions to the sample size—is 74 percent.¹³

Several findings emerge from the data in table 2.2:

- The probability of being overeducated (undereducated) increases (decreases) as the level of education increases (decreases). The higher a worker’s qualifications, the greater his or her risk of being overqualified for the job he or she holds.
- Internal migrants have a greater probability than nonmigrants of holding a job that requires more education than they have. The fact that on average they are less educated than the native population probably reflects their lower access to the education system, despite recent decentralization and deconcentration efforts in most African countries.
- Foreign migrants also have a higher probability of being undereducated: the role of social capital (social and community networks of migrants living in the country’s main city) appears to come into play here. Moreover, a selection bias exists for migrants: other unobservable characteristics explain the fact that for a given level of education, migrants are more likely to occupy jobs that require education levels higher than those they have attained. We find no statistically significant support to the stylized fact posited by Simon and Stark (2007) that overeducation in developing countries is the result of international migration.
- Members of the oldest cohort are more likely to be undereducated than members of younger cohorts, because the qualification norms (level of education) for a given occupation were lower when they entered the labor market.
- After controlling for cohort effects (and therefore differential access to education by generation), age increases the chances of being overeducated, in a nonlinear manner (both age and age squared are significant). As age is closely related to potential experience, it may be individuals’ potential experience (and not age) that positively influences the probability of being overeducated. This paradoxical result would tend to invalidate the stylized fact noted by Sicherman (1991) and Freeman (1976) that individuals become overeducated in order to compensate for the lack of human capital endowments, such as experience and training. What is being measured here is the age effect within a cohort (age bracket); the cohort effect is wholly in line with human capital theory.
- Working in the informal sector increases the chances of being overeducated. This finding can be explained by the fact that the informal sector does not offer sufficiently skilled work because of lack of access to technology and capital.

- Men have a higher probability than women of being undereducated or overeducated.
- Overeducation is positively correlated with job dissatisfaction. This finding comes not from the estimation of the multinomial model but from the simple study of the coefficient for the correlation between the dichotomous overeducation variable and the variable covering job satisfaction as reported by the individual. The correlation (0.18) is positive. The job satisfaction variable is not introduced into the model as an explanatory variable because of the high risk of endogeneity: although overqualification can clearly generate job dissatisfaction, job dissatisfaction (measured by the desire to change a job) can influence the probability of a job mismatch.

Having a high level of education, being a man, and belonging to a young cohort are correlated with overeducation; having a low level of education, being a migrant, being a woman, and working in a very small business are correlated with undereducation.

Impacts of Job Mismatch: Premium or Penalty?

Does wage or nonwage compensation exist for job mismatch? Are overeducated individuals paid more or less than matched individuals, after controlling for the effects of other individual characteristics? Do they have more stable jobs?

Impact of Job Mismatch on Earnings in Developed Countries

Human capital is defined as the stock of productive capacities an individual acquires (through the accumulation of general and specific knowledge, know-how, and so forth) (Becker 1975). Investment in human capital is an individual choice resulting from the cost-benefit trade-off between the costs (out-of-pocket cost of education and opportunity cost of going to school rather than working) and the future discounted earnings that can be generated by additional education. Individuals may choose to invest in order to raise their future productivity and therefore their earnings. Human capital theory assumes that individuals are paid in accordance with their productivity level at work and that this marginal productivity is determined more by the components of human capital (education, training, experience, skills, and so forth) than by the characteristics of the job (Mincer 1974; Becker 1975).

Becker posits that wage growth over a career more or less reflects the accumulation of human capital. He believes it to be concave: gross investment tends to decline with age, because any wage increase raises the opportunity cost and the return diminishes with age, because there are fewer years available in which

to make the investment pay off. Thus, from a human capital point of view, the rates of return on investment in education are expected to be positive: the more an individual has studied, the higher his or her earnings.

The results of 11 studies on different countries reviewed by Card (2001) suggest that the marginal returns to education estimated by the instrumental variables method were 6–10 percent. As with any investment, the returns to education diminish: the more an individual studies, the smaller the margin gain in earnings for each additional year of studies. Kuépié, Nordman, and Roubaud (2009; see also chapter 5 of this book) invalidate this assumption for Sub-Saharan Africa, finding that private returns to education are convex for workers in the West African capitals. Spence (1973) notes that, as human capital is hard for others to perceive, qualifications form a credible signal of the worker's level of productivity for an employer in a situation of information asymmetry. Wages in this case are essentially contingent upon the level of qualifications.

