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The Consequences of Educational Reform on Youth Employment: Evidence from an Enrollment Increase in Vocational Training in Ethiopia[*]

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Abstract

Increasing access to basic-level industrial education in developing economies and its quality improvement are quite important for the industrialization of low-income countries. It may also have an impact on individual labor market outcomes in industrial and entrepreneurial work. An increase in the labor supply by introduction of a new cohort also induces overcrowding due to competition between the new and old cohorts, which have received different types of basic-level industrial education. This paper examines the impacts of an educational expansion on youth labor market outcomes, exploiting an Ethiopian reform in technical and vocational educational training toward competency-based training, which expects to foster human capital through the adoption of a new curriculum and removes information asymmetry through public certification of skill levels. This paper tests whether improvements in human capital and information for a new cohort can overcome the problems of crowded labor markets arising due to the educational expansion. Large-scale and nation-wide administrative data suggest that the industrial education reform decreased the likelihood of employment in permanent, formal, or full-time jobs for the new cohort due to an increase in competition with old cohorts. This effect of large enrollment increase in vocational training pushes young people in general, and males in particular, to choose self-employment. The data also indicates that an industrial education expansion has a lasting negative effect only for women working in permanent, formal, or full-time jobs. Overall, an expansion in vocational training has more negative impacts for young women than for young men.

Keywords: returns to vocational training; educational reform; gender difference
JEL Classification Number: J21; I25; I26; O17

1 Introduction

Vocational training offers the chance for an improved lifestyle to individuals in developing economies that are moving from agricultural to manufacturing and service industries. Thus, educational reform in vocational training plays an important role in youth employment outcomes and the growth of manufacturing and service sectors. This paper examines the effects of increasing access to vocational training on employment outcomes among young people, exploiting an education reform in Ethiopia that has allowed enrollment increases since 2006 along with substantial reform from an old curriculum to a new competency-based assessment in technical vocational education and training (hereafter TVET). In Ethiopia, the education reform in 2006 had two dimensions. First, the training curriculum has changed to competency-based training; the graduates of vocational training cannot get skill certificates until they pass a competency-based assessment of skill-level. Second, the educational reform has also rapidly increased the enrollment capacity through school construction and allowing more students to enroll in existing schools. These two dimensions of educational reform in vocational training have led to an increase in the quantity and quality of the labor supply for a new cohort, who experienced the new curriculum.

In this paper, we investigate the effect of the educational reform in vocational training since 2006 on employment outcomes among young people. The reform of the vocational training system changed their curriculum from course-based training to competency-based training (CBT) in 2006. This paper assumes that "competency-based training" is a more effective tool of labor market signaling of productivity for vocational trainees while the previous course-based training is a less effective tool for signaling true productivity. The treatment group is a group of new entrants to vocational training in 2006 (their birth years are 1990 or 1991), and the control group is a group of entrants to vocational training in 2004 (their birth years are 1987, 1988, or 1989) and entrants of secondary education between 2004 and 2006.

We have large-scale administrative survey data on two cohorts during 2009–2015: those born before 1989 and those born after 1990. These two cohorts received different education systems in vocational training; the pre-1989 cohorts experience the old system and the post-1990 cohorts experienced the reformed one. While vocational training has experienced reform, neither the lower nor upper secondary education systems have experienced substantial reforms since 2006. Those who experienced competing grades allow us to control for youth employment outcomes. This paper exploits this to examine the reform using a differences-in-differences (DID) methodology, comparing youth employment outcomes across cohorts and grades. To analyze the effect of reform accurately, this paper applies a regression-discontinuity

design (RDD) approach to the DID methodology, restricting the analysis to two cohorts: those born in 1987–1989 and those born in 1990–1991. The data contains information about these two cohorts, including several employment outcomes and individual characteristics (gender, age, marital status, and geographic location) for every year during the period 2009–2015.

Why is it still important for us to study employment outcomes for those who have graduated from vocational training in developing economies? Fields (2012) shows that skill deficiencies are causing unemployment, a mismatch between the unemployed and job vacancies, and no creation of new jobs. Fields (2012) also asks how labor market policies, including schooling and training, help to connect individuals with better work. In short, the question is whether an individual with more education and training is more likely to work in better job categories and have higher wages. In addition, Eifert and Ramachandran (2004) have shown that skill shortages are a serious hindrance to manufacturing firms in Ethiopia because more than 30% of manufacturing firms in Ethiopia say that skill shortages among workers are a severe constraint to capacity utilization. From the viewpoint of vocational training in Ethiopia, this paper provides evidence to address the questions on the benefits and costs of investing in the skills and productive abilities of workers which Fields (2012) raised. We also provide evidence to address the question of how public policy fosters competitive human capital through improving labor market signaling and enrollment increases.

The unique features of this policy experiment, combined with the large-scale and nationwide data, allow us to compare youth employment in the same labor market in the same year for the same gender among those of a similar age who experienced two different training systems. This paper mainly looks at gender difference in the reform effect. Furthermore, we examine how the reform effect changes over time during the period that people in the old training cohorts turned 28 while those in the new one turned 24 or 25. The findings of this paper show that the education reform in vocational training generally reduced the likelihood of employment for the new cohort, especially for women who experienced the new expanded training system. The industrial education reform decreased the likelihood of young women from the new cohort to be employed in permanent, formal, or full-time jobs due to an increase in competition with old cohorts. In contrast to young men, the reform does not push young women to choose self-employment. We also find that the reform has a lasting negative effect on women working in permanent, formal, or full-time jobs. Overall, the reform creates substantial gender differences in employment outcomes for women and men in the post-reform cohort. There are more negative employment impacts of the reform for young women.

The contribution of this paper is three-fold. First, our analysis directly contributes to the educational reform literature analyzing employment outcomes by providing evidence from

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social experiments in Ethiopia. Since the previous literature has focused on the reform of general education (Meghir and Palme 2005) or the increasing provision of elementary education through large-scale school construction (Duflo 2001, 2004), there is much room for a discussion of vocational training, which is expected to be a basic educational tool for industrial work, such as manufacturing, and service growth. This is also true for developing economies where both general education and technical and vocational training need to be expanded in quality and quantity. The evaluation of policy changes in vocational training complements the analysis of general education reform when we consider how these two reform effects differ among those who are in the school-to-work transition. Our analysis also provides direct evidence for how an education reform creates a male–female difference in employment outcomes among those who experience the new training system. In short, these two distinctive contributions of this paper relate directly to questions about which dimensions of education reform affect whom. In contrast to Bianchi (2016) and Bianchi and Giorcelli (2017), who examine the impact of class-room congestion due to increases in the numbers of lower-achieving students on learning and innovation in STEM fields in Italy, our analysis examines the net effects of the reform, including quantity expansion and quality improvements.

Second, it is also important to highlight that the research design of this paper utilizing the actual educational reform is the complement of randomized control trials (RCTs) estimating the impact of job training programs in developing economies. Our analysis examines three main features of the impact of vocational training: gender difference, occupational choices, and medium- and long-run impacts. We examine how the reform in the vocational training system has differing employment impacts on women and men. Thus, this paper also contributes to the educational reform literature evaluating gender differences by examining whether and how the effect of quantity and quality expansion differs across gender. Two other recent studies have also addressed this problem. First, Cho, Kalomba, Mushfiq Mobarak, Orozco, and Wolfson (2016) focus on how the effects of vocational training differ across gender using experimental evidence from Malawian youth. In short, they demonstrate how economic and social constraints on women affect the impact of training through low participation and high dropout rates. Second, Blattman and Dercon (2016) found that self-employment becomes more preferable to low-skill manufacturing if economic constraints to self-employment are removed by using randomized experiments offering industrial work or cash and business training for self-employment.

Third, previous experimental evidence from Colombia, the Dominican Republic, and Turkey suggest that the treatment effects vary within and across countries. Card, Ibarraran, Regalia Rosas-Shady, and Soares (2011) show that there is little indication of a positive employment

impact from training in the Dominican Republic. Hirshleifer, McKenzie, Almeida, and Ridao-Cano (2014) show that the positive employment impacts of training have disappeared within three years in Turkey. Experimental evidence from Colombia show medium- and long-term impacts of job training programs as well as gender difference in the treatment effects. Attanasio, Kugler, and Meghir (2011) find that the program increases earnings and employment for women. Attanasio, Guarin, Medina, and Meghir (2015) show that the program in 2005 increased the probability of working in the formal sector even ten years after the job training program ended. Kugler, Kugler, Saavedra, and Herrera (2015) also found that the program increased the probability of entering and remaining in formal employment even three to eight years after the program ended. They also found that formal education and vocational training are complements. Since our analysis also shows medium- and long-term effects of the nation-wide reform in vocational training, including enrollment increases, it is useful to compare the findings from this RCT-based evidence targeting specific groups with our results to investigate how program effects and enrollment increases would create the impacts of government-sponsored vocational training policy.

In summary, we analyze the school-to-work transition and labor market in an emerging and developing economy, which is characterized by (1) high economic growth during the last decade and (2) a large informal sector, including self-employment. This paper studies the rapid expansion of technical and vocational education and training (including its extension services) in Ethiopia in the context of the above two characteristics of labor markets in developing economies. To do that, we examine the effects of public-sponsored industrial-skill development through technical and vocational education and training on job-market outcomes in a growing labor market with a large informal sector and large inequality.

The rest of the paper is organized as follows. Section 2 describes the education reform. Section 3 describes the data. Section 4 presents our model. Section 5 reports the evidence that the reform lowered youth employment outcomes, in particular for women. Section 7 discusses the results and concludes the paper.

2   Vocational training reform in Ethiopia

This section briefly describes the reform in vocational training, which is called technical and vocational education and training (hereafter, TVET) based on Shimazu (2014). In Ethiopia, there is a more than twenty-year history of government-supported vocational training for those who drop out of the formal education system, but there was a significant shortage of budget and organizations for certification until the 1990s. The Ethiopian government started to

prioritize TVET in the early 2000s because TVET was expected to supply a trained workforce for basic infrastructure- and natural resource-based industries for the government's economic planning at that time. After 2002, the TVET system was supported by the German government and its organization gradually improved. The requirement for TVET enrollment was completion of lower secondary school and those who could enroll in the TVET system for up to three years. The Ministry of Education in Ethiopia says that the total supply of vocational trainees was close to 100,000 and the number of TVET schools reached more than 250 over the country by 2005.

