

Benefits and Costs of Dual and Informal Apprenticeship in Bénin*

Bart Kudrzycki[†]

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Abstract

Traditional apprenticeships are an important source of skills for early school leavers in developing countries. Usually private arrangements between parents and informal firms, apprenticeship quality and costs are not subject to oversight or regulation. Public reforms have aimed at improving access or quality of training, for example by complementing in-firm training with a weekly classroom component. We provide a detailed account of such a program conducted at national scale in Bénin. Using two waves of surveys with firm owners and apprentices, we analyze the human capital gains and material costs and benefits associated with training. We find no differences in human capital accumulation between apprentices who participated in the program to a sample of rejected applicants and non-applicants from the same firms. Firms which trained more dual apprentices did not grow more quickly or become more profitable. Additionally, we observe that allowances distributed to apprentices in lieu of wages appear to be considerably higher than training fees paid, especially at larger firms. This contradicts the common wisdom that informal firms rely on apprenticeship fees as a source of financing. Instead, apprentice productive contributions to the firm appear to be the primary incentive for firms to participate in training. **The dual training program needs improvement, not clear why more experienced (hence productive) apprentices are sent; balance must be struck between the effectiveness of classroom training (should be weekly) and the preferences of trainers, who apparently benefit from apprentice labor, not fees; as argued by others, increasing MC skin in the game may be key for masters to see the classroom component as a benefit.**

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[†]Development Economics Group, ETH Zurich, Switzerland, bartlomiej.kudrzycki@nadel.ethz.ch

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1 Introduction

In sub-Saharan Africa (SSA), interest in apprenticeships is on the rise. In countries with largely informal economies, traditional apprenticeships (also referred to as apprenticeships in the informal sector or informal apprenticeships) are one of the most important sources of skills for early school leavers, accounting for as much as 80 percent of technical and vocational training (TVET)¹ and for as much as 90 percent of total employment in the crafts sector (Adams et al., 2013; Filmer and Fox, 2014; Walther and Filipiak, 2007; World Bank, 2017). As increasing numbers of youth in SSA suffer from a lack of labor attachment, underemployment, and poverty, informal sector training is seen by many policy experts as an important tool for tackling the youth employment challenge.

In contrast to formal TVET, which usually takes place exclusively in the classroom, traditional apprentices train on-the-job in informal sector microenterprises or workshops. Traditional apprenticeships involve a private contractual arrangement between an aspiring apprentice — usually a school leaver between the age of 14 and 18 — or his or her parents, and a master craftsman (MC) who agrees to train the apprentice for a duration of about three to four years for a fee (Bas, 1989). Upon completion of the apprenticeship, the MC usually issues a certificate acknowledging the training; some apprentices continue to work for the same or for another workshop wage employees, though most seek to start their own business given access to sufficient capital (Frazer, 2006). While unregulated at the national level, informal apprenticeships are nevertheless structured according to the dictates of tradition and the customs of local professional associations, and, in the context of highly informal economies, are generally considered to be more effective than formal TVET at delivering the skills

¹According to a survey of five countries, 20 percent of youth aged 25-34 had participated in an apprenticeship in the past, though participation varied by country and was as high as 35 percent in Ghana; in contrast, only 1 percent were enrolled in formal TVET, and about 9 percent in tertiary education (Filmer and Fox, 2014). A more recent estimate of enrollment in formal TVET is 6 percent across SSA (Hofmann et al., 2022)

demanding by the labor market (Ahadzie, 2009).

Despite their attractiveness as a source of skills for young school leavers, the unregulated nature of traditional apprenticeships also gives rise to a number of potential market failures that may negatively affect their provision and have led to calls for their reform (Walther, 2011). For instance, in the absence of complete, enforceable contracts, firms may be unable to commit to providing general skills training (Acemoglu and Pischke, 1998, 1999; Dustmann and Schönberg, 2012). Apprentice productivity may also be so low that subsistence levels (paid in the form of “chop money” by the firm owner) are greater than the returns to training, resulting in its under-provision. Firms may also fear “poaching” of newly trained apprentices by competitors — a particularly salient problem for small enterprises, which experience higher employee turnover and offer fewer opportunities for career advancement (Mcintosh et al., 2011) — though evidence of this is limited for the African context.