Impact of Job Mismatch on Earnings in Sub-Saharan Africa

Individual earnings are modeled to identify the effect of overeducation and undereducation on the level of earnings, controlling for the classic explanatory effects. For this purpose, Mincer's model can be extended as follows:

$$\ln Y_s = c + rS + aE + bE^2 + \sum d_i X_i + f_1 \text{ UNDER} + f_2 \text{ OVER} + u \quad (2.1)$$

where the X_i cover observable demographic characteristics (gender, ethnic group, religion, migratory status, father's socioeconomic group); *OVER* is a dummy variable taking the value 1 if the individual is overeducated for the job he or she holds and 0 if not; and *UNDER* is a dummy variable taking the value 1 if the individual is undereducated for the job he or she holds and 0 if not.

The estimations of $\ln Y$ based solely on observed earnings therefore need to take selection bias into account (Heckman 1979). After estimating a selection model (on the probability of working a paid job), we incorporate the Mills ratio into the earnings models to correct for selection bias.

Use of the standard ordinary least squares method is potentially problematic when estimating returns to education (and therefore returns to overeducation), because of the endogenous nature of education (that is, its correlation with the earnings equation residuals because of unobservable individual characteristics). In principle, this endogeneity can be overcome using the instrumental variable procedure, which consists of finding variables that are assumed to be correlated with education but not earnings. In practice, no convincing instrument (that had not already been used as an explanatory variable in the model) was found.

Earnings Model 1 proposes inserting job mismatch (undereducation and overeducation) dummy variables into Mincer's equation. This log-linear regression model of hourly earnings is initially tested on all adults 25–44. Two

additional estimations are made, for men and for women (table 2.3). The model yields the following results:

- A (small) penalty for overeducation and a premium for undereducation is evident after controlling for the level of education and selection biases. Overeducated individuals earn more than individuals in the same occupation with an appropriate level of education for the job, but they earn less than individuals with the same level of education working in better jobs. The penalty or premium associated with the job mismatch is smaller among women than men.

Table 2.3 Heckman-Corrected Mincerian Earnings Equation with Overeducation and Undereducation Variables for Men and Women in 10 Cities in Sub-Saharan Africa
(log of hourly earnings)

Variable	All	Men	Women
<i>Job mismatch (reference = job match)</i>			
Undereducated (discrete indicator)	0.179***	0.187***	0.159***
Overeducated (discrete indicator)	-0.0901***	-0.0945***	-0.0547
Years of education	0.0820***	0.0799***	0.0770***
<i>Size of business (reference = self-employment [1 person])</i>			
Microbusiness (2–5 people)	0.1510***	0.0645***	0.2000***
Small business (6–20 people)	0.263***	0.138***	0.516***
Large business (>20 people)	0.418***	0.281***	0.740***
<i>Migrant status (reference = native)</i>			
Interurban migrant	-0.0378**	-0.0319	-0.0387
Migrant from the rural exodus	-0.0615**	-0.0493	-0.0756*
Foreign migrant	0.01250	0.00355	0.02180
<i>Jobholding and time-related underemployment</i>			
Multiple jobholder (reference = one job)	-0.0291	-0.0377	-0.0219
Time-related underemployment (reference = no time-related underemployment)	0.640***	0.666***	0.635***
<i>Position in household (reference = head of household)</i>			
Head of household's spouse	-0.208***	-0.262	-0.146***
Secondary household member	-0.200***	-0.204***	-0.179***
<i>Marital status and gender</i>			
Couple (married or unmarried) (reference = single)	0.0602***	0.0565**	0.0432
Male (reference = female)	0.320***	—	—
<i>Sector (reference = secondary sector)</i>			
Tertiary sector	0.0942**	0.1280**	0.0440
Primary sector	-0.00367	0.0247	-0.0231

(continued next page)

Table 2.3 (continued)