In 2006, the TVET system drastically changed, except for the requirement for TVET enrollment of completing lower secondary school. The distinctive features of the reform are as follows. First, the new TVET system provides lower levels 1 and 2 for laboring work in addition to the existing three-year training system (levels 3, 4, and 5) for managerial work. It takes 2 years (3 years) to complete level 2 (level 3) training. Second, the training certification system has adopted competency-based training from Australia and the Philippines to establish skill standards and a national-level certification system, which is called the Ethiopian National Qualification Framework. The transition from the old system (course-based training) to the new qualification system requires vocational trainees to be evaluated in terms of whether their skill competence meets skill standards after completion of training courses at TVET schools. Third, the Ethiopian government had increased enrollment of TVET trainees, especially for levels 1 and 2, through a national-level education plan, called the National Human Resource Demand Pyramid. The government started to restrict the ratio of enrollment for upper secondary school (20%) and expanded enrollment of TVET trainees to meet demand from industries. In summary, there was subsequent quantity expansion along with the quality improvement of the training system through the change in curriculum policy from course-based training to competency-based training.

We now start to develop a conceptual framework to evaluate labor market responses to the reform. There are two key features of the conceptual framework that help us to understand the impact of the reform on the labor market for vocational trainees: signaling and enrollment increase. In the pre-reform vocational training system, those who completed lower secondary school and entered TVET had no way to disclose their ex-post trained skill levels. They did not have any means of signaling their true skill level to employers. It was important to enroll, take, and finish up to three years of course-based training for those who entered the old system before 2006. Those who entered after 2006 have been exposed to a new system, which is characterized by competency-based training. The competency-based training system in schools allows vocational trainees to signal their skill level through a national certification

system. We assume that the skills of those who have been exposed to the new system become common knowledge to employers in the labor market. That is, information about skill quality improves after the new system is introduced. However, the expansion of enrollment along with quality improvement makes schools congested, which could mean that learning is impeded. Furthermore, since TVET schools in Ethiopia have played a key role in finding jobs for vocational trainees, the school to work transition could be delayed in crowded schools. The quantity and quality channels of the reform, therefore, have different implications for the labor market. This paper examines which channels are dominant in the labor market in Ethiopia. To the best of our knowledge, the lower and upper secondary school system has not changed substantially during this period.

3   Identification and empirical strategy

This section describes our estimation of the impact of the reform on employment outcomes. To investigate the effect of the reform on young people, we consider several measures of employment as outcome variables. Since the reform started in 2006 in entire regions or communities within urban areas, the eligible individuals for the new training system are those who completed lower secondary school at age 15 or 16 after 2006 and chose vocational training for further education; the 1990 and 1991 cohorts were assigned to the new system. The individuals who completed lower secondary school before 2006 were already assigned to the old training system. We treat the 1987–1989 cohorts as old cohorts for comparison between old and new training systems. The sample for evaluation can thus be divided into two groups: (1) individuals from the 1987–1989 cohorts who were not assigned to the reformed system and (2) individuals from the 1990–1991 cohorts who were assigned to the reformed system.

We make the following assumptions, which are similar to those of Meghir and Palme (2005). First, in the absence of reform in vocational training, the average employment outcomes between eligible and non-eligible cohorts would have been the same conditional on observed characteristics. Second, we assume that labor demand schedules for vocational trainees and graduates of lower and upper secondary educations have similar trends in the labor market in Ethiopia. Third, we assume that students could not make a preemptive choice to enter the new training system before they complete lower secondary school. Finally, we assume no intervals between finishing lower secondary school and beginning vocational training; that is, we assume that the vocational trainees enrolled in training schools immediately after completion of their lower secondary education.

Based on these assumptions, we evaluate the effect of the reform using a DID approach; we

compare average employment outcomes between vocational trainees who were assigned to the pre-reform and post-reform cohorts while controlling cohort specific shocks to compare average employment outcomes between graduates of lower secondary education in the pre- and post-reform periods. To do a robustness check, we also estimate the effects separately using two comparison groups: those who graduated from upper secondary education in the pre-and post-reform periods and those who graduated from lower or upper secondary education in the pre- and post-reform periods.

We compute the DID estimator in the linear regression model as follows.

$$(\text{outcomes})_i = \beta_0 + \beta_1(\text{TVET})_i + \beta_2(\text{post})_i + \alpha(\text{TVET} \times \text{post}) + \beta_X(\text{covariates})_i + u_i, \quad (1)$$

where $(\text{outcomes})_i$ signifies the employment outcomes observed for individual i, $(\text{TVET})_i$ is a dummy variable indicating whether individuals went to vocational training school or stopped at lower secondary education, $(\text{post})_i$ is a dummy variable indicating the pre- and post-reform cohort to which the individual belongs, and $(\text{TVET} \times \text{post})_i$ equals 1 if individuals chose vocational training and were assigned to a post-reform training cohort. The key parameter to be estimated is α, the average effect of the reform for those who experienced changes in quantity and quality at vocational schools. The factor (covariates) is a set of observable characteristics of individuals over the periods; we compare the employment outcomes within the same local labor market, year, and gender. Finally, the unobserved component ϵ_i signifies a random error term, which is assumed to be uncorrelated with the main treatment variable $(\text{TVET} \times \text{post})_i$ conditional on other covariates. This paper uses ordinary least squares (OLS) when we estimate the effect of the reform. We also separately estimate the reform effects across years over the period 2009–2015.

4 Data

We use two individual-level and national-representative administrative datasets from the pre- and post-reform cohorts. First, we use the annual Urban Employment and Unemployment Survey (hereafter UEUS), which covers urban residents. UEUS covers the years 2009–2012 and 2014–2015. Second, we use the Labor Force Survey (hereafter LFS) in Ethiopia, which is conducted every five years and covers urban and rural residents. LFS allows us to look at individuals in 2013. Thus, we utilize data on individuals over the seven years between 2009 and 2015. The dataset covers more than 750,000 individuals over the periods.

We restrict the sample based on the following selection criteria. First, our focus is on urban residents and the urban labor market. We, therefore, drop rural residents from LFS in

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2013 to keep our focus only on urban residents and urban labor markets in the period 2009–2015. Second, our comparison focuses on those who completed lower secondary education but did not enter college. Regarding educational achievements, we focus on graduates of lower and upper secondary educations and graduates of TVET levels 1 or 2. Thus, we drop both college graduates and those who finished education at elementary (preparatory) schools. Third, this paper focuses on specific cohorts to identify the impacts of the reform. Again, we restrict our sample to individuals from the 1987–1989 cohorts, who were not assigned to the reformed system, and individuals from the 1990–1991 cohorts, who were assigned to the reformed system. Thus, our sample covers those aged 18–22 in 2009. In 2015, our sample of pre- and post-reform covers individuals who attained 24–28 years of age. The total sample for the estimation comprises 12,950 women and 12,588 men over seven years.

The dataset includes information on several binary variables that capture the employment status of both men and women: (1) a permanent job dummy variable; (2) a formal job dummy variable; (3) a fulltime work dummy variable, which is equal to 1 if individuals work more than 35 hours per week; (4) an employee dummy variable; (5) an employed dummy variable, which is equal to 1 if an individual worked 4 hours or more in the previous seven days; (6) an active dummy variable, which is equal to 1 if an individual worked in the previous seven days or looked for a job in the previous three months; and (7) a self-employed dummy variable. We use these status variables as outcome variables in the linear regression. In addition to these employment status variables, we use five working sector categories to investigate which sectors experienced a larger effect of the reform: education, public sector, services, manufacturing, and construction. Finally, the dataset also includes age, marital status, eleven geographic locations in Ethiopia (called zones), and surveyed year dummy variables for the period 2009–2015. We utilize these variables as covariates in the linear regression.

5 Results

5.1 Descriptive results

We start with descriptive statistics to present our empirical results. Table 1 shows summary statistics of employment outcome variables and individual characteristics for pre- and post-reform cohorts for both genders. We also report the difference in outcomes and individual characteristics between pre- and post-reform cohorts. Table 1 ignores education. Nevertheless, it can tell an important story about the response of the labor market to the education reform. The average proportion of women with permanent jobs for the pre-reform cohort is 12.8%, while 13.4% of men among pre-reform cohort have permanent jobs. These ratios dropped to

7.7% for women and to 7.8% for men belonging to the post-reform cohort.

These declines for the post-reform cohort were also true for other employment outcomes. Women belonging to the post-reform cohort were less likely to work in formal jobs or have fulltime work. Women from the post-reform cohort were less likely to be hired by employers, or to have worked at least four hours in the previous seven days. They were also less likely to work at all or search for jobs. The self-employment rate was also lower for women from the post-reform cohort. The comparisons of employment outcomes between pre- and post-reform cohorts among women show that the post-reform cohort had lower employability and lower labor force participation on average. These findings are confirmed by comparisons by work sector between pre- and post-reform cohorts. Women from the post-reform cohort were less likely to work in the education, services, or manufacturing sector; instead they went to the public sector.

These patterns are also true for men. Individuals belonging to post-reform cohort are less likely to have permanent, formal, fulltime jobs. They were also less likely to participate in the labor force. The average proportion of self-employment was lower for the post-reform cohort. Furthermore, Table 1 suggests that these declines of employment outcomes among post-reform cohorts are larger for men than for women. Men from the post-reform cohort also went to the public sector. In the lower panel of Table 1, we show the difference in enrollment rates for vocational training and lower and upper secondary education. These are small for both women and men. Pre-reform cohorts were more likely to be married. The average difference in age between pre-and post-reform cohorts is 2.6. There are small differences in geographic locations between pre- and post-reform cohorts.

It is more important to investigate how differences between pre- and post-reform cohorts vary with education. We report more detailed descriptions of differences in employment outcomes between pre- and post-reform cohorts in Table 2 to look at differences of impact between women and men having TVET and lower and upper secondary education. Table 2 shows that female TVET graduates belonging to the post-reform cohort experienced a slightly larger decline of employment outcomes compared with secondary-educated men belonging to the post-reform cohort. However, male TVET graduates belonging to the post-reform cohort experienced a smaller decline of employment outcomes than secondary-educated men of the post-reform cohort. The summary statistics in Table 2 suggest that the reform has a more disadvantageous impact on female TVET graduates than on male TVET graduates. We will clarify this finding using a DID approach while controlling observable characteristics.

