

# The Role of Skills in the Informal Sector

### In This Chapter

A synthesis of our five country case studies finds that education and skills development influence labor mobility off the farm and earnings attainment. The findings emphasize the importance of basic education for all as a foundation for further skills development. The failure to build a strong foundation is shown to have consequences for acquiring additional skills. Secondary and higher education are strong correlates of employment in the formal sector, whereas a primary education or less often translates into employment in the informal sector. Traditional apprenticeships are not only a key to employment in the informal sector but also open opportunities in the formal sector. The direct effect of these apprenticeships on earnings, however, is mixed. Technical and vocational education and training (TVET) offers entry into both sectors and leads to higher earnings. Earnings generally increase with education in both sectors but more so in the formal sector, as explained by market factors.

### Introduction

Education and skills development are well known to play a key role in economic growth. By improving worker productivity, supporting more informed livelihood choices, and enabling better management of household activities, education and skills are particularly important for the development, economic diversification, and transformation of low-income countries. Economists have recognized and written about the role of human capital and workforce skills in the production of goods and services since the 1950s (see Becker 1964; Mincer 1958; Schultz 1961). Early in the 1960s, the World Bank began lending for education along with its support for infrastructure, recognizing the need for a skilled workforce in developing countries to operate and maintain the infrastructure (Heyneman 2003). The lending initiatives focused on diversified secondary education and included TVET. The latter was viewed as a way of democratizing education and expanding opportunities for skills and employment beyond that which was available to the elite.

In Sub-Saharan Africa, growing expectations of industrialization followed the independence movements of the 1960s and the awareness of a need to produce more skilled labor for these nascent industries. However, the reality that followed was different. Initially, large numbers of children had no way to pursue a secondary education because they lacked access to primary schools. Rapid population growth put significant pressure on expanding schooling, with consequences for the quality of provision. Moreover, questions emerged from employers, parents, and educators about the relevance, quality, and cost of TVET. A review by the World Bank of this education in the late 1980s culminated with a shift of policy in 1991 that encouraged promotion of private provision of skills and reforms to improve the effectiveness and efficiency of public provision (Middleton, Ziderman, and Adams 1991).

At the same time, increased emphasis was placed on expanding access to basic education. The Education for All movement emerged in 1990 and with it the expansion of international support for primary education. Consequently, support for TVET fell in relative terms. At the same time, the failure of state-managed economies resulted in cutbacks in government administrations and enterprises, with negative consequences for employment. Private investment, including that from abroad in foreign direct investment, was insufficient to replace the cutback in government spending and produce the jobs needed by people emerging from schools and training centers.

Access to primary education has increased quite dramatically, but many African children still are not able to finish primary levels of education. Growing numbers of children entered primary schools as Education for All took hold, along with better country macroeconomic management and conditions for investment. As a result, girls' primary net enrollment rates increased from 53 percent to 73 percent between 1999 and 2010 (World Bank 2012). Notwithstanding these achievements, many children continue to drop out of school before finishing primary levels, especially in the poorest of the countries on the African continent. For those able to complete a primary education, large numbers are unable to continue their education for lack of space in secondary education.

Raising skill levels is one of a number of important challenges to future regional growth and poverty reduction. Raising agricultural productivity and ensuring environmentally sustainable approaches to development are joined by the need to address the effects of HIV/AIDS. Sustaining an investment climate that is favorable to economic growth and industrialization is important, as is raising productivity of the region's large informal sector and opening pathways for these small and household enterprises to grow and enter the formal economy. The literature on this topic centers on (a) improving the regulatory climate faced by such enterprises and (b) increasing their access to business development services, with credit and financial services at the fore (Fox and Sohnesen 2012). This chapter looks further at the role played by skills acquired through education and training and their influence on entry into the informal and formal sectors and on the earnings of people in each sector.

## What Is Meant by Skills?

Skills development takes place at different stages of the life cycle for different purposes and occurs in a number of institutional settings. Skills for work and life are the result of learning in settings that range from public and private schools to the nonschool domains of home, community, and workplace. Skills are acquired by learning to perform various tasks with different degrees of proficiency. Three types of skills (see, for example, Cunha and Heckman 2009; Hanushek and Woessmann 2008; Heckman and Rubenstein 2001) are recognized:

- *Cognitive skills* are the mental capabilities required to learn successfully academic subjects such as math, science, and reading. When an individual performs well academically, it is a reflection of the acquisition of cognitive skills such as concentration, perception and interpretation, memory, and logical thinking. Various mental disabilities such as attention disorders are known to impede the acquisition and exercise of cognitive skills in the process of learning.
- *Noncognitive skills* are sometimes overlooked and involve a different set of acquired abilities. James J. Heckman and Alan B. Krueger in their 2004 book *Inequality in America: What Role for Human Capital Policies?* stress that the most persistent, self-disciplined, adaptable students and professionals often have the ability to outperform those with higher levels of cognitive skills. These “overachievers,” by virtue of their noncognitive skills, are able to outperform their counterparts who possess higher levels of cognitive skills. Noncognitive skills are sometimes described as “soft” skills and include persistence, emotional maturity, verbal and nonverbal communication, and interpersonal skills. Noncognitive skills influence the overall behavior of an individual and are acquired in the home, at schools, in the community, and in the workplace.
- *Technical skills* combine cognitive and noncognitive skills in performing various tasks. These skills involve acquired expertise for performing certain functions and achieving specific outcomes. Some examples of technical skills include the ability to diagnose and treat diseases, to use information technology in the design and manufacture of products, to operate and maintain heavy equipment, and to design and produce garments. Each task involves specialized technical knowledge or expertise to achieve a specific outcome. This knowledge is acquired at different times in the life cycle for different purposes. It can be acquired early in the life cycle for the purpose of pursuing a first job. It can come later with efforts to stay current with technological change in an existing job or in acquiring new skills for a change of employment.

The acquisition of these skills takes place in many settings, public and private.

- Cognitive skills are shaped early in the life cycle, for example, by family, nutrition, and nurture in early childhood and by formal education.
- Noncognitive skills, in contrast, are acquired from birth onward by observing the behavior of family members and peers, participating in community activities, obtaining classroom experience, and learning in the work environment from the behavior of others. Learning to work with others to achieve goals, for example, occurs in settings such as a playschool, an athletic event, a school project, a community activity, or a work setting.
- Technical skills may come from formal education; a training center outside formal education; or the workplace through an apprenticeship, enterprise-based training, or experience on the job.

The combination of cognitive and noncognitive skills in primary and lower-secondary education provides a foundation for the acquisition of technical skills and the preparation of individuals for employment with secondary and postsecondary education. This foundation is also important to the subsequent reskilling of workers later in the life cycle. Employers look for signals of the presence of these skills in the recruitment process. Years of schooling and academic performance are often used as indicators of cognitive skills. Noncognitive skills are more difficult to detect, and references from teachers, community members, and prior employers are used for this purpose as well as assessments of the performance of individuals in job interviews, their involvement in extracurricular activities, and a record of prior accomplishments in family, community, and work settings.

### **Looking at the Effects of Skills**

This chapter and its analysis of skills acquired through education and training are concerned with how skills can influence the productivity and incomes of people employed in the informal sector. The chapter suggests strategies for improving productivity and incomes in the small and household enterprises of the informal sector for reducing poverty. It also examines the role of skills in promoting mobility between the informal and formal sectors. The case of Tanzania referred to in chapter 2 offers evidence that as many as 7 of 10 people employed in the informal sector are there for lack of choices; the question is what role do skills play in creating those choices? Economists contend that an enterprise's entry into the formal sector is constrained by costly regulations and market failures attached to credit and financial markets, but in this study, we look further at the role of skills as a constraint to the choice of employment (Fox and Sohnesen 2012).

The available data, however, have drawbacks pertaining to accurate analysis of links between skills, employment, and earnings. Household surveys of employment and earnings, like those used in this study, generally do not measure

cognitive, noncognitive, and technical skills. Instead, they are often limited to questions about participation in different sources of skills development (for example, schools) and, at best, training programs, apprenticeships, and on-the-job training. Better measures of skills, if available, would quantify not just participation in a program for skills development but also indicators of the actual skills attained.

Few household surveys contain measures of actual skills attainment. Possible indicators of skills attainment might include the completion status of a program, test scores and level of skills certification, scores on standardized tests, and academic degrees received. In most cases, indicators of learning and achievement are not available, and one is forced to rely on simple measures of participation in education or training—yes or no—or time spent in the program. The only exceptions are literacy and numeracy skills, which are sometimes available but clearly measure only a very basic level of skill. Much of the early human capital literature that gauges the effect of formal education on earnings, for example, uses the years of schooling completed rather than a standardized indicator of learning outcomes. Moreover, information on noncognitive and other complementary skills is not available.

This chapter relies on indicators of education and training participation in the household surveys of Ghana, Kenya, Nigeria, Rwanda, and Tanzania to correlate this participation with entry into informal and formal sector employment and the earnings in each of these sectors. The first question addressed is whether education and training from different providers are associated with the choice of formal and informal sector employment. We examine this question with data on education and training from the household surveys by first comparing the education and training profiles of people employed in the formal and informal sectors. We have controlled statistically<sup>1</sup> for factors influencing employment in the two sectors to assess how the years of schooling and participation in different training programs correlate with the likelihood of working in the informal sector.