Variable	All	Men	Women
<i>Sector (reference = public sector)</i>			
Informal sector	-0.352***	-0.308***	-0.454***
Formal private sector	-0.181***	-0.155***	-0.227**
<i>Age</i>			
Age	0.0328	0.0341	0.0215
Age squared	-0.000348	-0.000310	-0.000244
<i>Religion (reference = other)</i>			
Christian	0.0129	-0.0145	0.0278
Muslim	0.0553*	0.0444	0.0491
<i>Seniority in the business</i>			
Seniority in the business	0.0199***	0.0182***	0.0202***
<i>Selection model: Probability of participation</i>			
Cohabiting couple (married or unmarried) (reference = single)	0.313***	0.349***	0.207***
Age	0.0281***	0.0267***	0.0266***
Male (reference = female)	-0.109***	—	—
Number of earners in household	0.571***	0.540***	0.651***
Number of children in household	0.0514***	0.0323**	0.0860***
Total number of people in household (excluding visitors)	-0.166***	-0.157***	-0.183***
Constant	-3.324***	-0.173	-0.157

Sources: Based on Phase 1 of the 1-2-3 surveys of selected countries (see table 2.1 for details).

Note: Figures are for working individuals 25–44.

* significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level.

- The penalty for overeducation and the premium for undereducation do not offset each other: undereducation is much more profitable than overeducation is costly (in the log-linear model, the parameter corresponding to overeducation is twice as high in absolute value as the parameter corresponding to the undereducation dummy variable). This finding is different from what Groot and Maassen van den Brink (2000) report for developed countries
- The penalty (premium) for overeducation (undereducation) is smaller than the returns to high levels of education. The returns to education are positive and high (8 percent), for both women and men.

The model was also estimated using the number of surplus (deficit) years of education the individual has above (below) the norm for the years of education required for the occupation (Model 2 [not shown]). This model allows estimation of the returns to years of overeducation. The results confirm that the returns to required education are positive and large: one additional year

of required education (which enables the worker to hold a job demanding one more year of schooling) generates a 10.1 percent increase in the hourly earnings logarithm, for both men and women. Each year of education beyond the required schooling norm for the occupation generates additional earnings (by 6.2 percent in the hourly earnings logarithm); each year of education short of the normal length of schooling for the occupation decreases earnings (by 5.1 percent in the hourly earnings logarithm). The return to years of overeducation is thus positive but lower than the return to years of required education. As in Model 1, undereducated individuals earn a premium over their colleagues in the same occupation with the level of education required for the job. Model 2 erases the asymmetry revealed in Model 1 between the overeducation penalty and the undereducation premium: the results for the two components are similar in Model 2. By way of comparison, the meta-analysis conducted by Groot and Maassen van den Brink (2000) estimates the average returns to one year of overeducation in developed countries at 3 percent.

The results of the two models bear out the results of Verdugo and Verdugo (1989), Groot (1996), and Hartog (2000) for developed countries: overeducation generates a penalty and undereducation a premium once the effects of required education, selection biases, and other sociodemographic variables are controlled for.

Underemployment and Nonwage Compensation

In developed countries, nonwage benefits often compensate individuals who are overeducated for the position they hold (for a discussion of compensating differential theory, see chapter 4). This section examines whether nonwage compensation exists in Sub-Saharan Africa in the form of increased job security.

Insecurity (the risk of losing one's job) can be measured across an array of variables reflecting the extent of formality linking employee to employer: the existence or absence of a written contract that protects the employee; the existence of a payslip; social security coverage; the steady or unsteady nature of the work done (casual, temporary, or steady); access to a union; and so forth. The choice of components for this indicator was determined by the availability of data.

Workers are classified as dependent (wage-earners) or independent (own account, managers, and employers). The insecurity score for dependent workers is the arithmetic sum of the values of three variables: contract (long-term written contract, short-term written contract, oral contract, no contract); payslip; and steadiness (steady, casual, or temporary). For independent workers, the presence of written accounts captures the extent of the business's formality (and therefore its sustainability). Apprentices were excluded from the analysis.

The job mismatch indicators (Clogg's continuous indicator covering three to five categories and de Grip's discrete indicator covering three categories) and the insecurity score are negatively correlated.¹⁴ This correlation suggests that overeducated workers are indeed compensated with greater job security (table 2.4).

To analyze the net effects of job mismatch on insecurity (by controlling for other influential variables), it would be preferable to conduct an ordered multinomial logistic regression (because the score values are discrete, whole, and ordered). However, the number of categories in this score (six) makes the analysis and interpretation tricky and the conclusions hazy. For this reason, a simple linear regression of the insecurity score on the classic explanatory variables (from the corrected Mincer equation) and the overeducation and undereducation dummy variables (measured by the Clogg continuous indicator, for example) using the ordinary least squares (OLS) method is presented (table 2.5). It would have been desirable to address the possible endogeneity of the job mismatch in the explanation of the level of insecurity using an instrumental variable procedure, but no instrument was found to be conclusive.