==Tables 1 and 2 here: Summary statistics==

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5.2 Baseline results

The estimates of the impact of the reform on employment outcomes for female TVET graduates are reported in Table 3. In the baseline results of this paper, we compare TVET graduates with those educated to lower-secondary-school level. Panel A uses female graduates of lower secondary education as a control group; we compare the probabilities of getting permanent, formal, or fulltime employment status for TVET graduates and lower-secondary-educated individuals. Panel A of Table 3 shows that female TVET graduates are more likely to have higher employability than lower-secondary-educated individuals. Graduating TVET increases the probability of getting permanent jobs by 13.4 percentage points (column 1) for women. This increase also occurs for other employment outcomes. Graduating TVET also increases the probability of getting formal jobs by 15.6 percentage points (column 2), and it increases the probability of being hired by employers by 11.8 percentage points (column 4). It is important to report that TVET decreases the probability of being self-employed by 5 percentage points. Panel A of Table 3 shows that there is substantial premium regarding employment probability for TVET graduates compared with lower-secondary-educated individuals.

Our focus is the coefficient of treatment variable α, which signifies the impact of the reform on employment outcomes. Table 3 shows the average effect of the reform for female TVET graduates belonging to the post-reform cohort in permanent jobs is negative and statistically significant (column 1). The reform decreased the probability of getting permanent jobs for female TVET graduates belonging to the post-reform cohort by 7.4 percentage points. The reform also decreased the probability of getting formal jobs for female TVET graduates by 9.7 percentage points (column 2). Female TVET graduates are also less likely to have fulltime jobs and the reform decreased the employment in fulltime jobs by 4.8 percentage points (column 3) for female TVET graduates who experienced the new training system. The reform lowers the likelihood of being employees by 9.1 percentage points (column 4), and it also lowers probability of working by 5.4 percentage points (column 5). The reform decreases the labor force participation rate by 4.9 percentage points (column 6) as well. Finally, the reform increases the probability of being self-employed by 2.4 percentage points (column 6). In summary, female TVET graduates belonging to the post-reform cohort experienced a substantial decline of the TVET premium they gained. The reform in the vocational training system halved the impacts of TVET for those working in permanent, formal, or fulltime jobs.

==Table 3 here: Baseline results for women==

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5.3 TVET and higher achieving students

In addition to the baseline results, we compare TVET graduates to upper-secondary-educated individuals, who have a higher academic achievement in formal education than TVET graduates. The aim of this comparison is to check whether it was lower- or higher-achieving academic students that competed with TVET graduates. Panel B in Table 3 has further comparisons between TVET graduates and upper-secondary-educated individuals. It shows that TVET graduates are more likely to be employed in permanent, formal, and fulltime jobs than upper-secondary-educated individuals. The probability of being self-employed for TVET graduates is also lower. The reform decreased the probability of permanent employment of female TVET graduates by 4.9 percentage points while the reform decreased the probability of formal employment of female TVET graduates by 5.6 percentage points. These effects are smaller than those for lower-secondary-educated individuals. The reform did not decrease the probability of being employed in fulltime jobs, being hired by employers, being employed, labor force participation, or self-employment for female TVET graduates. Panel C of Table 3 shows a comparison of employment outcomes for TVET graduates and all secondary-educated individuals. The results are similar to those in panel A of Table 3; the employment premium of female TVET graduates significantly decreases for the post-reform cohort. The reform in the vocational training system almost halved the effect of TVET on the probability of working in permanent, formal, and fulltime jobs.

5.4 Gender difference

The empirical results of this paper show that male TVET graduates experienced different employment outcomes compared with female TVET graduates after the education reform in vocational training. Panel A of Table 4 compares employment outcomes between male TVET graduates and lower secondary educated individuals. It shows that, for men, TVET increases the probability of working in permanent and formal jobs as well as being hired by employers, but TVET decreases the probability of fulltime work, being employed, labor force participation, and self-employment. It is important to highlight that the reform effect does not change employment premiums of TVET for men. The reform increases the probability of being self-employed for male TVET graduates by 4.1 percentage points. This increase is also seen in panels B and C, which compare employment outcomes between male TVET graduates and higher-achieving academic students (upper-secondary educated) and all secondary-educated men. In contrast to female TVET graduates, male TVET graduates have not experienced significant negative impacts from the reform.

5.5 Differences in reform effects across sectors

Why did the employability of female TVET graduates decrease after the reform? To look for the reason, we present evidence about how reform effects in vocational training vary across sectors. Again, we compute a DID estimator in a linear regression model, using choice of sector as a dependent variable:

$$(\text{sector})_{ij} = \beta_0 + \beta_1(\text{TVET})_i + \beta_2(\text{post})_i + \alpha(\text{TVET} \times \text{post}) + \beta_X(\text{covariates})_i + u_i, \qquad (2)$$

where $(\text{sector})_{ij}$ equals 1 if an individual i chose sector j. The sectors cover education, the public sector, services, manufacturing, and construction. The explanatory variables are the same as those used for the baseline results. We also focus on α to look at whether the reform changed the selection of sectors.

Table 5 shows how the reform impacted selection of sectors among female TVET graduates. According to panel A of Table 5, female TVET graduates are more likely to choose education, while they are less likely to select the service and construction sectors. The main interest of this specification is that the treatment effect suggests that the reform in vocational training decreased the probability of employment in the education sector for female TVET graduates by 6.7 percentage points. The reform halved the TVET premium for the probability of working in the education sector for women. This effect can also be seen in panel B of Table 5, which compares female TVET graduates and upper-secondary-educated women. Female TVET graduates are also less likely to work in the education sector after the reform when we look at panel C of Table 5, which compares female TVET graduates with all secondary-educated women. In contrast, Table 6 shows that male TVET graduates experienced no negative impacts of the reform when they chose sectors. In summary, there is a gender difference in the reform effect on the selection of sectors; female TVET graduates were more likely to select the education sector than non-TVET graduates, but this halved after the reform. This does not happen for male TVET graduates.

6 Medium- and long-term impacts

Was the reform effect persistent? Were women also more likely to experience longer negative impacts from the reform? To address these questions, we show the effect of education reform

on employment outcomes for TVET graduates across years by re-estimating the baseline model year-by-year for the period 2009–2015. We focus on the OLS estimate of α again to look at how the TVET graduates belonging to the post-reform cohort subsequently experienced the reform effect in the labor market. Panel A of Table 7 shows that the effects of the reform on working in permanent jobs for female TVET graduates belonging to the post-reform cohort are still negative in 2012, 2013, and 2015. In particular, the reform effect decreases the probability of obtaining a permanent job for female TVET graduates by 13.8 percentage points in 2012. This eliminates the TVET premium for women, because female TVET graduates belonging to the post-reform cohort experienced large negative impacts on getting permanent jobs. In 2015, the TVET premium went up to 23 percentage points, but the effect of reform is still negative and significant. The effect of reform on the probability of working in a permanent job finally halved the premium for female TVET graduates belonging to the post-reform cohort.

Tables 9 and **??** also show that the negative effect of reform on employment (working at formal and fulltime jobs, being hired by employers, and labor force participation) persisted over time for female TVET graduates. Regarding entrepreneurial work, we do not observe that self-employment is increasing among female TVET graduates belonging to the post-reform cohort.

In contrast, Table 8 shows that male TVET graduates did not experience a persistent negative effect of the reform. Although the reform decreased the probability of getting permanent jobs for male TVET graduates belonging to post-reform cohort by 11.7 percentage points in 2010, the negative effect did not appear significantly in following years. This is also true for other employment outcomes (see Table 15 and subsequent Tables); the education reform does not have a persistent negative impact on employment for male TVET graduates belonging to the post-reform cohort. Thus, there is clear gender difference in the effect of reform on employment outcomes among TVET graduates belonging to the post-reform cohort.

==Tables 7 and 8 here: Medium-and long-term effects==

7   Discussion and conclusion

This paper has studied the reform of the Ethiopian vocational system and whether the policy change has had subsequent impacts on employment outcomes for young people. This paper used enrollment increases in vocational school since 2006 as a quantity expansion and curriculum reform toward competency-based assessment, which was introduced along with the enrollment increase, as a quality improvement. This education reform, comprising both quantity expansion and quality improvement, allows us to examine which dimensions have

important effects on employment outcomes. This social experiment in 2006 also allows us to distinguish old and new training cohorts and compare these two cohorts that experienced different education systems. If the reform helped the new training cohort through quality improvement, then we expect to observe that individuals from the new training cohort are more likely to achieve higher employment. If the quantity expansion overwhelmed the quality improvement, especially for the new training cohort, then we expect to observe that individuals from the new cohort are less likely to be employed.

Comparing individuals from the old training system with those from the new training system, this paper found that the reform of vocational training in Ethiopia since 2006 had persistent negative effects on employment outcomes for young women; however, the reform does not have persistent negative impacts on employment outcomes for young men. In short, the reform mainly disadvantages women in Ethiopia. The finding of this paper supports the view that quality improvement and quantity expansion in education reform have a serious trade-off in the labor market. This paper suggests that the costs from the trade-off are more likely to go to women than men in Ethiopia. Furthermore, the finding of this paper suggests the basic insight that women's empowerment through enrollment expansion in vocational training also creates competition due to the rapid increase in labor supply for the new cohort. Consistent with such a simple mechanism, we found that female individuals from the new training system have persistently lower employability than women from the old one. This finding shows the importance of evaluating which effects of quantity and quality changes in education policy may dominate and affect individuals.

There are a couple of remaining issues. First, our analysis focuses only on specific cohorts after the completion of the old and new training systems during 2009–2015, when Ethiopia experienced rapid growth and other important transitions. It is important to study how an examination of specific cohorts over a specific period can apply to other countries and different contexts. However, comparison of these specific cohorts over time allows us to assess clearly how an education reform has persistent effects on employment, unemployment, and non-employment among vocational trainees. Second, our analysis presents the net effect of an education reform and does not distinguish quantity and quality changes in the reform. An important shortcoming of this paper is that we do not assess the educational quality changes along with the enrollment increases, such as congestion in classrooms, changes of peers, or shortages of teachers. It is also important to understand how enrollment increases affect school and student qualities through changing the educational production function. Despite these remaining issues, the research design and results of this paper provide meaningful implications for labor market policies and youth employment.