We also examine the relationship between education and earnings. Once an individual has established employment in a sector, a second question is how education and training correlate with his or her earnings. Are the economic returns to education and training in the enterprises of the informal sector comparable to those of the formal sector, as they should be if markets are working to allocate labor and skills to their best use, or do the returns differ and imply structural barriers to labor and capital mobility that would equate these returns? Earnings of people employed in each sector are regressed on the years of schooling and the different providers of training available to compare economic returns to education and training. As explained in this chapter, steps are taken to control for unobserved characteristics that influence earnings in the informal and formal sectors and may bias the observed outcomes. Schooling measures are available for all five countries, but the measures of training available differ (table 3.1).

**Table 3.1 Training Measures in Five Country Household Surveys**

<i>Type of training measured</i>	<i>Ghana 2005/06<sup>a</sup></i>	<i>Kenya 2005/06<sup>b</sup></i>	<i>Nigeria 2003/04<sup>c</sup></i>	<i>Rwanda 2005/06<sup>d</sup></i>	<i>Tanzania 2005/06<sup>e</sup></i>
<b>Formal/nonformal education</b>					
Formal education	X	X	X	X	X
Vocational education	X	X	X	X	X
By type and trade					X
Short-term courses	X		X	X	X
By type and trade	X		X	X	X
Literacy course	X		X	X	
Achieved literacy/numeracy	X	X	X	X	X
<b>Enterprise-based training</b>					
Apprenticeships	X		X	X	X
By type and trade	X		X	X	X
<b>On-the-job training</b>					
					X

*Sources:* GSS 2005–06; KNBS 2007; NBS 2007; NBSN 2004; and NISR 2007.

*Note:* Skills and employment in the informal sector are measured.

a. Ghana Living Standards Survey (GLSS) 2005–06.

b. Kenya Integrated Household Budget Survey (KIHBS) 2005–06.

c. Nigeria Living Standard Survey (NLSS) 2003.

d. Rwanda Integrated Household Living Conditions Survey (EICV) 2005–06.

e. Tanzania Integrated Labour Force Survey (ILFS) 2006.

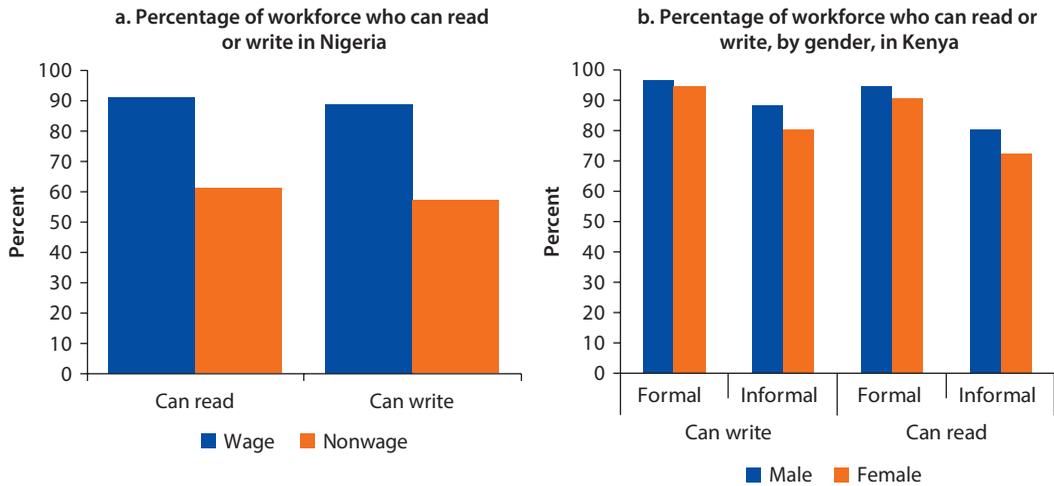
## The Profile of Skills in the Informal Sector

The profile of education and training in the informal sector is similar when compared across the five countries and with the formal sector. The following trends are observed:

- Literacy rates are high in each of the five countries but are lower for people employed in enterprises of the informal sector and for women.
- Years of schooling are lower in the informal sector than in the formal sector, with both higher than education levels in farming.
- Years of schooling is a strong predictor of subsequent access to vocational training but an inverse predictor for apprenticeships.
- Years of schooling and vocational training are both closely associated with employment in the formal sector.
- Apprenticeships are the principal source of skills for the informal sector, but apprenticeships also serve the formal sector.
- Gender differences are evident in education and training, and these differences in skills carry over to the sector of employment for women.
- Skills from all sources are more readily accessible in urban than rural areas, raising the question of whether this is a supply or demand phenomenon.

Although the ability to read and write is an essential skill for many business activities and for further skills development, adult literacy rates in Sub-Saharan Africa are among the lowest in the world. The United Nations Educational,

**Figure 3.1 Literacy Rates in the Informal and Formal Sectors, Nigeria and Kenya**



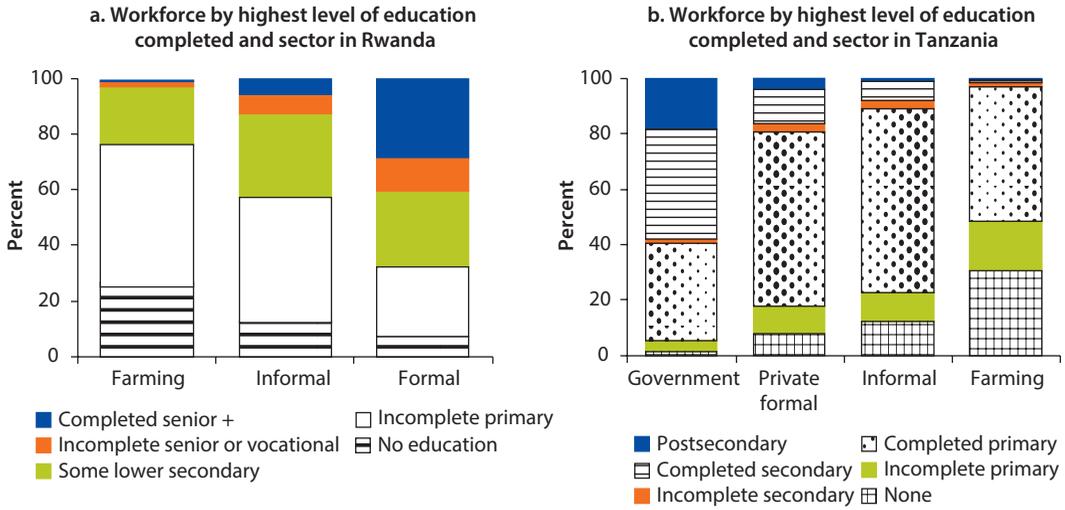
Sources: Elaborations based on KNBS 2007 and NBSN 2004.

Scientific and Cultural Organization (UNESCO) reports the regional average adult literacy rate as being 63 percent and the youth literacy rate as 66 percent for the period 2005–10. In our five country cases, literacy rates are above average, ranging from under 67 percent in Nigeria to over 84 percent in Kenya. However, the comparison of literacy rates in the formal and informal sectors of both countries (figure 3.1) reveals those working in the informal sector are less likely to be able to read or write than those in the formal sector. In Kenya, these rates are lower for women than men (figure 3.1, panel b). Similar patterns are evident in the other three countries. Rising enrollment and completion rates in primary education over the past decade are expected to improve literacy rates for future labor force entrants; for adults already employed, nevertheless, illiteracy is a problem, especially for the informal sector.

The informal sector displays lower education levels than the formal sector, but both sectors have education levels that exceed those of farming. Because literacy is an outcome of schooling, not surprisingly, education patterns are consistent with those observed for literacy. Overall, the data suggest that different levels of education are coupled with different kinds of employment opportunities. As shown in figure 3.2, panel b, 17 percent working in the private formal sector of Tanzania have completed a secondary education or higher. The figure rises to 58 percent for people working in government, reflecting the large number of university graduates in government positions. The informal sector in turn employs only 8 percent with a secondary education or higher, and the percentage drops to less than 2 percent for farming. The lower levels of education in farming are evident with 31 percent not having attended school in Tanzania. In Rwanda, the percentage is 27 percent, and in Ghana, it is 45 percent.