Given the construction of the insecurity indicator, it appears preferable to concentrate on a split (dependent/independent) interpretation of the results. The results of the regression model show that for dependent workers, other things equal, the insecurity score (and hence the level of job insecurity) increases with overeducation and decreases with undereducation. This result means that after controlling for the level of completed education (in particular), the level of job security of overeducated workers is actually higher. For independent workers, the explanatory variables associated with job mismatch are not significant. This phenomenon is therefore of concern to employees, not employers or self-account workers.

Table 2.4 Correlation Matrix between Job Mismatch and Insecurity Indicators in 10 Cities in Sub-Saharan Africa

Variable	Continuous job mismatch indicator (Clogg indicator)		Discrete job mismatch indicator (de Grip indicator)
	Five categories	Three categories	Three categories
Insecurity of dependent workers	-0.09	-0.17	-0.12
Insecurity of independent workers	-0.07	-0.15	-0.15
Insecurity score	-0.08	-0.22	-0.18

Sources: Based on Phase 1 of the 1-2-3 surveys of selected countries (see table 2.1 for details).
Note: Figures are for working individuals 15 and older.

Table 2.5 Insecurity Score Equation with Overeducation and Undereducation Variables for Dependent and Independent Workers in 10 Cities in Sub-Saharan Africa (ordinary least squares)

Variable	All	Dependent workers	Independent workers
<i>Job mismatch (reference = job match)</i>			
Undereducated (continuous indicator)	-0.0807***	-0.2000***	0.0322
Overeducated (continuous indicator)	0.2210***	0.1980***	0.0716
<i>Size of business (reference = self-employment [1 person])</i>			
Microbusiness (2–5 people)	-0.3090***	-0.2220***	-0.0775***
Medium-size business (6–20 people)	-0.815***	-0.559***	-0.297***
Large business (>20 people)	-1.426***	-1.152***	-1.599***
<i>Migrant status (reference = native)</i>			
Interurban migrant	-0.0318	-0.0547*	0.0302
Migrant from the rural exodus	0.00259	-0.02680	0.06090**
Foreigner	0.0385	0.0536	0.0594**
<i>Jobholding and time-related underemployment</i>			
Multiple jobholder	0.0867**	0.0800	0.0331
Time-related underemployment	0.332***	0.478***	0.227***
<i>Education (reference = no education or informal education)</i>			
Primary	-0.1060***	-0.2570***	0.0111
Lower-secondary	-0.27900***	-0.49000***	-0.00262
Upper-secondary	-0.673***	-0.892***	-0.212***
Higher	-0.977***	-1.247***	-0.408***
<i>Standing in household (reference = head of household)</i>			
Head of household's spouse	0.0979***	0.1190**	0.0533*
Secondary household member	0.06940**	0.15500***	-0.00527
<i>Marital status and gender</i>			
Couple (married or unmarried)(reference = single)	-0.0880***	-0.1040***	-0.0882***
Male (reference = female)	0.1320***	0.1790***	0.0416*
<i>Sector (reference = secondary sector)</i>			
Tertiary sector	-0.348***	-0.445***	-0.346***
Primary sector	-0.240***	-0.449***	-0.312***
<i>Sector (reference = public sector)</i>			
Informal sector	1.363***	0.894***	1.752***
Formal private sector	0.371***	0.258***	0.513***

(continued next page)

Table 2.5 (continued)

Variable	All	Dependent workers	Independent workers
<i>Age</i>			
Age	-0.01530***	-0.03220***	-0.00571
Age squared	0.000166***	0.000318***	0.0000532
<i>Religion (reference = other)</i>			
Christian	-0.0112	-0.0645	0.0318
Muslim	0.0214	-0.0104	0.0792*
<i>Seniority in the business</i>			
Seniority in the business	-0.00750***	-0.01940***	-0.00262**
<i>R²</i>	0.59	0.50	0.61

Sources: Based on Phase 1 of the 1-2-3 surveys of selected countries (see table 2.1 for details).

Note: Figures are for working individuals 15 and older.

* significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level.