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Table 1: **Summary statistics across pre- and post-cohorts for women and men**

	Women			Men		
	Pre	Post	Difference	Pre	Post	Difference
Employment status						
Permanent	0.128	0.077	-0.051	0.134	0.078	-0.056
Formal	0.268	0.184	-0.084	0.321	0.219	-0.102
Fulltime work	0.326	0.243	-0.083	0.488	0.332	-0.156
Employee	0.275	0.202	-0.072	0.356	0.245	-0.110
Employed	0.443	0.331	-0.112	0.619	0.436	-0.183
Active	0.618	0.491	-0.127	0.752	0.567	-0.185
Self employed	0.126	0.085	-0.041	0.209	0.135	-0.074
Sector						
Education sector	0.050	0.028	-0.022	0.023	0.013	-0.010
Public sector	0.611	0.699	0.088	0.431	0.595	0.164
Services	0.252	0.201	-0.051	0.324	0.231	-0.093
Manufacturing	0.054	0.044	-0.010	0.105	0.078	-0.027
Construction	0.022	0.018	-0.004	0.091	0.063	-0.028
Individual characteristics						
TVET12	0.175	0.173	-0.002	0.143	0.139	-0.004
Lower secondary education	0.679	0.698	0.020	0.684	0.705	0.021
Upper secondary education	0.146	0.129	-0.018	0.173	0.156	-0.017
Married	0.398	0.277	-0.121	0.178	0.086	-0.092
Age	23.723	21.083	-2.640	23.771	21.165	-2.606

Notes: Fulltime work equals to 1(if work more than 35 hours per week. Employed equals to 1 if worked in 4 hours or more last 7 days. Active equals to 1 if worked in last 7 days or looked for job in last 3 months.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 2: **Summary statistics across education for women and men**

Women	All secondary			TVET			
	Pre	Post	Difference	Pre	Post	Difference	DID
Employment status							
Permanent	0.106	0.066	-0.040	0.232	0.127	-0.105	-0.065
Formal	0.241	0.172	-0.069	0.394	0.237	-0.158	-0.088
Fulltime work	0.320	0.243	-0.078	0.353	0.245	-0.109	-0.031
Employee	0.253	0.194	-0.059	0.376	0.241	-0.135	-0.076
Employed	0.432	0.327	-0.105	0.491	0.347	-0.145	-0.040
Active	0.614	0.492	-0.122	0.635	0.485	-0.150	-0.028
Self employed	0.134	0.089	-0.046	0.089	0.067	-0.021	0.024
Sector							
Education sector	0.033	0.023	-0.011	0.128	0.055	-0.073	-0.063
Public sector	0.614	0.698	0.084	0.598	0.704	0.106	0.022
Services	0.263	0.207	-0.056	0.199	0.172	-0.026	0.030
Manufacturing	0.054	0.045	-0.009	0.049	0.038	-0.012	-0.002
Construction	0.023	0.018	-0.005	0.017	0.021	0.004	0.009
Individual characteristics							
Lower secondary education	0.822	0.844	0.022	0.000	0.000	0.000	
Upper secondary education	0.178	0.156	-0.022	0.000	0.000	0.000	
Married	0.403	0.280	-0.123	0.372	0.263	-0.109	
Age	23.727	21.045	-2.682	23.705	21.268	-2.437	

Men	All secondary			TVET			
	Pre	Post	Difference	Pre	Post	Difference	DID
Employment status							
Permanent	0.124	0.070	-0.054	0.192	0.128	-0.064	-0.010
Formal	0.311	0.208	-0.103	0.383	0.284	-0.098	0.005
Fulltime work	0.498	0.336	-0.162	0.424	0.306	-0.118	0.045
Employee	0.352	0.241	-0.111	0.378	0.274	-0.105	0.007
Employed	0.630	0.439	-0.192	0.553	0.421	-0.132	0.060
Active	0.765	0.570	-0.195	0.674	0.550	-0.124	0.071
Self employed	0.223	0.140	-0.083	0.123	0.105	-0.019	0.065
Sector							
Education sector	0.018	0.007	-0.010	0.053	0.046	-0.007	0.003
Public sector	0.415	0.589	0.174	0.527	0.628	0.102	-0.073
Services	0.342	0.242	-0.100	0.221	0.166	-0.055	0.045
Manufacturing	0.107	0.080	-0.027	0.095	0.068	-0.027	0.001
Construction	0.091	0.061	-0.030	0.090	0.077	-0.013	0.018
Individual characteristics							
Lower secondary education	0.798	0.819	0.020	0.000	0.000	0.000	
Upper secondary education	0.202	0.181	-0.020	0.000	0.000	0.000	
Married	0.183	0.089	-0.094	0.147	0.065	-0.081	
Age	23.810	21.118	-2.692	23.535	21.456	-2.079	

Notes: Fulltime work equals to 1(if work more than 35 hours per week. Employed equals to 1 if worked in 4 hours or more last 7 days. Active equals to 1 if worked in last 7 days or looked for job in last 3 months.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 3: **Baseline results for women**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Permanent job	Formal job	Full-time job	Employee	Employed	Active	Self-employed
Panel A: TVET vs. secondary 1 level students							
TVET	0.134***	0.156***	0.030**	0.118***	0.046***	0.001	-0.051***
	(0.013)	(0.017)	(0.015)	(0.015)	(0.016)	(0.015)	(0.009)
Post	0.009	0.016	-0.014	0.004	-0.019	-0.046**	-0.017
	(0.012)	(0.019)	(0.018)	(0.017)	(0.019)	(0.019)	(0.013)
TVET*post	-0.074***	-0.097***	-0.048**	-0.091***	-0.054**	-0.049**	0.024*
	(0.017)	(0.023)	(0.021)	(0.021)	(0.022)	(0.023)	(0.013)
Constant	-0.279***	-0.572***	-0.310**	-0.282**	-0.468***	-0.076	-0.226**
	(0.091)	(0.181)	(0.132)	(0.126)	(0.140)	(0.140)	(0.093)
N	11,159	8,925	11,159	11,159	11,159	11,142	11,159
R2	0.054	0.041	0.050	0.049	0.070	0.062	0.044
Panel B: TVET vs. secondary 2 level students							
TVET	0.094***	0.132***	0.043**	0.121***	0.077***	0.042**	-0.026**
	(0.016)	(0.022)	(0.020)	(0.020)	(0.021)	(0.020)	(0.013)
Post	0.037	0.023	-0.006	0.022	0.022	-0.022	0.004
	(0.026)	(0.037)	(0.033)	(0.032)	(0.035)	(0.036)	(0.022)
TVET*post	-0.049**	-0.056*	-0.005	-0.040	-0.026	0.026	0.003
	(0.021)	(0.030)	(0.027)	(0.026)	(0.029)	(0.030)	(0.018)
Constant	-0.688***	-0.940***	-0.708***	-0.868***	-1.023***	-0.948***	-0.195
	(0.178)	(0.319)	(0.214)	(0.212)	(0.225)	(0.226)	(0.137)
N	4,046	3,277	4,046	4,046	4,046	4,037	4,046
R2	0.067	0.061	0.080	0.078	0.110	0.128	0.038
Panel C: TVET vs. all secondary level students							
TVET	0.131***	0.153***	0.025*	0.113***	0.043***	-0.006	-0.050***
	(0.013)	(0.017)	(0.015)	(0.015)	(0.015)	(0.015)	(0.009)
Post	0.005	0.010	-0.017	-0.004	-0.018	-0.039**	-0.011
	(0.011)	(0.018)	(0.017)	(0.016)	(0.018)	(0.018)	(0.012)
TVET*post	-0.069***	-0.090***	-0.040*	-0.082***	-0.048**	-0.035	0.020
	(0.017)	(0.023)	(0.021)	(0.021)	(0.022)	(0.022)	(0.013)
Secondary2	0.026***	0.010	-0.035***	-0.033***	-0.045***	-0.085***	-0.011
	(0.008)	(0.012)	(0.011)	(0.010)	(0.012)	(0.012)	(0.008)
Constant	-0.288***	-0.554***	-0.334***	-0.298***	-0.509***	-0.236*	-0.240***
	(0.085)	(0.169)	(0.122)	(0.116)	(0.129)	(0.129)	(0.086)
N	12,950	10,343	12,950	12,950	12,950	12,930	12,950
R2	0.053	0.040	0.054	0.051	0.074	0.071	0.041

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 4: **Baseline results for men**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Permanent job	Formal job	Full-time job	Employee	Employed	Active	Self-employed
			Panel A: TVET vs. secondary 1 level students				
TVET	0.081***	0.078***	-0.066***	0.027*	-0.072***	-0.091***	-0.091***
	(0.013)	(0.018)	(0.016)	(0.016)	(0.016)	(0.015)	(0.012)
Post	0.014	-0.001	-0.013	0.000	-0.016	-0.017	-0.030*
	(0.013)	(0.021)	(0.020)	(0.019)	(0.019)	(0.017)	(0.016)
TVET*post	-0.032*	-0.014	-0.003	-0.028	0.002	0.010	0.041**
	(0.018)	(0.026)	(0.024)	(0.023)	(0.024)	(0.023)	(0.017)
Constant	-0.314***	-0.461**	-0.648***	-0.440***	-0.736***	-0.562***	-0.200*
	(0.096)	(0.201)	(0.142)	(0.139)	(0.135)	(0.122)	(0.114)
N	10,507	8,287	10,508	10,507	10,508	10,492	10,508
R2	0.053	0.050	0.116	0.069	0.175	0.190	0.073
			Panel B: TVET vs. secondary 2 level students				
TVET	0.059***	0.075***	-0.006	0.094***	0.031	0.017	-0.070***
	(0.015)	(0.023)	(0.020)	(0.020)	(0.019)	(0.018)	(0.015)
Post	0.024	0.013	-0.061*	-0.001	-0.042	-0.056*	-0.066***
	(0.022)	(0.036)	(0.032)	(0.030)	(0.033)	(0.032)	(0.025)
TVET*post	0.004	0.027	0.046	0.007	0.057**	0.068**	0.064***
	(0.021)	(0.032)	(0.029)	(0.027)	(0.029)	(0.028)	(0.021)
Constant	-0.694***	-1.014***	-0.772***	-0.768***	-1.111***	-0.928***	-0.135
	(0.163)	(0.322)	(0.221)	(0.214)	(0.219)	(0.207)	(0.171)
N	3,858	3,025	3,860	3,858	3,860	3,855	3,860
R2	0.091	0.090	0.170	0.114	0.223	0.258	0.083
			Panel C: TVET vs. all secondary level students				
TVET	0.077***	0.074***	-0.070***	0.024	-0.077***	-0.096***	-0.093***
	(0.013)	(0.018)	(0.016)	(0.016)	(0.016)	(0.014)	(0.012)
Post	0.017	0.003	-0.016	0.003	-0.017	-0.019	-0.035**
	(0.011)	(0.019)	(0.018)	(0.017)	(0.017)	(0.016)	(0.014)
TVET*post	-0.025	-0.006	0.006	-0.021	0.012	0.021	0.045***
	(0.018)	(0.026)	(0.023)	(0.023)	(0.023)	(0.023)	(0.017)
Secondary2	0.006	-0.013	-0.084***	-0.081***	-0.124***	-0.131***	-0.027***
	(0.007)	(0.012)	(0.011)	(0.010)	(0.011)	(0.010)	(0.009)
Constant	-0.404***	-0.587***	-0.706***	-0.517***	-0.819***	-0.662***	-0.200*
	(0.087)	(0.181)	(0.128)	(0.124)	(0.123)	(0.112)	(0.104)
N	12,588	9,888	12,590	12,588	12,590	12,571	12,590
R2	0.054	0.056	0.132	0.079	0.194	0.215	0.076