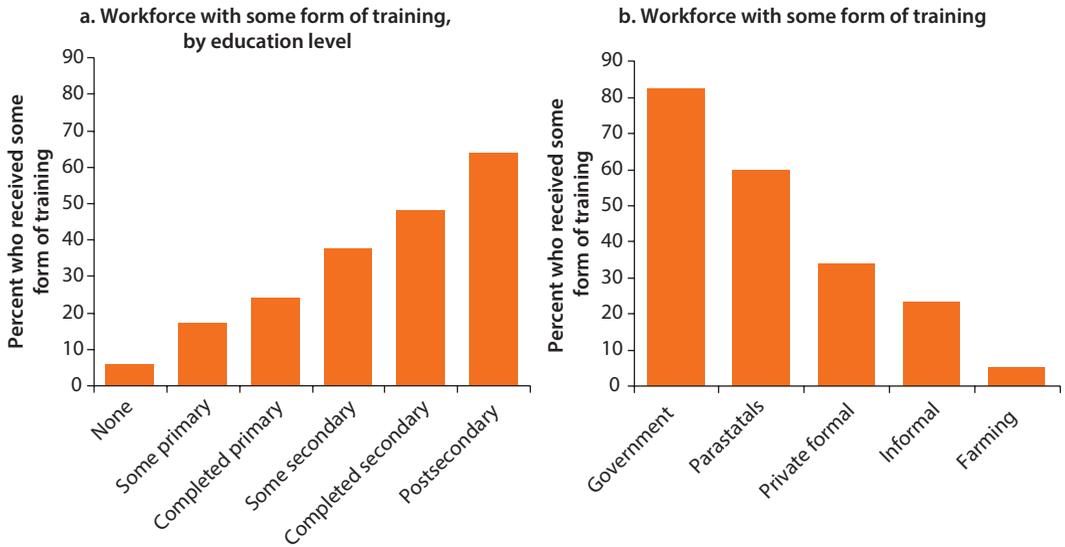
Skills acquisition shows evidence of being a cumulative process linked to years of schooling. Economists have taken note of the cumulative nature of skills

**Figure 3.2 Education Levels in the Informal, Formal, and Farming Sectors, Rwanda and Tanzania**



Sources: Elaborations based on NISR 2007 and NBS 2007.

**Figure 3.3 Training and Formal Education in the Formal Sector, Especially Government, in Tanzania**



Source: Elaborations based on NBS 2007.

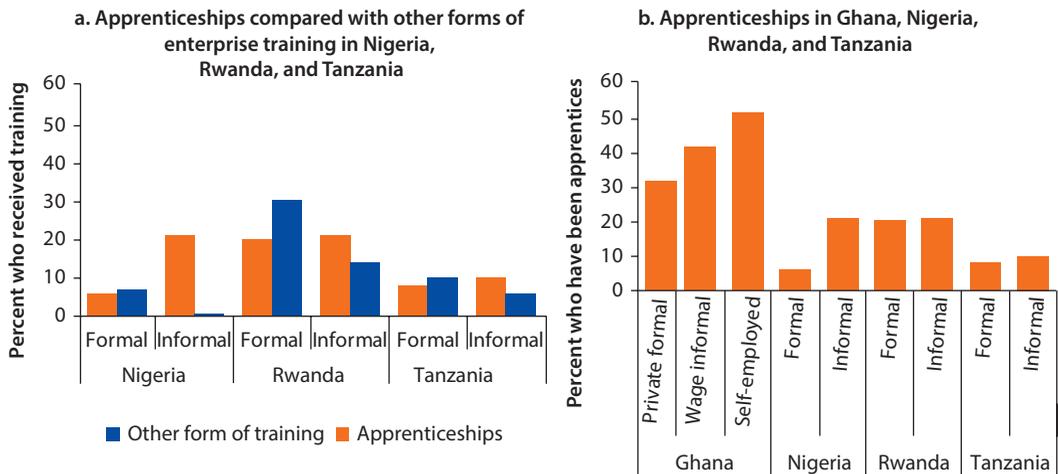
development over the life cycle of workers with those building a foundation of education early in life being more likely to continue this investment later in the life cycle (Cunha and others 2005). Literacy is a basic requirement for further school-based education and many other forms of training. The importance of an early foundation in education is demonstrated in figure 3.3, panel a, for Tanzania.

It shows the percentage of those answering a question about whether they have participated in vocational training. Only 5 percent of people without any education have subsequently participated in a vocational training program, whereas the percentage rises with each level of education. People who acquire education early are more likely to continue investing in their own skills or find others such as employers to invest in them later.

Education translates into further investments in skills, and the differences in education by sector are connected with patterns of vocational training. For Tanzania, figure 3.3, panel b, shows the percentage of the workforce by sector of employment answering “yes” to the question about whether they have participated in some form of vocational training. Five percent or less of those engaged in farming answered affirmatively. The chances of participation in vocational training were higher for those working in the informal sector, with slightly over 20 percent indicating they had received some form of training. However, those working in the private formal sector with their higher levels of education were more likely to have received some form of training compared with people working in the informal sector. Government with its very high level of education shows more than 80 percent receiving training.

The informal sector trains in ways that are different from the formal sector. In the informal sector, traditional apprenticeships primarily provide training. Other sources of training provide the skills for the formal sector (see figure 3.4, panel a). Traditional apprenticeships involve agreements between a master craftsperson and a parent or apprentice to provide training in the workplace for a specified period in return for a small fee, reduced wages, or both. At the conclusion of the training, the apprentice is recognized

**Figure 3.4 Apprenticeship Use in Formal and Informal Sectors, Selected Countries**



Sources: Elaborations based on GSS 2005–06; NBS 2007; NBSN 2004; and NISR 2007.

Note: Data for Ghana refer only to youth 15–30 years of age.

as a journeyman and may continue working for the master craftsperson or leave to work with another enterprise or start her or his own small business. The government or worker organizations do not regulate traditional apprenticeships, unlike formal apprenticeships in industrial countries. Traditional apprenticeships are self-regulated and self-financing and are, therefore, a popular source of skills for people engaged in the informal sector. As figure 3.4, panel b, shows, those trained by apprenticeship also find their way to employment in the formal sector.

In both urban and rural areas, traditional apprenticeships are the main source of skills for people in the informal sector. Table 3.2 reveals residential differences in access to skills by source of training for people employed in the informal sector of Tanzania. For those who have received training, traditional apprenticeships dominate as a source of skills development. Traditional apprenticeships and on-the-job training are the most likely sources of skills in the informal sector. The chances of having attended a school or acquired a certificate from a training center are lower. In Tanzania, finding an apprenticeship is easier in urban than in rural areas. If one resides in a rural area, skills are less likely to be acquired through an apprenticeship; rather, they are obtained by learning on the job. Perhaps reflecting the tendency of schools and training centers to locate in urban areas near pockets of industry and large population centers, a smaller share of those in rural areas working in the informal sector acquire their skills from these sources. The residential differences in access to apprenticeships observed in Tanzania are also found in Ghana, Nigeria, and Rwanda (see figure 3.5).

Opportunities for access to apprenticeships vary not only by place of residence but also by gender. In Ghana, virtual parity exists in access to apprenticeships for young women and men, but in Nigeria and Rwanda, differences are seen (figure 3.5). Young men are more likely to have been through an apprenticeship than young women in both countries. As noted in chapter 2, women in Nigeria and Ghana were found to account for a larger share of employment in the informal sector than men. Even with the larger presence of women in

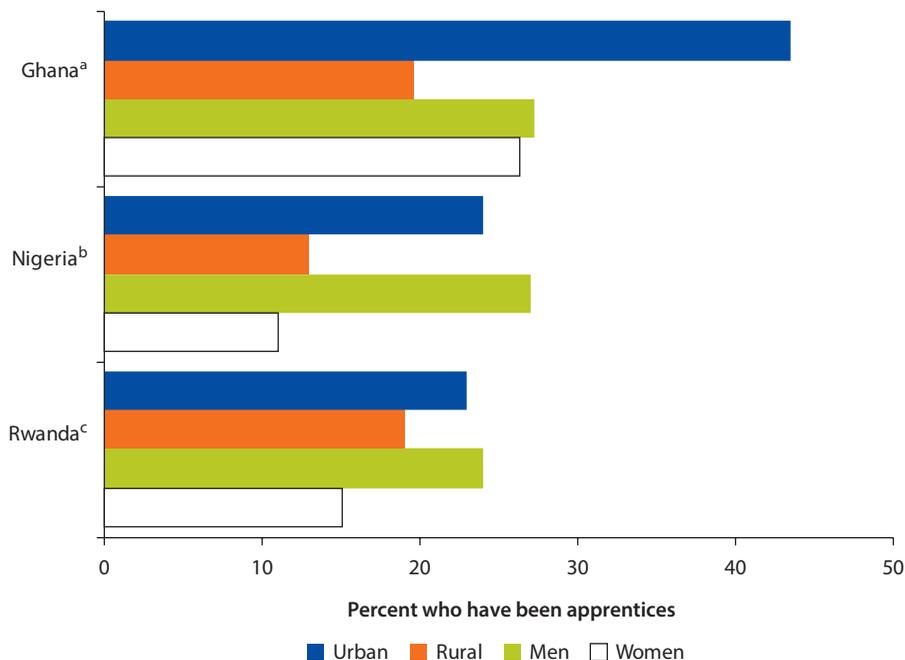
**Table 3.2 Types of Training within the Informal Sector in Tanzania, 2006**

*Percent*

<i>Type of training, conditional upon having been trained</i>	<i>Urban</i>	<i>Rural</i>	<i>Total</i>
Informal apprenticeship	46.8	39.4	45.0
On-the-job training	22.6	35.6	25.7
Vocational certificate	15.4	13.4	14.9
College or academic certificate	12.3	8.8	11.4
Diploma	1.4	0	1.1
Advanced diploma or university degree	0.5	0	0.4
Other	1.0	2.8	1.5
Total	100.0	100.0	100.0

*Source:* Elaborations based on NBS 2007 data.