Quality is also affected by the unregulated nature of informal apprenticeships, and may have adverse consequences for participating youth: apprentices may be exposed to inexperienced trainers who keep them in their apprenticeship for too long (Bas, 1989), or experience limited labor market mobility into formal sector wage jobs due to the lack of formal accreditation systems (Acemoglu and Pischke, 2000; Alfonsi et al., 2020; World Bank, 2017). Policy makers have been increasingly interested in reforms to address such market failures, such as the competence-based, nationally-accredited certification of informal apprenticeship which has recently been introduced in countries including Niger, Togo, Malawi and Tanzania.

An alternative reform is the introduction of a classroom component to an otherwise traditional apprenticeship, producing a hybrid “dual system” comparable to that of the Swiss and German variety (Walther, 2011). Dual systems promise to increase training quality by introducing a state-regulated classroom component, while also improving the signalling ability of apprentices by offering official, nationally-recognized certifica-

tion. In SSA, dual apprenticeship schemes were first introduced in Bénin and Togo in the 1980s by the Hans Seidel Foundation, a German NGO, and apprenticeship reforms based on the dual system have since been introduced in Mali, Côte d’Ivoire, Senegal, Tanzania, Togo, and Niger (ILO, 2020; Walther, 2011). Many of these schemes have struggled with financing, MC engagement, and integration into the existing national TVET and regulatory frameworks; nevertheless, with its potential to simultaneously harness the abundance of training firms in the informal sector and the growing demand among parents and youth for formal education, dual system formalization remains a promising approach to TVET reform.

In this paper, we analyze the impact of a national dual system program on participating apprentices and firms in Bénin. The program, called *Certificat de Qualification Professionnelle* (CQP), appends weekly classroom training at a local training center to otherwise traditional in-firm apprenticeship training in an informal firm. Using two waves of apprentice-firm survey data collected for 427 apprentices training in 197 firms, we assess the impact of this weekly classroom training component on learning outcomes, and estimate the marginal effect of apprentice participation in dual system training on firm size and profits.

Studies of vocational training interventions combining on-the-job and classroom teaching in middle-income countries have reported modest yet persistent increases in earnings together with mixed impacts on employment (Alzúa et al., 2016; Attanasio et al., 2017, 2011; Card et al., 2011; Ibararán et al., 2019, 2014). Similar interventions in LICs have been characterized by low take-up, high dropout, and low efficacy (see Blattman and Ralston, 2015; Ghisletta et al., 2021; Tripney and Hombrados, 2013 for an overview). These programs tend to be shorter than the one studied in this paper (up to several months, rather than years), and focus on employment in the formal rather than the informal sector. To our knowledge, only one paper has attempted to quantify the impact of dual-system training in Sub-Saharan Africa: in a randomized experiment

in Côte d'Ivoire, Crépon and Premand (2019) found that youth offered a stipend for an apprenticeship that combined 12 to 24 months of on-the-job training with theoretical classes at local training institutions earned 15 percent more after three years, were involved in more complex and non-routine tasks², and received training certification at a higher rate than non-treated youth. We study a similarly structured dual training program, but one that is about twice as long and does not involve any direct subsidies or eliminate fees.

A related literature studies the incentive structure behind the dual system by analyzing the costs and benefits of apprenticeship for the training firm. A number of such studies have been conducted in the European context with the aid of surveys and simulations (see, e.g., Mühlemann, 2016; Mühlemann and Wolter, 2014; Mühlemann and Wolter, 2019), but have only recently begun to generate interest in lower-middle and low-income countries. Examples include Bolli et al. (2021), who find that training costs outweigh benefits in Serbia (with larger firms suffering smaller losses), and Bolli et al. (2020), who show that training firms in Nepal generally profit from training, with little variation in net benefits across firm size. To our knowledge, ours is the first rigorous cost-benefit study of dual training conducted in SSA.