Wage Downgrading as a Pathway Out of Unemployment or Economic Inactivity

The decision to remain unemployed can be interpreted as resistance to downgrading and skill-related underemployment. Conversely, overeducation can be interpreted as resistance to unemployment. Examination of an overeducated jobholder's previous situation (similar job or unemployment) was used to evaluate the likelihood of this hypothesis. Table 2.6 presents the results.

A Chi-squared test rejects (at the 5 percent level) the hypothesis of independence between the mobility variable change between the employed worker's previous situation and current employment and the job mismatch indicator (Clogg indicator).

Relative to individuals in a job match situation, proportionally more overeducated individuals were upwardly mobile (that is, moved up socioeconomically since their previous job or completion of studies). This finding could reflect the theory of the human capital life cycle, which states that individuals temporarily hold a series of jobs below their level in order to accumulate experience and know-how that prepare them to apply for positions more in keeping with their qualifications.

A slightly smaller than average proportion of overeducated workers is unemployed or out of the labor force just before holding their current job. This finding contradicts the economic intuition that overeducation often follows a period of unemployment. This question calls for further examination of the determinants of professional mobility.

Table 2.6 Labor Market Status before Current Employment in 10 Cities in Sub-Saharan Africa (percent)

Situation before current employment	Situation in current employment			
	Undereducated	Job match	Overeducated	All
Unemployed/inactive	61.8	64.2	61.8	63.2
<i>Previous employment</i>				
Held better job	3.4	8.2	22.0	7.3
Held worse job	3.8	4.9	3.9	4.4
Held similar job	31.0	22.7	12.3	25.1

Sources: Based on Phase 1 of the 1-2-3 surveys of selected countries (see table 2.1 for details).

Note: Figures are for working individuals 25–44.

Table 2.7 Type of Job Sought by the Unemployed in 10 Cities in Sub-Saharan Africa, by Length of Unemployment (percent)

Job sought	Long-term unemployed	Short-term unemployed	Total unemployed
Job corresponding to trade or training	29.4	36.6	31.0
Job in another trade or sector	16.1	15.7	16.0
Indifferent	54.5	47.7	53.0
Total	100.0	100.0	100.0

Sources: Based on Phase 1 of the 1-2-3 surveys of selected countries (see table 2.1 for details).

Note: Figures are for working individuals 25–44.

The long-term unemployed (people unemployed for more than a year) appear to be less particular than the short-term unemployed about the match between the job and their qualifications: just 29 percent of the long-term unemployed seek a job that corresponds to their training or their trade, as opposed to 37 percent of the short-term unemployed (table 2.7). This simple empirical result validates the theory that a mismatch occurs in the event of a strong risk of unemployment and a long period of unemployment: the longer the period of unemployment, the more the unemployed reduce their reservation wage and the skill level of the job they will apply for.

Conclusion

The special features of its labor markets—the lack of unemployment benefits, the predominance of the informal sector, the prevalence of personal networks to obtain jobs, the low unemployment rate, and so forth—make the classic

indicators of unemployment and time-related underemployment inappropriate, if not misleading, for understanding labor markets in Sub-Saharan Africa. The harmonized job mismatch measurement captures these as yet unmeasured aspects by concentrating on underutilization of productive capacities. Job mismatch should be considered an extension of the underemployment notion.

Overeducation—measured as the gap between individual qualifications and the qualifications usually required for the job held—is not confined to developed countries: it affects 21 percent of workers in Sub-Saharan Africa. Men, older people, migrants, workers in the informal sector, the uneducated, and the highly educated are more likely than other workers to find their job mismatched with their education.

Job mismatch affects both earnings and job insecurity: other things equal, workers who are overeducated for the work they do have less job security than workers whose qualifications match their job and workers who are undereducated for their jobs. The job mismatch evolves over the course of a career, with overqualification following economic inactivity, unemployment, or more extreme overeducation.

The analysis makes a case for the widespread harmonization of job quality indicators and the extension of the inadequate employment measurement. The empirical methods used here need to be compared with other measurement methods, such as the expert job analysis method, which is more focused on business demand for qualifications and workers' own declarations, which are more subjective but easier to set up.