**Figure 3.5 Share of Group Who Have Been Apprentices, by Residence Area and Gender, in Ghana, Nigeria, and Rwanda**



Sources: Elaborations based on GSS 2005–06; NBSN 2004; and NISR 2007.

a. Formal and informal, youth 15–30 years of age.

b. Informal only.

c. Formal and informal.

the informal sector in Nigeria, these women are notably less likely to have access to skills through an apprenticeship. The lower access to skills development is compounded on the demand side of labor markets by occupational segregation because women and men access very different forms of apprenticeships (see chapter 4). Gender is as important an issue in skills as in employment.

Apprenticeships in Ghana are the main source of skills for people working in both the informal and formal sectors. Ghana provides a particularly rich description of those who have completed an apprenticeship among youth 15–30 years of age (table 3.3). The popularity of traditional apprenticeships is reflected in the share of youth who have completed an apprenticeship, 27 percent, and the share who have passed through a technical or vocational education program, only 2 percent. Fully 51 percent of youth who were working off the farm and self-employed acquired skills through an apprenticeship. Smaller, but still significant, numbers of youth working for wages also completed an apprenticeship in both the informal and formal sectors.

Apprenticeships are less accessible to the very poor. Because an apprentice can pay for his or her training by accepting lower wages, in principle

**Table 3.3 Percentage of Youth Having Gone through TVET and Apprenticeships in Ghana**  
Percent

<i>Criteria</i>	<i>TVET</i>	<i>Apprenticeships</i>	<i>Criteria</i>	<i>TVET</i>	<i>Apprenticeships</i>
All	2	27	All	2	27
Location			Sector of employment		
Urban	4	44	Wage public sector	4	12
Rural	1	20	Wage private formal	8	32
Gender			Wage private informal	2	41
Male	2	27	Self-employed nonfarm	0	51
Female	2	26	Self-employed farm-paid	3	20
Age (years)			Self-employed farm-unpaid	0	9
15–19	0	11	Level of education		
20–24	2	31	No education	..	9
25–29	3	32	Some primary	..	21
Consumption quintile			Primary	..	33
Poorest	1	11	Lower secondary	..	51
Second poorest	1	18	TVET	..	20
Third poorest	1	28	Higher secondary	..	26
Second richest	3	37	Postsecondary	..	7
Richest	4	47			

*Source:* Elaboration of World Bank 2009.

*Note:* Youth is defined as 15–29 years of age; .. = negligible; TVET = technical and vocational education and training.

apprenticeships are thought to be more accessible to low-income youth, but table 3.3 offers evidence to the contrary by looking at the percentage of those with an apprenticeship in consumption quintiles. The percentage with an apprenticeship in Ghana systematically rises by consumption quintile: the top consumption quintile is four times more likely to have participated in an apprenticeship than the bottom consumption quintile. This pattern is not limited to apprenticeships. The same holds true for TVET in Ghana. In a separate analysis by the World Bank, the share of youth in the highest consumption quintile with a technical and vocational education, 4.3 percent, is seven times higher than that in the lowest consumption quintile (World Bank 2009).

Access to apprenticeships is also related with some (albeit low) level of basic competencies. All the patterns described in table 3.3 for Ghana are evident in Nigeria (table 3.4). Skills in the informal sector are more likely to have been obtained through an apprenticeship. Men and urban dwellers are more likely to participate in these apprenticeships than women. Although some evidence indicates that apprenticeships are primarily a source of skills for people with limited education, Nigeria demonstrates that apprenticeships can be popular at all levels of education in the informal sector. Illiteracy is a barrier to acquiring skills through an apprenticeship in both the formal and informal sectors. In cases where a basic education has provided individuals with the ability to read and write, access to apprenticeships is more widely available.

**Table 3.4 Correlation of Low Levels of Education and Functional Capacities with Holding Apprenticeships in the Informal Sector of Nigeria**

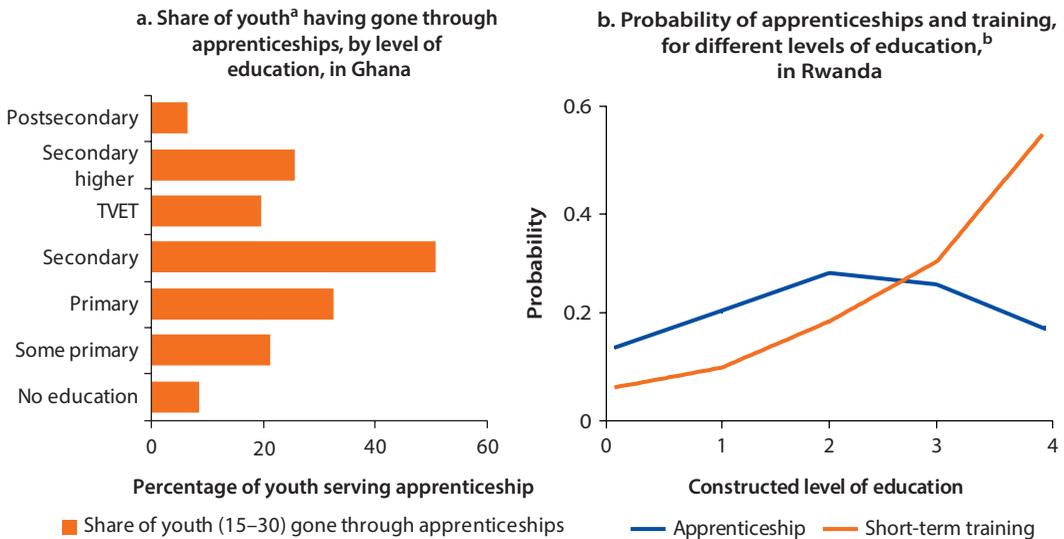
Percent

<i>Education and other criteria</i>	<i>Apprenticeships</i>		<i>On-the-job training</i>	
	<i>Formal</i>	<i>Informal</i>	<i>Formal</i>	<i>Informal</i>
Male	6	27	8	1
Female	2	11	3	0
Urban	6	24	7	2
Rural	4	13	6	0
Education ≥ 10 years	4	24	7	5
Education < 10 years	11	27	2	0
Received OJT	6	5	n.a.	n.a.
No OJT	5	5	n.a.	n.a.
Can read	5	27	7	1
Cannot read	4	8	4	0
Can calculate	5	27	7	1
Cannot calculate	5	8	4	0
Can write	5	26	7	1
Cannot write	5	11	4	0

*Source:* Elaborations based on NBSN 2004.*Note:* OJT = on-the-job training; n.a. = not applicable.

As shown in table 3.3, having obtained some level of education is associated with a higher probability of having been through an apprenticeship. Together with the evidence that those who often are most excluded from basic education—the poorest, the rural population, and women—do not access apprenticeships, this evidence suggests that some minimum competencies are necessary to access even traditional apprenticeships. The relationship is best described as a *U* shape, with the likelihood of an apprenticeship in the informal sector increasing with some education and decreasing for higher levels of education (see figure 3.6).

Overall, this profile of skills emphasizes the importance of a good quality basic education as a foundation for acquiring skills over the life cycle. The profile points to the weak foundation of education for people who are now employed in the informal sector, including low levels of literacy. For want of a strong foundation in education, people in the informal sector are more likely to acquire skills through a traditional apprenticeship. However, access to these apprenticeships is uneven. People living in rural areas face greater difficulty in finding an apprenticeship than those living in urban areas. Women constitute a large part of the informal sector, but they are less likely to participate in an apprenticeship than men. The concentration of women in trade and services in the informal sector (observed in chapter 2), where apprenticeships are less common, is expected to be part of the explanation for this pattern. Finally, even though apprenticeships are self-financing, access to them is lowest among the very poorest of households.

**Figure 3.6 Education Levels Needed for Apprenticeships, Ghana and Rwanda**

Sources: Elaborations based on GSS 2005–06; NISR 2007.

Note: TVET = technical and vocational education and training.

a. Youth is defined as 15–30 years of age.

b. Constructed level of education is defined as follows: Edu0 = no education; Edu1 = some education but less than completed primary education; Edu2 = completed primary and some lower secondary; Edu3 = completed lower-secondary and some higher-secondary or vocational education; Edu4 = completed higher-secondary or extended vocational education and above.

## Sector of Employment

Education and training may affect a worker's earnings by influencing first the type of employment obtained and then the productivity of the worker in the employment and his or her earnings. Multivariate analysis is used to provide a better understanding of the relationship between skills and employment. Focusing on simple correlations can be insufficient: for example, are women less likely to be in the formal sector because they have had less access to education or because of some other gender-specific characteristic? Moreover, education can influence earnings in two different ways. First, a certain level of education or training may be required to get a job in a particular sector. For example, the government sector may predominantly hire university graduates, or operating as an informal self-employed mechanic may be difficult without an apprenticeship. Second, a certain level of education may raise the productivity of a person and thus increase his or her earnings.