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 5: **Selection into sectors for women**

	(1)	(2)	(3)	(4)	(5)
Sector	Education	Public	Services	Manufacturing	Constructions

Panel A: TVET vs. secondary 1 level students

	Education	Public	Services	Manufacturing	Constructions
TVET	0.099***	-0.005	-0.075***	-0.006	-0.007*
	(0.010)	(0.015)	(0.013)	(0.007)	(0.004)
Post	0.013	0.010	-0.014	0.009	-0.010*
	(0.008)	(0.019)	(0.017)	(0.009)	(0.006)
TVET*post	-0.067***	0.035	0.022	-0.004	0.009
	(0.012)	(0.022)	(0.018)	(0.010)	(0.007)
Constant	-0.164***	1.381***	-0.194	-0.109*	0.058
	(0.058)	(0.138)	(0.124)	(0.065)	(0.043)
N	11,159	11,159	11,159	11,159	11,159
R2	0.035	0.060	0.039	0.017	0.006

Panel B: TVET vs. secondary 2 level students

	Education	Public	Services	Manufacturing	Constructions
TVET	0.072***	-0.043**	-0.042**	0.013	-0.000
	(0.012)	(0.020)	(0.018)	(0.009)	(0.006)
Post	0.025	-0.028	-0.001	0.008	-0.007
	(0.019)	(0.034)	(0.030)	(0.015)	(0.009)
TVET*post	-0.058***	0.014	0.034	-0.000	0.013*
	(0.015)	(0.028)	(0.025)	(0.012)	(0.008)
Constant	-0.340***	1.881***	-0.405**	-0.138	-0.015
	(0.132)	(0.220)	(0.189)	(0.101)	(0.063)
N	4,046	4,046	4,046	4,046	4,046
R2	0.035	0.090	0.058	0.015	0.012

Panel C: TVET vs. all secondary level students

	Education	Public	Services	Manufacturing	Constructions
TVET	0.098***	-0.003	-0.076***	-0.007	-0.008*
	(0.010)	(0.015)	(0.013)	(0.007)	(0.004)
Post	0.008	0.011	-0.010	0.005	-0.009
	(0.007)	(0.018)	(0.016)	(0.008)	(0.006)
TVET*post	-0.065***	0.031	0.024	-0.003	0.010
	(0.012)	(0.021)	(0.018)	(0.010)	(0.006)
Secondary2	0.020***	0.046***	-0.036***	-0.021***	-0.007**
	(0.005)	(0.012)	(0.011)	(0.005)	(0.003)
Constant	-0.145***	1.402***	-0.240**	-0.081	0.041
	(0.055)	(0.127)	(0.114)	(0.059)	(0.039)
N	12,950	12,950	12,950	12,950	12,950
R2	0.030	0.063	0.042	0.016	0.006

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 6: **Selection into sectors for men**

	(1)	(2)	(3)	(4)	(5)
Sector	Education	Public	Services	Manufacturing	Constructions

Panel A: TVET vs. secondary 1 level students					
TVET	0.039***	0.106***	-0.121***	-0.007	-0.004
	(0.007)	(0.016)	(0.014)	(0.010)	(0.010)
Post	-0.006	0.013	-0.010	-0.001	-0.006
	(0.006)	(0.019)	(0.019)	(0.012)	(0.012)
TVET*post	0.001	-0.016	0.019	-0.016	0.008
	(0.010)	(0.024)	(0.021)	(0.014)	(0.014)
Constant	-0.022	1.664***	-0.362***	-0.046	-0.120
	(0.040)	(0.140)	(0.135)	(0.088)	(0.085)
N	10,508	10,508	10,508	10,508	10,508
R2	0.020	0.149	0.070	0.021	0.020

Panel B: TVET vs. secondary 2 level students					
TVET	0.030***	0.005	-0.060***	-0.006	0.038***
	(0.008)	(0.020)	(0.018)	(0.013)	(0.011)
Post	0.012	0.049	-0.046	-0.051**	0.039**
	(0.013)	(0.033)	(0.029)	(0.020)	(0.016)
TVET*post	0.002	-0.065**	0.037	0.016	0.002
	(0.012)	(0.029)	(0.026)	(0.017)	(0.016)
Constant	-0.161*	1.909***	-0.301	0.061	-0.472***
	(0.091)	(0.222)	(0.200)	(0.139)	(0.117)
N	3,860	3,860	3,860	3,860	3,860
R2	0.034	0.190	0.085	0.039	0.036

Panel C: TVET vs. all secondary level students					
TVET	0.039***	0.110***	-0.122***	-0.010	-0.004
	(0.007)	(0.016)	(0.014)	(0.010)	(0.010)
Post	-0.005	0.016	-0.007	-0.008	-0.003
	(0.005)	(0.017)	(0.017)	(0.011)	(0.010)
TVET*post	0.001	-0.026	0.021	-0.010	0.007
	(0.010)	(0.024)	(0.020)	(0.014)	(0.014)
Secondary2	0.010***	0.116***	-0.067***	-0.015**	-0.037***
	(0.003)	(0.011)	(0.010)	(0.007)	(0.005)
Constant	-0.030	1.727***	-0.420***	-0.043	-0.137*
	(0.038)	(0.126)	(0.122)	(0.080)	(0.074)
N	12,590	12,590	12,590	12,590	12,590
R2	0.019	0.166	0.077	0.023	0.023

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 7: **Effects of permanent jobs for women**

Permanent	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015

Panel A: TVET vs. secondary 1 level students							
TVET	0.091***	0.067**	0.118***	0.147***	0.177***	0.144***	0.230***
	(0.023)	(0.032)	(0.031)	(0.034)	(0.031)	(0.039)	(0.050)
Post	-0.014	0.010	0.066**	0.021	0.005	-0.016	0.011
	(0.018)	(0.027)	(0.033)	(0.038)	(0.033)	(0.040)	(0.044)
TVET*post	-0.048	-0.048	-0.047	-0.138***	-0.109***	0.021	-0.112*
	(0.030)	(0.037)	(0.041)	(0.044)	(0.042)	(0.059)	(0.067)
Constant	0.009	-0.343*	-1.004***	-0.091	-0.173	0.046	-0.299
	(0.138)	(0.209)	(0.268)	(0.318)	(0.285)	(0.383)	(0.408)
N	2,029	1,822	1,527	1,335	2,050	1,163	1,233
R2	0.038	0.036	0.063	0.045	0.048	0.065	0.063

Panel B: TVET vs. secondary 2 level students							
TVET	0.060**	0.012	0.121***	0.103**	0.095**	0.088	0.223***
	(0.029)	(0.041)	(0.043)	(0.046)	(0.041)	(0.055)	(0.060)
Post	-0.037	-0.059	0.173**	0.087	0.005	-0.035	0.218**
	(0.034)	(0.054)	(0.068)	(0.086)	(0.070)	(0.097)	(0.098)
TVET*post	-0.016	0.026	-0.069	-0.114	-0.015	0.050	-0.236***
	(0.035)	(0.045)	(0.054)	(0.073)	(0.053)	(0.080)	(0.085)
Constant	-0.059	-0.355	-1.617***	-0.915	-0.991*	0.011	-1.108
	(0.275)	(0.419)	(0.522)	(0.588)	(0.563)	(0.743)	(0.854)
N	708	651	523	512	788	446	418
R2	0.050	0.051	0.100	0.080	0.060	0.051	0.078

Panel C: TVET vs. secondary 1 and 2 level students							
TVET	0.087***	0.059*	0.119***	0.145***	0.169***	0.141***	0.237***
	(0.023)	(0.032)	(0.031)	(0.034)	(0.031)	(0.039)	(0.050)
Post	-0.014	-0.000	0.060**	0.018	0.005	-0.030	0.025
	(0.016)	(0.025)	(0.031)	(0.036)	(0.031)	(0.039)	(0.041)
TVET*post	-0.042	-0.035	-0.049	-0.134***	-0.091**	0.025	-0.129*
	(0.030)	(0.037)	(0.040)	(0.043)	(0.041)	(0.059)	(0.067)
Secondary2	0.012	0.012	0.004	0.037	0.052**	0.032	0.054*
	(0.011)	(0.015)	(0.021)	(0.030)	(0.021)	(0.029)	(0.030)
Constant	-0.057	-0.380*	-0.921***	-0.092	-0.336	0.154	-0.218
	(0.128)	(0.199)	(0.251)	(0.299)	(0.269)	(0.356)	(0.381)
N	2,375	2,170	1,700	1,501	2,407	1,357	1,440
R2	0.032	0.033	0.059	0.045	0.046	0.059	0.057

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 8: **Effects of permanent jobs for men**

Permanent	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015
Panel A: TVET vs. secondary 1 level students							
TVET	-0.005	0.101***	0.049	0.080**	0.105***	0.145***	0.160***
	(0.018)	(0.032)	(0.030)	(0.039)	(0.034)	(0.047)	(0.050)
Post	-0.023	0.067***	0.057*	-0.045	0.038	-0.010	0.013
	(0.020)	(0.026)	(0.034)	(0.039)	(0.037)	(0.044)	(0.045)
TVET*post	0.009	-0.117***	0.024	-0.013	-0.073	-0.038	-0.030
	(0.024)	(0.036)	(0.045)	(0.055)	(0.045)	(0.065)	(0.068)
Constant	-0.070	-0.937***	-0.700**	-0.075	-0.407	-0.030	0.044
	(0.150)	(0.221)	(0.278)	(0.339)	(0.316)	(0.414)	(0.408)
N	1,863	1,652	1,393	1,262	1,949	1,149	1,239
R2	0.020	0.057	0.056	0.048	0.045	0.050	0.051
Panel B: TVET vs. secondary 2 level students							
TVET	-0.003	0.097***	0.023	0.019	0.077*	0.108**	0.143**
	(0.022)	(0.034)	(0.042)	(0.052)	(0.041)	(0.054)	(0.057)
Post	-0.010	0.025	0.070	-0.043	-0.049	0.081	0.072
	(0.028)	(0.042)	(0.079)	(0.081)	(0.062)	(0.079)	(0.084)
TVET*post	0.024	-0.089**	0.044	0.080	0.017	0.009	-0.022
	(0.027)	(0.038)	(0.060)	(0.069)	(0.052)	(0.079)	(0.080)
Constant	-0.338	-0.737**	-0.937*	-0.718	-0.497	-1.205*	-0.411
	(0.239)	(0.342)	(0.538)	(0.634)	(0.538)	(0.679)	(0.706)
N	749	681	455	412	724	414	423
R2	0.057	0.117	0.067	0.140	0.063	0.113	0.122
Panel C: TVET vs. all secondary level students							
TVET	-0.005	0.100***	0.049	0.077**	0.096***	0.141***	0.160***
	(0.017)	(0.032)	(0.030)	(0.039)	(0.034)	(0.046)	(0.050)
Post	-0.019	0.045**	0.047	-0.030	0.036	0.020	0.027
	(0.018)	(0.022)	(0.032)	(0.036)	(0.033)	(0.040)	(0.040)
TVET*post	0.011	-0.112***	0.026	-0.001	-0.056	-0.028	-0.028
	(0.023)	(0.035)	(0.045)	(0.054)	(0.044)	(0.065)	(0.068)
Secondary2	-0.006	-0.009	0.016	0.038	-0.005	0.015	0.009
	(0.010)	(0.012)	(0.023)	(0.027)	(0.019)	(0.027)	(0.026)
Constant	-0.134	-0.781***	-0.651**	-0.304	-0.569**	-0.426	-0.094
	(0.136)	(0.187)	(0.261)	(0.317)	(0.288)	(0.372)	(0.364)
N	2,291	2,078	1,590	1,454	2,326	1,368	1,481
R2	0.027	0.054	0.047	0.054	0.041	0.054	0.052