Though traditional apprenticeships are very common in West Africa and across SSA, there is limited direct empirical evidence of their impact on the skills or labor market outcomes of apprentices. Long-term returns to informal training have been shown to be quite heterogeneous in Ghana, benefiting youth with lower levels of education the most (Monk et al., 2008). An experimental study in Uganda found that six months of in-firm training measurably improved apprentices' skills, and that these skills persisted two to three years after the end of training (Alfonsi et al., 2020). However, skills acquired in informal training tend to be firm-specific, and thus more likely to lead to self-employment

²Enrollment in subsidized dual apprenticeship training increased the likelihood of undertaking non-routine analytical tasks by .24 standard deviations (SDs) and non-routine interpersonal tasks by 0.08 SDs relative to non-treated traditional apprentices. A task intensity index was found to be .21 SDs lower for dual apprentices, suggesting that dual apprentices were involved in a wider range of tasks.

than to quick career progression in the formal sector than formal schooling (Alfonsi et al., 2020; Frazer, 2006; Hardy et al., 2019).

Studies from SSA also suggest that informal apprenticeship training tends to have positive effects on microenterprise growth and profitability. Using data on formal manufacturing firms from Kenya, Zimbabwe and Ghana, Rosholm et al. (2007) observed a significant wage increase (of about 20%) in firms that trained in the previous 12 months, with large firms benefiting more than small ones. Hardy and McCasland (2022) found that randomly assigning an apprentice to informal firms in Ghana increased firm size by about half a worker, and firm revenues by 5-15 percent per apprentice. While Crépon and Premand (2019) look at the impact of fee subsidies on firms' apprentice and employee stocks, they did not estimate the change in size or revenues that a firm can expect from hiring additional apprentices. Our study is thus the first, to our knowledge, to report the impact of dual system training in SSA on firm size and profits.

Finally, a number of studies have examined the financial arrangements between traditional apprentices and informal firms. Velenchik (1995) studies the structure of apprenticeship contracts in small informal firms in Ghana, identifies three main transactions between apprentice and firm — apprentice wages, fees and allowances — and distinguishes between two broad types of contracts, namely those with and those without training fees. She finds that firms that do not charge fees are smaller and tend to offer more specific training. Velenchik (1995) and Frazer (2006) also suggest that training fees may be a substantial source of financing for some firms, but do not provide estimates of the allowances, wages and other training costs that these fees are meant to offset. This study attempts to fill this gap.

We find that, in general, all apprentices gain trade-specific human capital over the three observed years of training. However, we are unable to show that participation in dual system training contributes to additional learning. We find large variation in learning across trades, and the largest gains in human capital to be for youth with low

learning scores at baseline. On the firm side, we find that the majority of MCs suffer net losses for each apprentice they train. The proportion of firms with negative net benefits from training, and the magnitude these losses, vary considerably depending on assumptions around allowances disbursed by the firms. Mean net benefits per apprentice range from a total -454.58 \$US to 295.69 \$US depending on the costs and benefits taken into consideration.