The likelihood of employment in the informal and formal sectors and the relationship to education and training are estimated using data from the household surveys. Each of the country chapters explores the correlation between education and training, on the one hand, and sector of employment held, on the other, by estimating the probability of attaining employment in the informal and formal sectors, controlling for years of schooling, various

forms of training, and other demographic characteristics. The analysis compares people employed off the farm in the informal and formal sectors with those employed in farming. It then estimates the relationship between education and training on the probability of employment in the formal or informal sectors, controlling for personal and situational factors that might influence this probability.<sup>2</sup>

Education and training exhibit a strong and statistically significant association with the type of job held.<sup>3</sup> The patterns differ on various points among the countries, although overall they are remarkably robust in showing the positive effect of education and training on the probability of obtaining employment off the farm, and similarly, whether an individual is employed in the informal or formal sectors.<sup>4</sup> The results for Tanzania (see box 3.1) are generally matched in the other countries studied, although some differences are found based on data available (see annex 3A, table 3A.1). Formal education and particularly higher education are associated with an increase in the odds of later holding employment in the formal, or wage, sector for all of our countries. People with limited education, usually with less than a primary education, are more likely to wind up employed in the informal sector. The stylized evidence in our five countries points to the importance of education, particularly secondary and higher education, for increasing the chances of later holding formal sector employment. In Nigeria, to determine the probability of formal rather than farm employment, we compared people with a general secondary education to those with a technical and vocational education. Both forms of secondary education increase the odds of holding employment in the formal sector by about one-third. In Ghana, the odds of doing this for technical and vocational education are higher than those for general secondary education. More specifically the results suggest the following:

- Education is linked with a higher probability of employment off the farm. With higher levels of schooling, the chances are much better for finding employment in both the public and private formal sectors than in the informal or farm sectors.
- Training also makes a difference. The results for different forms of training are equally interesting. In Tanzania, people with training of any type are more likely to be employed off the farm than those without training.
- Apprenticeships are correlated with off-farm employment, especially in the informal sectors. In Tanzania, the probabilities are about even across the sectors. In other countries, apprenticeships are associated with informal sector work, whereas the links to formal sector work are low or nil.
- In Tanzania, on-the-job training or training recognized with a vocational certificate or a college certificate is associated with informal sector employment, whereas higher levels of training at the diploma or advanced diploma levels are not associated with informal sector employment.

### Box 3.1 Education, Training, and Sector of Employment in Tanzania

The Tanzania case study confirms strong links between education and training, on the one hand, and the probability of work in the informal or formal sector, on the other. The formal sector in Tanzania is divided into two parts representing the public and private formal sectors. Government employment in the public sector, with its large professional cadre, contains a more highly educated workforce than the private formal sector. Probabilities of employment in the two formal sector strata are estimated alongside the probability of employment in the informal sector. The comparison in each case is with people employed in farming.

Multinomial logit regressions (see table B3.1.1) show the following:

- The chances of women finding employment off the farm in the informal sector of Tanzania are lower than those of men.
- They also indicate that living in an urban area increases significantly the odds of finding employment in the informal sector, and age increases the chances of employment off the farm in formal and informal sectors, but the odds of this increase at a decreasing rate.

**Table B3.1.1 Entry into Sectors and Role of Apprenticeships: Selected Results from Multinomial Logit Equations in Tanzania**

<i>Variables</i>	<i>Government</i>	<i>Private formal</i>	<i>Informal</i>
Age	1.355***	1.005	1.084***
Age squared	0.713***	0.961***	0.900***
Female	0.549***	0.361***	0.716***
Education (baseline: no education)			
Incomplete primary	3.141***	1.153	1.112
Completed primary	5.466***	1.743***	1.723***
Incomplete secondary	7.271***	1.536**	1.550**
Completed secondary	49.063***	4.695***	3.338***
Advanced secondary/university	73.021***	6.271***	3.588***
Training (baseline: no training)			
On-the-job training	16.698***	4.465***	2.699***
Informal apprenticeship	3.345***	2.941***	2.986***
Vocational certificate	13.524***	5.482***	3.560***
College certificate	45.179***	5.832***	2.101***
Diploma	24.187***	4.170***	1.114
Advanced diploma/university degree	18.050***	3.314**	0.255**
Other training	6.502***	2.167***	0.567*
Urban	6.876***	9.988***	12.058***
Constant	0.000***	0.032***	0.011***
Observations	34,671	34,671	34,671

*Source:* Elaborations based on NBS 2007.

*Note:* Weighted regression. Relative odds ratios presented instead of coefficients: baseline category is farming. Quarter and region dummies included but not reported.

*Significance level:* \* = 10 percent; \*\* = 5 percent; \*\*\* = 1 percent.

*box continues next page*

**Box 3.1 Education, Training, and Sector of Employment in Tanzania** *(continued)*

- The more interesting results are for education and training. Examining the table by column, starting with the informal sector, higher levels of schooling correspond to higher levels of employment off the farm. A higher-secondary or university education is associated with higher odds of informal sector employment over farming (by a factor of 2.5 times). Yet comparing the informal sector with the private formal sector, a higher-secondary or university education nearly doubles the odds for employment in the private formal sector.
- 

- Although advanced training at the diploma level is not strongly associated with employment in the informal sector when compared with farming, it is in the case of the formal sector. This result is observed in both Tanzania and Nigeria. In Rwanda, in contrast, training at all levels is found not to be associated with the sector of employment.
- Access to training from all sources, including advanced training, is more strongly associated with formal sector employment compared with informal sector employment. The exception is apprenticeships, for which the association is roughly the same across formal and informal sectors. We need to keep in mind this does not show causation, because the odds of obtaining training are higher in the formal sector than in the informal sector. Thus, whether training that provides a diploma, for example, increases the chances of formal sector employment or vice versa is undetermined. What we can see is that training beyond formal schooling is generally associated with employment off the farm and more so with employment in the formal sector compared with the informal sector, except for apprenticeships.
- Under the generic heading of vocational training, ample evidence from the five countries shows the link between training and employment off the farm in both formal and informal sectors. In Nigeria, this training is associated with a 26 percent higher likelihood of formal sector employment. In Kenya, it improves the chances for both formal and informal sector employment compared with farm work.

Apprenticeships, as already noted, are the principal source of skills for the informal sector. However, we see evidence that people with apprenticeships are also able to find their way into the formal sector. In Ghana, the question of whether apprenticeships substitute for formal education was examined by creating a variable that intersects participation in an apprenticeship with different levels of education. The results in table 3.5 show a modest positive association between an apprenticeship and employment off the farm in the formal and informal sectors for those with a primary education or less. The effect is larger in rural than in urban areas. The more surprising result is for people with

**Table 3.5 Entry into Sectors and Apprenticeships: Selected Results from Multinomial Logit Equations in Ghana**

Variables	Wage		Self-employed nonfarm	
	1991/92	2005/06	1991/92	2005/06
<b>Urban</b>				
Apprenticeships low education	1.819***	1.054	1.383*	1.283*
Apprenticeships medium education	0.909	0.743**	2.058**	1.573***
Apprenticeships high education	1.617	1.099	1.401	4.678***
<b>Rural</b>				
Apprenticeships low education	1.047	4.06***	1.277	2.14***
Apprenticeships medium education	0.984	1.43*	1.647**	1.90***
Apprenticeships high education	0.346	1.24	2.375	2.95

Source: Elaborations based on World Bank 2009.

Significance level: \* = 10 percent, \*\* = 5 percent, \*\*\* = 1 percent.

a university education. The most recent survey year in Ghana, 2005/06, shows the odds of holding employment in the informal urban sector have increased sharply for those with a university education and an apprenticeship. As seen, apprenticeships are associated with government or formal private sector employment in Tanzania. This may reflect difficulties in finding employment in the formal sector; university graduates are using apprenticeships and entering the informal sector.

## Earnings

Once an individual is employed, education and training are expected to enhance the worker's productivity and, in doing so, increase his or her earnings. To assess how further investments in education and training might raise productivity and earnings of workers in the informal sector, we ran separate regression equations in each country for those employed in the two sectors. These earnings are regressed on measures of education and training plus other individual or situational factors in each country that might influence earning outcomes. We have already noted a pattern of selection into the formal and informal sectors based on education and training as well as on other personal characteristics. Thus, we have used these findings to correct for selection bias in the earnings equations. The steps taken to control for this bias use a two-stage estimation procedure.<sup>5</sup> For comparison, ordinary least squares (OLS) regressions were estimated for some countries, and the results are generally similar.<sup>6</sup> The outcomes are reported in table 3A.2. The importance of these controls seems to vary by country with no significant effects in Ghana and Rwanda but observed effects in Nigeria and Kenya, where education and training significance is increased with controls for selection bias, especially in the formal sector of Kenya.

Lower levels of education and forms of training are associated with off-farm employment but have little or no further effect on earnings. Even with

differences in specification of the earnings functions and estimation methods, the patterns around education, vocational training, and apprenticeships are similar, and some consistent patterns emerge. Although literacy is linked to employment off the farm, its direct effect on earnings is modest. In stylized form, the years of schooling increase earnings in all five countries, but more so in the formal than in the informal sector. The returns to a year of schooling in Kenya for people employed in the formal sector in 2005/06 were 18 percent, compared with 8.3 percent in the informal sector. If correction is made for selection bias, the returns to education in the formal sector increase to 23 percent, leaving unchanged the returns in the informal sector, thus widening the gap in returns between the two sectors.