Table 9: **Effects of formal jobs for women**

Formal Year	(1) 2010	(2) 2011	(3) 2012	(4) 2013	(5) 2014	(6) 2015
	Panel A: TVET vs. secondary 1 level students					
TVET	0.072*	0.170***	0.130***	0.175***	0.158***	0.255***
	(0.042)	(0.040)	(0.041)	(0.035)	(0.044)	(0.052)
Post	0.037	0.041	0.017	0.012	0.051	-0.037
	(0.039)	(0.048)	(0.051)	(0.043)	(0.051)	(0.052)
TVET*post	-0.060	-0.106*	-0.143**	-0.082*	0.008	-0.187***
	(0.050)	(0.055)	(0.057)	(0.050)	(0.068)	(0.071)
Constant	-1.141***	-0.755**	-0.213	-0.568	-0.570	0.452
	(0.311)	(0.380)	(0.423)	(0.370)	(0.474)	(0.478)
Observations	1,788	1,496	1,289	1,998	1,139	1,215
R-squared	0.044	0.045	0.025	0.051	0.044	0.058
	Panel B: TVET vs. secondary 2 level students					
TVET	0.057	0.225***	0.134**	0.095**	0.091	0.235***
	(0.051)	(0.054)	(0.056)	(0.047)	(0.061)	(0.064)
Post	-0.042	0.123	0.071	-0.031	-0.067	0.091
	(0.072)	(0.094)	(0.096)	(0.082)	(0.105)	(0.107)
TVET*post	-0.000	-0.161**	-0.070	0.024	0.103	-0.260***
	(0.059)	(0.076)	(0.083)	(0.065)	(0.090)	(0.092)
Constant	-0.912*	-0.949	-1.439**	-1.109*	0.017	0.089
	(0.534)	(0.692)	(0.690)	(0.649)	(0.836)	(0.931)
Observations	645	512	494	770	443	413
R-squared	0.080	0.084	0.067	0.072	0.062	0.087
	Panel B: TVET vs. all secondary level students					
TVET	0.067	0.172***	0.126***	0.167***	0.154***	0.258***
	(0.042)	(0.040)	(0.040)	(0.035)	(0.044)	(0.052)
Post	0.019	0.040	0.021	0.006	0.021	-0.019
	(0.036)	(0.046)	(0.048)	(0.040)	(0.048)	(0.049)
TVET*post	-0.051	-0.110**	-0.133**	-0.064	0.022	-0.195***
	(0.049)	(0.054)	(0.056)	(0.049)	(0.067)	(0.070)
Secondary2	-0.014	-0.027	-0.026	0.043*	0.029	0.048
	(0.021)	(0.032)	(0.036)	(0.026)	(0.035)	(0.034)
Constant	-1.053***	-0.682*	-0.347	-0.686**	-0.345	0.445
	(0.285)	(0.359)	(0.394)	(0.344)	(0.437)	(0.447)
Observations	2,132	1,664	1,448	2,349	1,331	1,419
R-squared	0.045	0.039	0.026	0.051	0.043	0.052

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 10: **Effects of fulltime jobs for women**

Fulltime work	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015
Panel A: TVET vs. secondary 1 level students							
TVET	-0.026	-0.051	0.020	0.024	0.105***	0.049	0.140***
	(0.030)	(0.044)	(0.040)	(0.040)	(0.035)	(0.045)	(0.053)
Post	-0.027	-0.047	-0.054	0.113**	-0.030	-0.004	0.048
	(0.037)	(0.046)	(0.052)	(0.052)	(0.046)	(0.056)	(0.058)
TVET*post	-0.029	-0.015	0.020	-0.105*	-0.089*	0.013	-0.202***
	(0.040)	(0.052)	(0.057)	(0.058)	(0.052)	(0.068)	(0.073)
Constant	-0.228	-0.608*	-0.129	-0.675	-0.007	0.044	-0.279
	(0.266)	(0.359)	(0.405)	(0.428)	(0.395)	(0.508)	(0.535)
N	2,029	1,822	1,527	1,335	2,050	1,163	1,233
R2	0.023	0.044	0.031	0.044	0.053	0.025	0.080
Panel B: TVET vs. secondary 2 level students							
TVET	0.054	0.055	0.067	0.059	0.026	-0.010	0.104
	(0.038)	(0.051)	(0.060)	(0.056)	(0.047)	(0.065)	(0.068)
Post	0.007	-0.072	-0.046	0.136	-0.093	-0.055	0.200*
	(0.054)	(0.074)	(0.101)	(0.104)	(0.087)	(0.113)	(0.116)
TVET*post	-0.034	-0.004	-0.023	-0.037	0.063	0.096	-0.218**
	(0.048)	(0.061)	(0.085)	(0.093)	(0.068)	(0.096)	(0.098)
Constant	-0.527	-0.514	0.233	-1.444**	-0.776	-0.113	-1.334
	(0.376)	(0.541)	(0.697)	(0.684)	(0.663)	(0.866)	(0.971)
N	708	651	523	512	788	446	418
R2	0.052	0.081	0.029	0.042	0.071	0.030	0.058
Panel C: TVET vs. all secondary level students							
TVET	-0.026	-0.051	0.021	0.021	0.093***	0.045	0.136***
	(0.030)	(0.043)	(0.040)	(0.039)	(0.035)	(0.044)	(0.053)
Post	-0.028	-0.054	-0.056	0.110**	-0.039	-0.014	0.060
	(0.033)	(0.042)	(0.049)	(0.049)	(0.043)	(0.052)	(0.054)
TVET*post	-0.029	-0.014	0.016	-0.095*	-0.062	0.026	-0.203***
	(0.039)	(0.051)	(0.056)	(0.057)	(0.051)	(0.068)	(0.072)
Secondary2	-0.077***	-0.109***	-0.027	-0.047	0.014	0.028	0.045
	(0.020)	(0.022)	(0.037)	(0.039)	(0.028)	(0.037)	(0.038)
Constant	-0.219	-0.540*	-0.067	-0.717*	-0.172	0.033	-0.316
	(0.238)	(0.322)	(0.381)	(0.400)	(0.366)	(0.470)	(0.500)
N	2,375	2,170	1,700	1,501	2,407	1,357	1,440
R2	0.027	0.050	0.026	0.040	0.051	0.025	0.069

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 11: **Effects of employee for women**

Employee	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015
Panel A: TVET vs. secondary 1 level students							
TVET	0.031	0.005	0.141***	0.142***	0.196***	0.110**	0.231***
	(0.031)	(0.042)	(0.040)	(0.041)	(0.035)	(0.045)	(0.053)
Post	-0.057*	0.009	0.033	0.068	0.018	0.025	-0.008
	(0.034)	(0.043)	(0.049)	(0.051)	(0.044)	(0.053)	(0.053)
TVET*post	-0.043	-0.050	-0.092*	-0.175***	-0.112**	0.048	-0.231***
	(0.041)	(0.050)	(0.055)	(0.059)	(0.051)	(0.069)	(0.072)
Constant	0.032	-0.729**	-0.610	-0.048	-0.381	-0.208	0.462
	(0.251)	(0.334)	(0.382)	(0.419)	(0.375)	(0.490)	(0.492)
N	2,029	1,822	1,527	1,335	2,050	1,163	1,233
R2	0.024	0.043	0.044	0.033	0.068	0.053	0.084
Panel B: TVET vs. secondary 2 level students							
TVET	0.082**	0.026	0.161***	0.131**	0.144***	0.093	0.243***
	(0.038)	(0.052)	(0.057)	(0.056)	(0.046)	(0.062)	(0.065)
Post	-0.053	-0.042	0.041	0.067	0.028	-0.006	0.165
	(0.051)	(0.073)	(0.099)	(0.098)	(0.082)	(0.108)	(0.111)
TVET*post	-0.024	0.022	-0.096	-0.023	0.008	0.110	-0.303***
	(0.048)	(0.060)	(0.079)	(0.087)	(0.065)	(0.092)	(0.094)
Constant	-0.242	-0.936*	-0.508	-1.450**	-1.599**	-0.429	-0.559
	(0.378)	(0.536)	(0.700)	(0.693)	(0.642)	(0.846)	(0.935)
N	708	651	523	512	788	446	418
R2	0.063	0.080	0.056	0.050	0.088	0.055	0.076
Panel C: TVET vs. all secondary level students							
TVET	0.029	-0.001	0.141***	0.135***	0.186***	0.105**	0.235***
	(0.031)	(0.042)	(0.040)	(0.040)	(0.035)	(0.045)	(0.053)
Post	-0.055*	-0.001	0.015	0.055	0.019	0.006	0.001
	(0.031)	(0.039)	(0.046)	(0.048)	(0.040)	(0.050)	(0.049)
TVET*post	-0.041	-0.038	-0.090*	-0.157***	-0.090*	0.056	-0.242***
	(0.041)	(0.049)	(0.054)	(0.058)	(0.050)	(0.068)	(0.072)
Secondary2	-0.063***	-0.061***	-0.030	-0.031	0.004	-0.020	0.011
	(0.018)	(0.022)	(0.034)	(0.037)	(0.026)	(0.035)	(0.034)
Constant	-0.031	-0.766**	-0.441	-0.099	-0.602*	-0.082	0.507
	(0.226)	(0.303)	(0.362)	(0.391)	(0.346)	(0.451)	(0.456)
N	2,375	2,170	1,700	1,501	2,407	1,357	1,440
R2	0.028	0.046	0.036	0.031	0.066	0.051	0.080