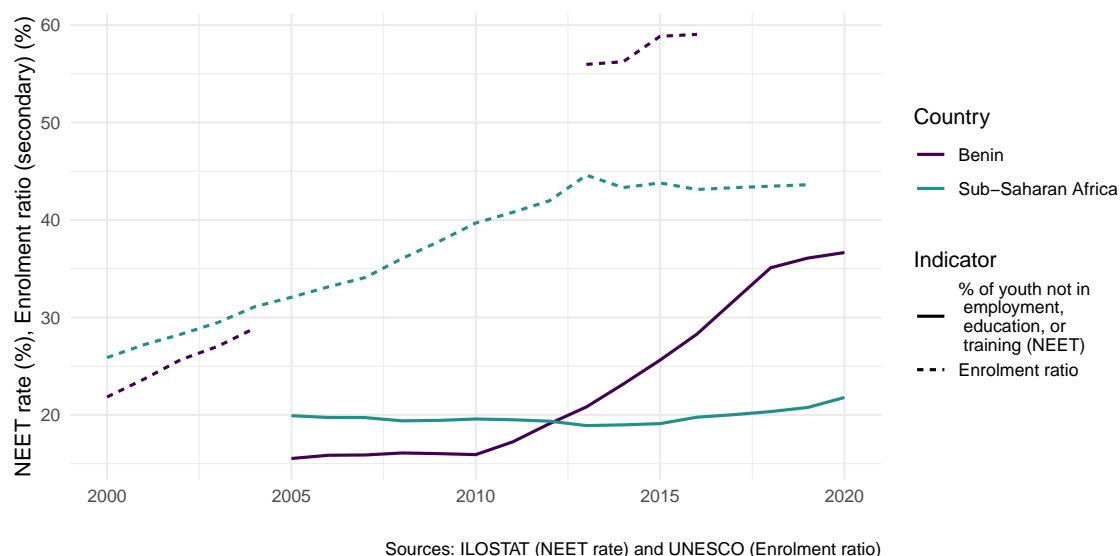
The paper proceeds as follows. Informal apprenticeship in Bénin, the CQP program, and the survey data used for the analysis are presented in Section ???. Results are presented in Section ??. Section ??? concludes.

2 Data and Methods

2.1 Country Context

Despite the relative stability of its democratic government and strategic importance as a transportation hub, Bénin (population approx. 12.1 million) performs poorly on many development indicators, ranking 158th out of 189 countries on the 2020 Human Development Index. Youth employment is a particularly pressing issue, with youth labor force participation decreasing from 60 percent in 2000 to 40 percent in 2020 according to the ILO. As in other parts of SSA, secondary and tertiary school enrollment has seen a steady increase in the past two decades, coinciding with a sharp decrease in the youth employment rate: according to the most recent labor force surveys, the youth employment-to-population ratio decreased by 22 percent, from 40 percent to 31 percent, between 2011 and 2018, compared to an 8 percent decrease for adults over the age of 25 over the same time period. Meanwhile, the share of youth neither in employment, education or training (NEET) increased from 17 percent in 2011 to 35 percent in 2018 (see Figure ??) — one the highest rates in West Africa, and the world (ILO, 2022).

Figure 1: Rates of youth enrollment and inactivity: Bénin and SSA



As enrollment in formal education has not translated to increasing rates of youth employment, interest in promoting alternative pathways to the labor force has grown. In Bénin, entry into formal technical and vocational education and training (TVET) begins after the completion of the second year of secondary school, or nine years of education. Yet across the country, the median number of years spent in the education system is just four; only five percent of youth of secondary school age are enrolled in TVET (ILO, 2021), in line with the six percent of young workers estimated to participate in formal TVET across SSA (Hofmann et al., 2022). Thus, rather than formal TVET, it is informal apprenticeship that is the primary conduit into the labor market for early school leavers in Bénin, with as many as 300,000 young men and women estimated to be in training (ILO, 2021). Recent examples of investment in Bénin's apprenticeship system include \$6.3 million from the World Bank's for the Benin Youth Employment Project (PEJ), completed in 2019, and a planned \$16.4 million dollar investment in strengthening the TVET system starting in 2020 (World Bank, 2020).

In 2005, the government of Bénin announced a restructuring of traditional appren-

ticeship in the informal sector. Two national apprenticeship schemes were introduced: a formalization of informal, firm-based apprenticeship called the *Certificat de Qualification aux Métiers*, which introduced a national certificate for the completion of traditional training, and the dual system *Certificat de Qualification Professionnelle* (CQP) program, which sought to combine in-firm, firm-specific training with more general classroom-based teaching, and to accredit the training through a separate nationally-recognized certificate. The three stated objectives of the CQP reform were to (i) offer practical and theoretical training to youth under apprenticeship contracts in the craft sector (ii) train a high-performance labor force; and (iii) improve the productivity and profitability of workshops in the craft sector (Davodoun, 2011).