The evidence generally shows higher marginal returns for each level of education in the formal sector compared with the informal sector. In Ghana, Nigeria, and Tanzania, each completed level of education pays off less in the informal than in the formal sector, while in Kenya, additional years of schooling are positively associated with earnings in the formal sector but have no effect in the informal sector. However, Rwanda provides an exception because returns to education in the informal sector exceed those in the formal sector.

There are a number of hypotheses for higher returns for each level of education in the formal sector, but we are unable to distinguish among them. The possibility exists, for example, of labor market segmentation with barriers to labor mobility between the formal and informal sectors. Employment in the formal sector could be rationed, leaving large numbers to crowd into the informal sector, thereby placing downward pressure on earnings in this sector. As already noted, education may play a role in perpetuating this segmentation. Other explanations could include lower quality of education for those who find their way to the informal sector. The education curriculum that tends to focus on skills for moving into higher education may not be well suited to entrepreneurial activities. Differences in returns may also reflect wage premiums found in larger enterprises of the formal sector and the possibility of wages in the formal sector being driven by public sector wage policies that are not competitively determined.

Returns also increase with level of education, especially in the formal sector. Rwanda shows that returns to education in the formal sector become significant only after completing a lower-secondary or higher level of education, including TVET. There is evidence of convexity in returns in other countries, among them Nigeria, where the returns to higher levels of education account for most of the difference between the average earnings of the formal sector when compared with the informal sector. In Ghana, the argument is made that primary education is no longer enough. The success of Education for All has produced numbers of primary school graduates that drive down the returns to this education. The returns in Ghana show that education is most strongly associated with earnings in the formal sector and that the correlation is significant only beginning with those completing a lower-secondary education. The payoff to primary education may therefore be in promoting labor mobility out of farming into the informal sector with its higher earning opportunities, but

once there, workers make no further income gains until they attain higher levels of education.

The findings on vocational training in its different forms and sources are mixed among the five countries.

- In Tanzania, as shown previously, lower levels of vocational training are connected with employment in the informal sector, and advanced levels of training do not increase the chances of this employment, but advanced training has higher chances of being linked to employment in the formal sector. The earning functions, perhaps reflecting the variety of training sources organized under the heading of vocational training, do not give us a clear picture of how the training affects earnings. However, training in all forms has robust effects on earnings in the formal sector with returns only for a vocational or college certificate in the informal sector. These two forms of training not only influence access to the informal sector but also influence earnings in a positive manner.
- In Rwanda, training is not linked to earnings in either sector, although a technical and vocational education appears to be associated with higher earnings in the informal sector.
- In Ghana, no separate estimates exist for vocational training and earnings, but estimates of secondary technical and vocational education show returns that match those of general secondary education in both formal and informal sectors.
- In Nigeria, vocational training is not found to be related with earning gains in either the informal or the formal sectors.
- In Kenya, the results for vocational training are influenced by selection bias. Vocational training is not statistically significant in either the formal or informal sector earning functions. However, much like the case for higher education in Kenya, when selection bias is corrected, the returns become significant, but only at the margin. It is difficult to make much from these findings for vocational training because of the diversity of training sources wrapped up in this variable.

People who complete apprenticeships do not see an increase in their earnings. The earlier results in this chapter showed apprenticeship was linked to employment in the informal sector, with significant numbers also finding their way into the formal sector. Once these people are employed, however, the actual effect on earnings is disappointing. In Ghana, apprenticeships do not correspond to higher earnings. In Nigeria, the effect of apprenticeships on earnings is found to be as weak as it is in Tanzania. Rwanda is an exception because apprentices are shown to earn as much as 22 percent more in the informal sector than those who have not completed an apprenticeship. However, there is no observed impact on earnings in the formal sector for those with apprenticeships.

## Main Conclusions

Employment off the farm in the informal and formal sectors is strongly associated with education. This chapter emphasizes the importance of education and training and of establishing a solid foundation of education for all who enter the workforce in Sub-Saharan Africa. Failing to do so leads to long-term adverse consequences for skills acquisition, the type of employment held, and one's subsequent earnings in employment. This chapter breaks apart the links between education and employment into education's effect on the type of employment held, and once employed, on what one earns. Although causality cannot be inferred, some minimum education appears to be linked to employment off the farm. However, the failure to attain more than a primary education increases measurably the chances of winding up in the informal sector compared to the formal sector, and once one is working in this sector, the earnings are likely to be lower than the earnings of people who make their way into the formal sector.

The use of modern technologies for competitiveness requires additional education. Although primary schooling is linked to informal sector and off-farm work, it is unlikely to open doors to the formal sector. Secondary and higher education appear to be the passport today for entry into the formal sector of the countries in this study. These higher levels of education do not guarantee better jobs in the formal sector; however, without this education, the chances of finding this employment are significantly reduced. Although many factors will influence whether a small and household enterprise grows and becomes part of the formal sector, what is clear from our findings is that the education of the enterprise's workforce will play a critical role in this transition. An enterprise whose workforce has only a primary education or less will face a barrier to entry into the formal sector. Providing broader access to secondary and more advanced education thus has to be part of the strategy for expanding employment in the formal sector.

Education and training can also influence earnings. Generally, more education is linked to higher earnings in both sectors, although the payoff may be lower in the informal sector. This chapter offers a number of hypotheses for this finding that range from market segmentation with years of schooling as a segmenting force to other factors on the supply and demand sides of labor markets. On the supply side is the quality of education available to people who find themselves in the informal sector and the type of curriculum offered in schools and its relevance to entrepreneurial activity. On the demand side are the wage premiums found in larger enterprises in the formal sector and the likelihood of wages in the formal sector being driven by public sector wages that are not competitively determined. The latter hypothesis proves interesting in light of the large share of public sector employment in the formal sectors of our five countries.

Access to education at all levels takes on added importance when looking at the effect of schooling on where one works and what one is paid. The influence of gender, residence, and household income on schooling access is part of

the story behind the demographic profile of employment in the informal sector. Overall, access to different levels of education and training shows the following:

- Access to basic education and literacy plays a role in future skills development by opening the door to postbasic education and providing a signal about the ability of the worker to acquire higher levels of skills and productivity through training from different sources.
- Training outside schools is closely aligned with where one works.
- Apprenticeships are the ticket to employment in the informal sector, but their value for employment in the formal sector is also evident in some countries.
- Lower levels of nonformal training can open pathways to employment in the informal sector, while training in more advanced skills is essential to employment in the formal sector.
- Technical and vocational education in schools, often criticized for its cost and relevance, influences access to employment in both sectors and higher earnings.

The dominant source of skills for the informal sector, traditional apprenticeships, offers a mixed picture of their effect on earnings. Only in Rwanda did we find statistical evidence of this effect. The primary effect appears to be on the access these apprenticeships offer to employment off the farm in the informal sector and for some to find employment later in the formal sector. One can ask why this self-regulating, self-financing source of skills, popular to many in Sub-Saharan Africa, is not producing a larger, more observable impact on earnings. Part of the answer to this question doubtless rests in the limited education and literacy of those who pursue their skills through this means. Addressing this issue would call for attention to second-chance education and adult literacy programs. Other reasons may be found in the quality of the training offered by master craftspersons, the dated technology and production methods often used and taught, and a market for these skills that suffers from information asymmetries about what skills have actually been acquired.

The following chapter draws on the review of skills development programs in our five countries, especially programs focused on the informal sector, as well as experience in other countries. It identifies strategies that address the constraints to skills development in the informal sector (chapter 1) and that may offer a pathway to improving the productivity of these enterprises and those who work in them.

### **Annex 3A: Summary of Education and Training Impact on Sector of Employment and Individual Earnings by Country**

This annex summarizes the results of the study's multinomial logit and earnings regressions in each of the five countries. Table 3A.1 describes whether education and training in its different forms is statistically related in each country to the likelihood of being employed in the formal and informal sectors. Table 3A.2 describes whether earnings in each sector are correlated with the type of education and training received in each country.