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 12: **Effects of employed for women**

Employed	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015
Panel A: TVET vs. secondary 1 level students							
TVET	-0.036	-0.073	0.057	0.036	0.118***	0.095**	0.170***
	(0.034)	(0.045)	(0.042)	(0.042)	(0.035)	(0.046)	(0.048)
Post	-0.057	-0.023	-0.006	0.037	-0.034	0.020	0.020
	(0.041)	(0.049)	(0.054)	(0.057)	(0.048)	(0.059)	(0.058)
TVET*post	-0.013	-0.005	0.008	-0.117*	-0.087	-0.017	-0.214***
	(0.047)	(0.055)	(0.060)	(0.063)	(0.053)	(0.072)	(0.072)
Constant	-0.259	-0.933**	-0.770*	-0.179	-0.250	-0.458	0.186
	(0.300)	(0.375)	(0.425)	(0.464)	(0.407)	(0.539)	(0.538)
N	2,029	1,822	1,527	1,335	2,050	1,163	1,233
R2	0.028	0.053	0.043	0.035	0.059	0.028	0.079
Panel B: TVET vs. secondary 2 level students							
TVET	0.063	0.027	0.118*	0.097	0.082*	0.073	0.129**
	(0.043)	(0.055)	(0.063)	(0.059)	(0.047)	(0.065)	(0.064)
Post	-0.009	-0.019	0.040	0.132	-0.052	0.053	0.157
	(0.064)	(0.083)	(0.107)	(0.111)	(0.088)	(0.114)	(0.115)
TVET*post	-0.037	0.008	-0.063	-0.048	0.021	0.030	-0.178*
	(0.059)	(0.067)	(0.090)	(0.098)	(0.070)	(0.099)	(0.096)
Constant	-0.540	-1.112*	-0.422	-1.524**	-1.097*	-1.111	-1.429
	(0.446)	(0.587)	(0.736)	(0.744)	(0.658)	(0.862)	(0.963)
N	708	651	523	512	788	446	418
R2	0.046	0.080	0.048	0.043	0.097	0.040	0.084
Panel C: TVET vs. all secondary level students							
TVET	-0.034	-0.072	0.061	0.034	0.109***	0.092**	0.166***
	(0.034)	(0.045)	(0.042)	(0.042)	(0.034)	(0.046)	(0.048)
Post	-0.054	-0.023	-0.012	0.055	-0.033	0.024	0.018
	(0.037)	(0.044)	(0.051)	(0.053)	(0.044)	(0.055)	(0.054)
TVET*post	-0.016	-0.006	0.001	-0.107*	-0.068	-0.010	-0.207***
	(0.046)	(0.054)	(0.059)	(0.062)	(0.052)	(0.070)	(0.071)
Secondary2	-0.085***	-0.104***	-0.032	-0.059	-0.006	0.004	0.025
	(0.023)	(0.025)	(0.039)	(0.042)	(0.028)	(0.040)	(0.038)
Constant	-0.262	-0.926***	-0.631	-0.408	-0.441	-0.549	0.184
	(0.270)	(0.340)	(0.402)	(0.434)	(0.375)	(0.494)	(0.501)
N	2,375	2,170	1,700	1,501	2,407	1,357	1,440
R2	0.031	0.056	0.037	0.032	0.059	0.027	0.074

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 13: **Effects of labor force participation for women**

Active	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015
	Panel A: TVET vs. secondary 1 level students						
TVET	-0.116***	-0.133***	0.035	0.047	0.049	0.057	0.128***
	(0.038)	(0.048)	(0.041)	(0.039)	(0.033)	(0.042)	(0.043)
Post	-0.093**	-0.013	-0.022	0.045	-0.123***	0.038	-0.026
	(0.045)	(0.051)	(0.055)	(0.055)	(0.047)	(0.055)	(0.054)
TVET*post	-0.029	0.006	-0.041	-0.135**	-0.030	-0.038	-0.165**
	(0.054)	(0.061)	(0.060)	(0.060)	(0.052)	(0.067)	(0.067)
Constant	-0.243	-0.928**	-0.303	0.148	0.728*	-0.122	1.068**
	(0.330)	(0.390)	(0.424)	(0.443)	(0.400)	(0.499)	(0.493)
N	2,023	1,822	1,526	1,335	2,046	1,161	1,229
R2	0.064	0.064	0.031	0.048	0.061	0.038	0.090
	Panel B: TVET vs. secondary 2 level students						
TVET	0.046	0.035	0.081	-0.001	0.049	0.062	0.052
	(0.049)	(0.059)	(0.064)	(0.055)	(0.045)	(0.060)	(0.055)
Post	-0.023	-0.063	-0.051	-0.019	-0.007	0.026	0.063
	(0.077)	(0.089)	(0.112)	(0.113)	(0.087)	(0.104)	(0.103)
TVET*post	-0.021	0.068	0.014	0.045	0.006	0.058	-0.073
	(0.068)	(0.074)	(0.093)	(0.099)	(0.071)	(0.093)	(0.088)
Constant	-1.111**	-1.149*	-0.477	-0.731	-0.784	-1.035	-0.714
	(0.519)	(0.634)	(0.738)	(0.730)	(0.645)	(0.777)	(0.857)
N	704	651	523	512	787	445	415
R2	0.097	0.098	0.054	0.037	0.072	0.057	0.095
	Panel C: TVET vs. all secondary level students						
TVET	-0.116***	-0.135***	0.028	0.038	0.046	0.049	0.119***
	(0.037)	(0.047)	(0.040)	(0.038)	(0.033)	(0.042)	(0.042)
Post	-0.074*	-0.019	-0.025	0.049	-0.090**	0.033	-0.026
	(0.041)	(0.046)	(0.052)	(0.051)	(0.043)	(0.051)	(0.050)
TVET*post	-0.028	0.014	-0.030	-0.110*	-0.023	-0.019	-0.150**
	(0.053)	(0.060)	(0.059)	(0.059)	(0.051)	(0.065)	(0.065)
	-0.162***	-0.198***	-0.080*	0.000	-0.024	-0.049	0.035
	(0.027)	(0.027)	(0.041)	(0.041)	(0.028)	(0.038)	(0.034)
Constant	-0.433	-0.938***	-0.351	-0.094	0.328	-0.262	0.933**
	(0.301)	(0.353)	(0.402)	(0.415)	(0.367)	(0.458)	(0.458)
N	2,367	2,170	1,699	1,501	2,403	1,355	1,435
R2	0.072	0.080	0.032	0.038	0.059	0.038	0.087

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 14: **Effects of self-employed for women**

Self-employed	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015
Panel A: TVET vs. secondary 1 level students							
TVET	-0.040***	-0.057***	-0.073***	-0.083***	-0.041*	0.006	-0.071*
	(0.015)	(0.020)	(0.023)	(0.025)	(0.023)	(0.038)	(0.041)
Post	0.017	-0.033	-0.021	-0.017	-0.030	-0.021	-0.003
	(0.021)	(0.029)	(0.034)	(0.036)	(0.032)	(0.046)	(0.048)
TVET*post	0.020	0.042*	0.075**	0.007	0.012	-0.066	0.046
	(0.019)	(0.025)	(0.032)	(0.034)	(0.031)	(0.050)	(0.058)
Constant	-0.428**	-0.075	-0.286	-0.156	-0.041	-0.237	-0.145
	(0.167)	(0.218)	(0.269)	(0.300)	(0.273)	(0.427)	(0.455)
N	2,029	1,822	1,527	1,335	2,050	1,163	1,233
R2	0.027	0.021	0.029	0.042	0.035	0.033	0.022
Panel B: TVET vs. secondary 2 level students							
TVET	-0.009	-0.019	-0.033	-0.016	-0.054*	0.046	-0.061
	(0.020)	(0.024)	(0.037)	(0.033)	(0.032)	(0.050)	(0.054)
Post	0.030	-0.013	0.018	0.121*	-0.077	0.086	0.011
	(0.030)	(0.042)	(0.052)	(0.073)	(0.063)	(0.093)	(0.084)
TVET*post	-0.000	0.007	0.022	-0.097	0.023	-0.145**	0.116
	(0.025)	(0.032)	(0.053)	(0.067)	(0.044)	(0.074)	(0.074)
Constant	-0.398*	0.045	-0.156	-0.298	0.333	-0.458	-0.869
	(0.230)	(0.285)	(0.337)	(0.391)	(0.453)	(0.708)	(0.728)
N	708	651	523	512	788	446	418
R2	0.032	0.038	0.019	0.034	0.034	0.040	0.026
Panel C: TVET vs. all secondary level students							
TVET	-0.039***	-0.052***	-0.071***	-0.075***	-0.042*	0.012	-0.075*
	(0.014)	(0.020)	(0.022)	(0.025)	(0.023)	(0.037)	(0.040)
Post	0.018	-0.026	-0.017	0.010	-0.038	0.003	-0.002
	(0.019)	(0.026)	(0.031)	(0.034)	(0.030)	(0.043)	(0.044)
TVET*post	0.017	0.035	0.068**	-0.006	0.013	-0.077	0.057
	(0.018)	(0.024)	(0.032)	(0.033)	(0.030)	(0.049)	(0.057)
	-0.021*	-0.018	-0.011	-0.011	0.006	0.008	-0.025
	(0.012)	(0.013)	(0.022)	(0.028)	(0.019)	(0.030)	(0.030)
Constant	-0.404***	-0.069	-0.271	-0.259	0.025	-0.350	-0.241
	(0.150)	(0.194)	(0.250)	(0.284)	(0.256)	(0.393)	(0.418)
N	2,375	2,170	1,700	1,501	2,407	1,357	1,440
R2	0.026	0.021	0.026	0.036	0.030	0.025	0.021
R2	0.072	0.080	0.032	0.038	0.059	0.038	0.087

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 15: **Effects of formal jobs for men**