Notes

1. In its 2006 evaluation of African labor markets, the World Bank identified four problems: the dearth of data, lack of comparability, measurement problems, and low relevance for low-income countries.
2. The ILO definition of unemployment (1997) corresponds to workers who did not work (even one hour) in the seven days preceding the survey, who sought work during the previous month, and who are available to work. Time-related underemployment covers gainfully employed workers whose working week is shorter than the statutory working week and who would like to work more.
3. This type of situation used to be called *disguised unemployment* (Robinson 1937).
4. Although Abidjan and Cotonou are not administrative capitals, we refer to them as capitals because they are the most important economic centers in their countries (Cotonou is also the seat of government).
5. This extension used to be called *invisible underemployment*, which the ILO described as “primarily an analytical concept reflecting a misallocation of labour resources or a fundamental imbalance between labour and other factors of production. Characteristic symptoms might be low income, underutilization of skill, and low productivity. Analytical studies of invisible underemployment should be directed to the examination and analysis of a wide variety of data, including income and skill

- levels (disguised underemployment) and productivity measures (potential underemployment)” (ILO 1982, pp. 52–53).
6. Thurow and Lucas (1972), Hartog (1980), and others use the *Dictionary of Occupational Titles* (U.S. Department of Labor) to measure overeducation.
 7. De Grip developed an algorithm to identify the dominant (qualitative) level of education for each type of occupation. Depending on the distribution of the types of education within the given occupation, the dominant type of education is either the most commonly occurring or a combination of two or three levels grouped together. The algorithm had some flaws, which are corrected for here (de Grip, Borghans, and Smits 1998).
 8. For a description of 1-2-3 surveys, see box O.1 in the overview. Cameroon and Madagascar were included because their labor markets are very similar to labor markets in West Africa (see chapter 1).
 9. The fact that the share of overeducated people in Europe and the United States is similar to the share in Sub-Saharan Africa does not mean that the levels of education are similar. The level of education in Africa is still much lower than in the developed countries.
 10. If we use the mean instead of the median to estimate the norms when building the continuous indicator, the correlation factor rises to 86 percent.
 11. Stata’s test of independence on the logit procedure returns a positive and significant result.
 12. The final model estimated aims to be as sparing as possible. The explanatory variables ultimately chosen for the model are selected by a procedure of gradual elimination of the variables or categories with the least explanatory power.
 13. In the absence of an additional test sample, this confusion matrix was constructed from the data used to build the model. This evaluation could therefore be criticized for being overly optimistic.
 14. Clogg’s five ordered categories are –2 (extreme undereducation), –1 (undereducation), 0 (match), 1 (overeducation), 2 (extreme overeducation). De Grip’s three categories are undereducation, job match, and overeducation.

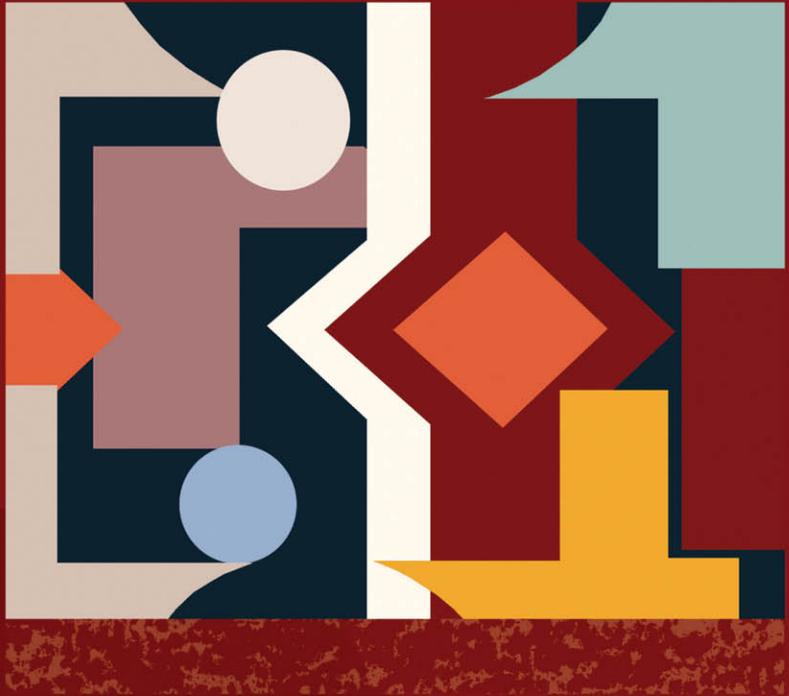
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Editors



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