**Table 3A.1 Multinomial Logit Regressions on Occupational Choice/Sector Entry: Main Results with Respect to Skills<sup>a</sup>**

Country: group	<i>Wage worker/formal</i>		<i>Self-employed/informal</i>	
	<i>Formal education/TVET</i>	<i>Apprenticeships/other training</i>	<i>Formal education/TVET</i>	<i>Apprenticeships/other training</i>
Ghana: Urban, 25–64 years of age, W/S-E	<ul style="list-style-type: none"> <li>• No significance below secondary; significant and increasing effects from secondary onward</li> <li>• TVET effect higher than secondary, lower than postsecondary</li> </ul>	<ul style="list-style-type: none"> <li>• No significant effect from apprenticeships</li> </ul>	<ul style="list-style-type: none"> <li>• Significant entry effect as of higher secondary</li> <li>• Much weaker entry effect than in wage sector</li> </ul>	<ul style="list-style-type: none"> <li>• Significant entry effect from apprenticeships (especially medium and high education)</li> </ul>
Ghana: Rural, 25–64 years of age, W/S-E	<ul style="list-style-type: none"> <li>• Significant effects from all levels of education</li> </ul>	<ul style="list-style-type: none"> <li>• Significant effect from low-level apprenticeships</li> </ul>	<ul style="list-style-type: none"> <li>• Significant entry effects as of lower levels of education</li> </ul>	<ul style="list-style-type: none"> <li>• Significant effects from apprenticeships (especially low and medium education)</li> </ul>
Kenya: 15–65 years of age, F/IF	<ul style="list-style-type: none"> <li>• Years of schooling determinant of entry</li> <li>• TVET stronger determinant than years of schooling</li> </ul>	<ul style="list-style-type: none"> <li>• Literacy no impact</li> </ul>	<ul style="list-style-type: none"> <li>• No significant effect of years of education</li> </ul>	<ul style="list-style-type: none"> <li>• Literacy increases probability of entry</li> <li>• TVET increases probability of entry but less than in formal sector</li> </ul>
Nigeria: 15–65 years of age, W/SE and F/IF <sup>b</sup>	<ul style="list-style-type: none"> <li>• Positive and increasing entry effect of education</li> <li>• TVET same effect as secondary general on entry</li> </ul>	<ul style="list-style-type: none"> <li>• No effect of apprenticeship</li> <li>• Positive effect of other training</li> <li>• Positive effect of literacy/ numeracy</li> </ul>	<ul style="list-style-type: none"> <li>• No effect of education except senior secondary</li> <li>• No effect of TVET</li> </ul>	<ul style="list-style-type: none"> <li>• Strong positive effect of apprenticeship</li> <li>• No effect of literacy</li> <li>• No effect of other training</li> </ul>
Rwanda: 15–65 years of age, F/IF	<ul style="list-style-type: none"> <li>• Strong and increasing effect of education</li> <li>• TVET no effect</li> </ul>	<ul style="list-style-type: none"> <li>• Apprenticeship small effect</li> <li>• Training no effect</li> </ul>	<ul style="list-style-type: none"> <li>• Positive effect of education but wears off (senior secondary and above less effect than some secondary); smaller effects than in formal sector</li> <li>• TVET no effect</li> </ul>	<ul style="list-style-type: none"> <li>• Apprenticeship stronger effect than in formal sector (but less than completed primary)</li> <li>• Training no effect</li> </ul>

*table continues next page*

**Table 3A.1 Multinomial Logit Regressions on Occupational Choice/Sector Entry: Main Results with Respect to Skills<sup>a</sup> (continued)**

<i>Country: group</i>	<i>Wage worker/formal</i>		<i>Self-employed/informal</i>	
	<i>Formal education/TVET</i>	<i>Apprenticeships/other training</i>	<i>Formal education/TVET</i>	<i>Apprenticeships/other training</i>
Tanzania: 15–65 years of age, W/SE and F/IF <sup>c</sup>	<ul style="list-style-type: none"> <li>• Education has a significant effect as of completed primary, exponentially increasing (very fast for government sector)</li> <li>• TVET effect strong</li> </ul>	<ul style="list-style-type: none"> <li>• Apprenticeship effect significant, but less than completed secondary education</li> <li>• Other training highly significant, about same as TVET</li> </ul>	<ul style="list-style-type: none"> <li>• Education is a significant determinant of entry as of completed primary, increasing but much less than for formal</li> <li>• TVET more significant than training but much less than in wage sector</li> </ul>	<ul style="list-style-type: none"> <li>• Apprenticeships stronger effect than education below completed secondary but less than TVET</li> <li>• Positive effect of other training but less than apprenticeships</li> </ul>

**Note:** TVET = technical and vocational education and training.

a. Likelihood of being in sector, agriculture is the base outcome. For definitions of formal/informal, see country chapters. W/S-E: Comparing wage workers with self-employed. F/IF: Comparing formal wage workers with informal wage and self-employed.

b. Same results irrespective of whether W/S-E or F/IF are compared.

c. Same results for W/S-E and F/IF, except that effect of education does not wear off significantly for informal (including informal wage workers) as for self-employed group.

**Table 3A.2 Earnings Regressions: Main Results with Respect to Skills<sup>a</sup>**

<i>Country: group</i>	<i>Wage/formal</i>		<i>Nonwage/informal</i>	
	<i>Formal education/TVET</i>	<i>Apprenticeships/other training</i>	<i>Formal education/TVET</i>	<i>Apprenticeships/other training</i>
Ghana: Urban, 25–64 years of age, W/S-E, sample selection	<ul style="list-style-type: none"> <li>• Significant and increasing returns to formal education from secondary/TVET onward</li> </ul>	<ul style="list-style-type: none"> <li>• Negative effect of apprenticeships at higher education</li> </ul>	<ul style="list-style-type: none"> <li>• Weak significance of secondary-plus education; lower than wage earners</li> </ul>	<ul style="list-style-type: none"> <li>• No significance</li> </ul>
Ghana: Rural, 25–64 years of age, W/S-E, sample selection	<ul style="list-style-type: none"> <li>• Only postsecondary significant</li> </ul>	<ul style="list-style-type: none"> <li>• Negative effect of apprenticeships at medium levels of education</li> </ul>	<ul style="list-style-type: none"> <li>• No significance</li> </ul>	<ul style="list-style-type: none"> <li>• No significance</li> </ul>
Ghana: Urban, 25–64 years of age, W/S-E, OLS	<ul style="list-style-type: none"> <li>• Significant and increasing effects from secondary higher/TVET onward</li> </ul>	<ul style="list-style-type: none"> <li>• Negative effect of apprenticeships at higher levels of education</li> </ul>	<ul style="list-style-type: none"> <li>• Significant returns from secondary lower and onward (lower than wage earners at postsecondary, higher at lower secondary)</li> </ul>	<ul style="list-style-type: none"> <li>• No significance</li> </ul>
Ghana: Rural, 25–64 years of age, W/S-E, OLS	<ul style="list-style-type: none"> <li>• Significant and increasing effects from secondary lower and onward</li> </ul>	<ul style="list-style-type: none"> <li>• Positive effect of apprenticeships at low education levels</li> </ul>	<ul style="list-style-type: none"> <li>• Significant returns until lower secondary; no significance at higher levels</li> </ul>	<ul style="list-style-type: none"> <li>• No significance</li> </ul>
Kenya: 15–65 years of age, F/IF, sample selection	<ul style="list-style-type: none"> <li>• Years of education positive and stronger than for informal sector</li> <li>• TVET positive and stronger than for informal sector</li> </ul>	<ul style="list-style-type: none"> <li>• Literacy no significance</li> </ul>	<ul style="list-style-type: none"> <li>• Years of education very small impact</li> <li>• TVET stronger impact</li> </ul>	<ul style="list-style-type: none"> <li>• Literacy small positive impact</li> </ul>
Kenya: 15–65 years of age, F/IF, OLS	<ul style="list-style-type: none"> <li>• Years of education positive and stronger than for informal sector</li> <li>• TVET not significant</li> </ul>	<ul style="list-style-type: none"> <li>• Literacy no significance</li> </ul>	<ul style="list-style-type: none"> <li>• Years of education very small impact</li> <li>• TVET stronger impact</li> </ul>	<ul style="list-style-type: none"> <li>• Literacy no significance</li> </ul>
Nigeria: 15–65 years of age, W/S-E, sample selection	<ul style="list-style-type: none"> <li>• Positive effects of education from secondary onward</li> <li>• TVET not significant</li> </ul>	<ul style="list-style-type: none"> <li>• No significance of training or apprenticeships</li> <li>• Literacy significant</li> </ul>	<ul style="list-style-type: none"> <li>• No significance</li> </ul>	<ul style="list-style-type: none"> <li>• No significance of training or apprenticeships</li> <li>• Literacy not significant</li> </ul>
Nigeria: 15–65 years of age, W/S-E, OLS	<ul style="list-style-type: none"> <li>• Positive effects only at postsecondary level</li> </ul>	<ul style="list-style-type: none"> <li>• No effects of apprenticeships, training, or literacy</li> </ul>	<ul style="list-style-type: none"> <li>• Positive effects only at postsecondary level, weaker than in formal sector</li> </ul>	<ul style="list-style-type: none"> <li>• No effects of apprenticeships or literacy</li> <li>• Small effect of training</li> </ul>