The CQP is currently available for 13 out of the more than 300 trades listed in the craft sector: auto mechanics, motorcycle mechanics, air conditioning installers, tailors, masons, carpenters, metalworkers (primarily welding of gates for living compounds), electricians, and plumbers (*Swisscontact*, 2019)³. To participate in the CQP, applicants must (i) be at least 14 years old, unless otherwise authorized by the labor inspector; (ii) have a written apprenticeship contract that complies with labor laws; (iii) have completed at least 6 years of formal schooling; and (iv) pass a national entry examination (KOF, 2017). Firm owners apply on behalf of the apprentices already in their charge, generally through local craftsmen associations. After three to four years of training, CQP apprentices may attempt the final examination, which takes place on one date a year for the entire nation, has a practical and a written component, and is overseen by state representatives and local craftsmen. Upon successful completion, apprentices receive a nationally-recognized certificate and have the option to pursue further technical and professional studies if they so desire.

The main government organs tasked with the administration of the CQP are the

³This selection of trades was based at least in part on existing trades from early experimental dual training programs to take advantage of existing training center infrastructure. The CQM is available for about 50 trades.

national TVET directorate (DETFP), which is in charge of apprentice recruitment and training center accreditation, the Direction of Test and Exam Services (DEC), in charge of the entrance and exit examinations, and FODEFCA, responsible for procuring and distributing funding for the program (Nouatin et al., 2019). The CQP began curriculum planning in 2005 with technical assistance from the French Development Agency (AFD) and the Swiss Agency for Development and Cooperation (SDC), among others, and became operational in 2008. In 2012, management of the program passed from Swisscontact, a Swiss NGO, entirely into the hands of FODEFCA (Nouatin et al., 2019). Cost sharing for the CQP program is shared by the state and the apprentice, with the state financing body for dual apprenticeship, FODEFCA, officially taking on 90 percent of the training costs (KOF, 2017). However, FODEFCA is largely reliant on external donor funding, and regular financing has been an issue for the program in recent years (David-Gnahoui and Ahouangnivo, 2017). The financing of dual training comprises three main budget items: the costs of training to the firm, the administration of the vocational training center, and expenses for entry tests, the final examination, and certification. While on-the-job training in the firm is paid for by the apprentice or their parents, activities in the vocational training centers are largely financed through FODEFCA from various sources (national budget, donors, NGOs, etc.). Certification upon successful completion of the CQP is allocated to the national budget via the Directorate of Examinations, DEC (David-Gnahoui and Ahouangnivo, 2017).

2.2 Sampling and Attrition

The data for this study was collected in two separate surveys. The first consisted of interviews with apprentices who had applied to the 2019 cohort of the CQP program; the second was conducted with the firm owners, or master craftsmen, of their respective training firms. To allow for trade-level controls and to reduce travel distances for interviews, apprentices were randomly selected from a subsample of all CQP applicants: those train-

ing in electrical installation, carpentry, masonry, metalwork or plumbing workshops in the southernmost regions of Bénin.

Table 1: Apprentice Sampling

CQP Status	Explanation	Apprentice Survey	Firm Survey
Selected	Applied to CQP in 2019 through master craftsmen. Passed exam and was selected.	Random sampling from list of all CQP applicants in five chosen trades and from southern Bénin)	MC assesses <i>at most</i> two apprentices, randomly chosen from all CQP selected/not selected in firm at baseline.
Not selected	Applied to CQP in 2019 through master craftsmen. Was not selected due to exam score or lack of proximate training center.	Random sampling from list of all CQP applicants in five chosen trades and from southern Bénin)	MC assesses <i>at most</i> two apprentices, randomly chosen from all CQP selected/not selected in firm at baseline.
Did not apply	Did not apply to CQP. Training as traditional apprentice.	N/A	MC lists <i>up to</i> 5 apprentices who did not apply to CQP. Assesses only one, randomly chosen at baseline.

In addition to questions regarding training practices and firm performance, master craftsmen were asked to assess specific apprentices training at their firm. Up to two