*table continues next page*

**Table 3A.2 Earnings Regressions: Main Results with Respect to Skills<sup>a</sup> (continued)**

Country: group	Wage/formal		Nonwage/informal	
	Formal education/TVET	Apprenticeships/other training	Formal education/TVET	Apprenticeships/other training
Nigeria: 15–65 years of age, F/IF, sample selection	<ul style="list-style-type: none"> <li>• Only (weakly significant) positive effects of education at postsecondary level</li> <li>• TVET not significant</li> </ul>	<ul style="list-style-type: none"> <li>• No significance of training or apprenticeships</li> <li>• Literacy weakly significant</li> </ul>	<ul style="list-style-type: none"> <li>• No significance</li> </ul>	<ul style="list-style-type: none"> <li>• No significance of training or apprenticeships</li> <li>• Literacy weakly significant</li> </ul>
Nigeria: 15–65 years of age, F/IF, OLS	<ul style="list-style-type: none"> <li>• Positive effects only at postsecondary level</li> </ul>	<ul style="list-style-type: none"> <li>• No effects of apprenticeships, training, or literacy</li> </ul>	<ul style="list-style-type: none"> <li>• Positive effects only at postsecondary level, weaker than in formal sector</li> </ul>	<ul style="list-style-type: none"> <li>• No effects of apprenticeships, training, or literacy</li> </ul>
Tanzania: 15–65 years of age, W/S-E, sample selection	<ul style="list-style-type: none"> <li>• Significant and exponentially increasing returns from completed primary onward</li> <li>• TVET effect stronger than completed primary but less than higher levels of education</li> </ul>	<ul style="list-style-type: none"> <li>• Positive effects of informal apprenticeships</li> <li>• Positive effects of on-the-job training (higher than apprenticeships)</li> </ul>	<ul style="list-style-type: none"> <li>• Positive effect of education but wears off (senior secondary and above less effect than some secondary); smaller effects than in formal sector</li> <li>• TVET stronger than completed primary education, less payoff than in formal sector</li> </ul>	<ul style="list-style-type: none"> <li>• No significance of apprenticeships or training</li> </ul>
Rwanda: 15–65 years of age, F/IF, sample selection	<ul style="list-style-type: none"> <li>• Significant effect only at secondary levels and beyond</li> <li>• TVET not significant</li> </ul>	<ul style="list-style-type: none"> <li>• No significance</li> </ul>	<ul style="list-style-type: none"> <li>• Significant effects from all levels compared to none</li> <li>• TVET positive (but less than primary education)</li> </ul>	<ul style="list-style-type: none"> <li>• Apprenticeships positive and significant</li> </ul>
Rwanda: 15–65 years of age, F/IF, OLS	<ul style="list-style-type: none"> <li>• Significant effect only at secondary levels and beyond</li> <li>• TVET not significant</li> </ul>	<ul style="list-style-type: none"> <li>• No significance</li> </ul>	<ul style="list-style-type: none"> <li>• Significant effects at all levels, as high or higher than formal sector</li> <li>• TVET positive (but less than primary education)</li> </ul>	<ul style="list-style-type: none"> <li>• Apprenticeships positive and significant</li> <li>• No effect from training</li> </ul>

*Note:* TVET = technical and vocational education and training; OLS = ordinary least squares.

a. W/S-E: Comparing wage for wage workers with earnings for self-employed. F/IF: Comparing wage for formal wage workers with wages for informal wage and earnings for (formal) self-employed.

## Notes

1. We used logit analysis.
2. Although education and training may be positively linked to the likelihood of entering a sector, or increase productivity and earnings in that sector, the reasons behind these effects may be more complex. Omitting relevant variables can result in biased results and inadequate policy prescriptions, in this case an exaggerated emphasis on education to improve outcomes. A key problem, discussed in chapter 2, is the difficulty of measuring ability, rather than educational outcomes. If innate ability could be controlled for, the effects of education might be smaller. Moreover, family background may condition educational attainment, as well as preferences or chances of obtaining a certain job. The importance of this latter variable was tested for Ghana, where survey information is available on parental education. Controlling for father's education did not materially change returns to education, however.
3. The multinomial logit equation is run for three sectors, generally with farming as the reference category, with independent variables such as years of schooling, training, and different control variables. The regression coefficients (odds ratios) are determined for informal and formal sectors. They represent the change in the odds of being in either sector associated with changes in the respective independent variable; values of the ratio above 1.0 represent a positive effect on the chances of informal or formal sector employment, whereas values below 1.0 represent a negative impact on the chances of informal or formal sector employment. As an example, a coefficient for a completed primary education of 1.723 for the informal sector indicates that people with this primary education have a 72.3 percent higher probability of working in the informal sector than in farming. The results need to be statistically significant to conclude that education makes a difference in the chances for employment off the farm in the informal sector.
4. The failure of surveys to break out the training by source leads to ambiguity in assessing the effect of the different training sources on the chances of leaving the farm to find employment in either the formal or the informal sector. A reason for this result is that household sample surveys are unlikely to produce a sample of sufficient size for small training programs to allow reliable estimates of outcomes. Such a sample could be available, however, where large, national training programs are involved. Overall, our surveys identify apprenticeships in all countries except Kenya. Other sources of training, as illustrated by Tanzania, may include nonformal training offered by various line ministries, by for-profit and nonprofit institutions, and by employers. These sources of training are generally grouped together in household surveys under the heading of vocational training. Usually, the survey asks questions about participation in vocational training of six months or less, which includes short courses and training offered on the job by employers.
5. The two-step procedure follows methods initially developed by Heckman (1976). The estimation of an earnings function for the informal sector may be biased by the self-selection of workers into the informal sector. The same problem in reverse would arise for estimates of an earnings function for the formal sector. The two-step procedure estimates the earning functions, taking into account first the sample selection bias estimated with the multinomial logit function for each sector. The correction may not produce unbiased results in cases where specification problems exist in the multinomial logit function. In this case, Puhani (2000), in a survey of the literature on the appropriateness of different sample-selection correction procedures, argues that

a Heckman-like procedure can do more harm than good and recommends using OLS for estimation of the earnings function.

6. This is based on the conventional Mincer (1958) specification of the earnings function in natural log form.

## References

- Becker, Gary. 1964. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. New York: National Bureau of Economic Research.
- Cunha, Flavio, and James J. Heckman. 2009. "Formulating, Identifying, and Estimating the Technology of Cognitive and Non-Cognitive Skill Formation." Working Paper 16, China Center for Human Capital and Labor Market Research, Central University of Finance and Economics, Beijing.
- Cunha, Flavio, James Heckman, Lance Lochner, and Dimitriy V. Masterov. 2005. "Interpreting the Evidence of Life Cycle Skill Formation." Working Paper 11331, National Bureau of Economic Research, Cambridge, MA.
- Fox, Louise, and Thomas Pave Sohnesen. 2012. "Household Enterprises in Sub-Saharan Africa: Why They Matter for Growth, Jobs, and Livelihoods." World Bank, Washington, DC.
- GSS (Ghana Statistical Service). 2005–06. *Ghana Living Standards Survey (GLSS) V 2005–2006*. World Bank SHIP Harmonized Dataset, GHA\_2006\_GLSS\_v01\_M\_v01\_A\_SHIP. <http://microdata.worldbank.org/index.php/catalog/1064>.
- Hanushek, Eric A., and Ludger Woessmann. 2008. "The Role of Cognitive Skills in Economic Development." *Journal of Economic Literature* 46 (3): 607–68.
- Heckman, James J. 1976. "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models." *Annals of Economic and Social Measurement* 5 (4): 475–92.
- Heckman, James J., and Alan B. Krueger. 2004. *Inequality in America: What Role for Human Capital Policies?* Cambridge, MA: MIT Press.
- Heckman, James J., and Yona Rubenstein. 2001. "The Importance of Noncognitive Skills: Lessons from the GED Testing Program." *American Economic Review* 91 (2): 145–49.
- Heyneman, Stephen P. 2003. "The History and Problems in the Making of Education Policy at the World Bank 1960–2000." *International Journal of Education Development* 23 (3): 315–37.
- KNBS (Kenya National Bureau of Statistics, Ministry of Planning and National Development). 2007. *Kenya Integrated Household Budget Survey 2005–2006*. Version 1.0 of the KNBS dataset, Government of Kenya, Nairobi. <http://statistics.knbs.or.ke/nada/index.php/catalog/8>.
- Middleton, John, Adrian Ziderman, and Arvil Van Adams. 1991. *Vocational and Technical Education and Training: A World Bank Policy Paper*. Washington, DC: World Bank.
- Mincer, Jacob. 1958. "Investment in Human Capital and Personal Income Distribution." *Journal of Political Economy* 66: 281–302.
- NBS (National Bureau of Statistics, Ministry of Finance and Economics Affairs). 2007. *Integrated Labour Force Survey 2006 (ILFS 2006)*. Version 1.0 of the public use datasets (August 2007), provided by the National Bureau of Statistics, Government of Tanzania, Dar es Salaam. <http://www.nbs.go.tz>.

- NBSN (National Bureau of Statistics, Nigeria). 2004. *National Living Standard Survey 2003*. Federal Government of Nigeria, Abuja. <http://www.nigerianstat.gov.ng/nada/index.php/catalog/28>.
- NISR (National Institute of Statistics of Rwanda). 2007. *Enquête Intégrale sur les Conditions de Vie des Ménages 2005–2006 - Overview- 10 -2005-2006 (EICV 2005)*. Version 1.1. NISR, Kigali. <http://www.statistics.gov.rw/survey-period/integrated-household-living-conditions-survey-2-eicv-2>.
- Puhani, Patrick A. 2000. "The Heckman Correction for Sample Selection and Its Critique." *Journal of Economic Surveys* 14 (1): 53–68.
- Schultz, Theodore W. 1961. "Investment in Human Capital." *American Economic Review* 51 (1): 1–17.
- World Bank. 2009. *Ghana: Job Creation and Skills Development Draft Report*. Vol. I: Main Report. Report No. 40328-GH, World Bank, Washington, DC. <http://ddp-ext.worldbank.org/EdStats/GHASTu09a.pdf>.
- . 2012. *World Development Indicators 2012*. Washington, DC: World Bank. <http://data.worldbank.org/data-catalog/world-development-indicators>.