Formal	(1)	(2)	(3)	(4)	(5)	(6)
Year	2010	2011	2012	2013	2014	2015
Panel A: TVET vs. secondary 1 level students						
TVET	0.062	-0.022	0.066	0.117***	0.121**	0.125**
	(0.039)	(0.042)	(0.048)	(0.040)	(0.051)	(0.056)
Post	0.014	-0.053	-0.003	-0.010	0.028	-0.031
	(0.043)	(0.051)	(0.059)	(0.047)	(0.055)	(0.059)
TVET*post	-0.059	0.080	-0.055	0.003	-0.001	-0.068
	(0.054)	(0.060)	(0.072)	(0.057)	(0.076)	(0.076)
Constant	-0.730**	-0.484	-0.478	-0.350	-0.150	0.284
	(0.350)	(0.416)	(0.486)	(0.407)	(0.514)	(0.534)
N	1,612	1,338	1,196	1,842	1,105	1,194
R2	0.041	0.072	0.050	0.055	0.051	0.040
Panel B: TVET vs. secondary 2 level students						
TVET	0.099**	-0.012	-0.013	0.104**	0.120*	0.095
	(0.043)	(0.057)	(0.065)	(0.050)	(0.061)	(0.068)
Post	0.022	-0.042	-0.131	-0.031	0.103	0.060
	(0.058)	(0.104)	(0.112)	(0.088)	(0.099)	(0.112)
TVET*post	-0.012	0.101	0.104	0.049	0.038	-0.064
	(0.058)	(0.081)	(0.094)	(0.070)	(0.096)	(0.095)
Constant	-1.099**	-0.516	-0.591	-0.737	-1.141	-0.507
	(0.464)	(0.723)	(0.843)	(0.696)	(0.801)	(0.936)
N	667	444	393	707	403	411
R2	0.132	0.082	0.145	0.054	0.093	0.078
Panel C: TVET vs. all secondary level students						
TVET	0.059	-0.022	0.058	0.112***	0.117**	0.126**
	(0.038)	(0.041)	(0.048)	(0.040)	(0.051)	(0.056)
Post	0.015	-0.058	-0.006	-0.003	0.053	-0.027
	(0.036)	(0.049)	(0.054)	(0.043)	(0.049)	(0.054)
TVET*post	-0.054	0.080	-0.035	0.012	0.008	-0.067
	(0.053)	(0.059)	(0.070)	(0.056)	(0.075)	(0.075)
	-0.068***	-0.032	0.022	0.009	-0.005	0.026
	(0.018)	(0.033)	(0.038)	(0.026)	(0.035)	(0.034)
Constant	-0.754**	-0.440	-0.644	-0.533	-0.496	0.269
	(0.295)	(0.386)	(0.451)	(0.371)	(0.460)	(0.486)
N	2,027	1,531	1,378	2,207	1,319	1,426
R2	0.055	0.066	0.056	0.051	0.050	0.042

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 16: **Effects of fulltime jobs for men**

Fulltime work	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015
Panel A: TVET vs. secondary 1 level students							
TVET	-0.130***	-0.090**	-0.085*	0.036	-0.048	-0.088	-0.041
	(0.031)	(0.041)	(0.045)	(0.048)	(0.041)	(0.054)	(0.053)
Post	0.003	-0.015	0.038	-0.061	-0.044	-0.005	-0.021
	(0.040)	(0.049)	(0.056)	(0.060)	(0.050)	(0.059)	(0.058)
TVET*post	0.014	0.021	0.042	-0.088	-0.004	-0.011	-0.041
	(0.041)	(0.059)	(0.064)	(0.074)	(0.059)	(0.078)	(0.078)
Constant	-1.075***	-0.962**	-1.473***	-0.062	-0.165	0.310	0.155
	(0.295)	(0.394)	(0.432)	(0.491)	(0.422)	(0.550)	(0.527)
N	1,863	1,652	1,394	1,262	1,949	1,149	1,239
R2	0.073	0.086	0.086	0.045	0.053	0.029	0.036
Panel B: TVET vs. secondary 2 level students							
TVET	-0.020	0.050	0.003	0.013	0.018	-0.123*	-0.057
	(0.038)	(0.047)	(0.061)	(0.064)	(0.050)	(0.067)	(0.063)
Post	-0.072	0.029	-0.038	-0.241**	0.068	-0.094	-0.165
	(0.052)	(0.063)	(0.115)	(0.114)	(0.092)	(0.107)	(0.111)
TVET*post	0.060	0.053	0.031	0.113	-0.012	0.097	0.060
	(0.045)	(0.063)	(0.090)	(0.097)	(0.075)	(0.099)	(0.098)
Constant	-0.835**	-1.746***	-0.546	-0.037	-1.219*	0.186	0.592
	(0.398)	(0.515)	(0.769)	(0.860)	(0.706)	(0.867)	(0.928)
N	749	682	456	412	724	414	423
R2	0.102	0.127	0.071	0.117	0.057	0.055	0.067
Panel C: TVET vs. all secondary level students							
TVET	-0.134***	-0.093**	-0.084*	0.026	-0.047	-0.095*	-0.048
	(0.031)	(0.041)	(0.044)	(0.047)	(0.041)	(0.053)	(0.053)
Post	-0.013	0.004	0.027	-0.079	-0.024	-0.001	-0.037
	(0.035)	(0.042)	(0.052)	(0.055)	(0.046)	(0.054)	(0.053)
TVET*post	0.025	0.025	0.037	-0.064	-0.004	0.009	-0.024
	(0.039)	(0.057)	(0.063)	(0.073)	(0.058)	(0.077)	(0.077)
Secondary2	-0.128***	-0.156***	-0.099***	-0.053	-0.048*	-0.009	-0.010
	(0.018)	(0.021)	(0.036)	(0.038)	(0.028)	(0.038)	(0.034)
Constant	-1.004***	-1.161***	-1.329***	-0.119	-0.343	0.065	0.149
	(0.263)	(0.336)	(0.403)	(0.456)	(0.386)	(0.495)	(0.480)
N	2,291	2,079	1,591	1,454	2,326	1,368	1,481
R2	0.086	0.113	0.083	0.050	0.052	0.028	0.038

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 17: **Effects of employee for men**

Employee	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015
Panel A: TVET vs. secondary 1 level students							
TVET	-0.027	0.021	-0.007	0.065	0.084**	0.030	0.016
	(0.032)	(0.040)	(0.042)	(0.047)	(0.041)	(0.052)	(0.056)
Post	-0.042	0.013	0.056	0.009	-0.004	0.041	-0.071
	(0.039)	(0.044)	(0.051)	(0.058)	(0.050)	(0.059)	(0.062)
TVET*post	-0.033	-0.035	0.030	-0.057	-0.079	-0.017	0.008
	(0.043)	(0.056)	(0.061)	(0.072)	(0.057)	(0.077)	(0.079)
Constant	-0.399	-0.714**	-1.210***	-0.557	-0.129	-0.344	0.780
	(0.283)	(0.356)	(0.409)	(0.482)	(0.426)	(0.544)	(0.555)
N	1,863	1,652	1,393	1,262	1,949	1,149	1,239
R2	0.042	0.048	0.074	0.045	0.030	0.028	0.014
Panel B: TVET vs. secondary 2 level students							
TVET	0.057	0.093**	0.022	0.038	0.188***	0.107*	0.096
	(0.037)	(0.044)	(0.059)	(0.064)	(0.049)	(0.062)	(0.068)
Post	0.020	-0.022	-0.083	-0.184*	0.042	0.119	-0.049
	(0.049)	(0.058)	(0.106)	(0.105)	(0.089)	(0.103)	(0.110)
TVET*post	-0.020	0.027	0.099	0.103	-0.075	0.005	0.029
	(0.046)	(0.058)	(0.081)	(0.091)	(0.071)	(0.097)	(0.097)
Constant	-1.128***	-0.956**	-0.419	-0.129	-0.770	-1.164	0.571
	(0.400)	(0.478)	(0.733)	(0.832)	(0.696)	(0.821)	(0.926)
N	749	681	455	412	724	414	423
R2	0.089	0.126	0.074	0.145	0.061	0.084	0.080
Panel C: TVET vs. all secondary level students							
TVET	-0.026	0.017	-0.010	0.056	0.083**	0.027	0.015
	(0.031)	(0.039)	(0.042)	(0.046)	(0.041)	(0.051)	(0.056)
Post	-0.026	0.006	0.024	-0.005	0.016	0.066	-0.061
	(0.033)	(0.037)	(0.048)	(0.054)	(0.045)	(0.053)	(0.056)
TVET*post	-0.031	-0.025	0.039	-0.039	-0.077	-0.012	0.014
	(0.041)	(0.054)	(0.060)	(0.070)	(0.056)	(0.076)	(0.078)
Secondary2	-0.090***	-0.103***	-0.060*	-0.041	-0.084***	-0.085**	-0.073**
	(0.017)	(0.018)	(0.033)	(0.037)	(0.027)	(0.036)	(0.034)
Constant	-0.550**	-0.745**	-0.997***	-0.620	-0.356	-0.621	0.672
	(0.250)	(0.302)	(0.382)	(0.446)	(0.385)	(0.483)	(0.501)
N	2,291	2,078	1,590	1,454	2,326	1,368	1,481
R2	0.053	0.068	0.067	0.052	0.031	0.033	0.021

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 18: **Effects of employed for men**

Employed	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015
Panel A: TVET vs. secondary 1 level students							
TVET	-0.142***	-0.119***	-0.081*	-0.037	-0.029	-0.079*	-0.011
	(0.036)	(0.042)	(0.044)	(0.044)	(0.038)	(0.045)	(0.043)
Post	0.018	-0.026	0.055	-0.012	-0.073	-0.057	-0.017
	(0.045)	(0.052)	(0.055)	(0.056)	(0.046)	(0.048)	(0.049)
TVET*post	0.007	0.087	0.011	-0.058	-0.012	0.007	-0.069
	(0.050)	(0.063)	(0.066)	(0.073)	(0.056)	(0.071)	(0.068)
Constant	-1.447***	-1.103***	-1.541***	-0.489	-0.063	0.639	0.214
	(0.322)	(0.405)	(0.422)	(0.463)	(0.387)	(0.446)	(0.440)
N	1,863	1,652	1,394	1,262	1,949	1,149	1,239
R2	0.081	0.098	0.114	0.078	0.089	0.074	0.073
Panel B: TVET vs. secondary 2 level students							
TVET	0.004	0.060	0.003	0.013	0.079*	-0.051	0.009
	(0.043)	(0.048)	(0.061)	(0.060)	(0.047)	(0.057)	(0.053)
Post	-0.027	0.059	-0.024	-0.161	0.050	-0.166*	-0.176*
	(0.062)	(0.071)	(0.116)	(0.112)	(0.091)	(0.099)	(0.095)
TVET*post	0.050	0.081	0.054	0.124	-0.020	0.204**	0.016
	(0.056)	(0.069)	(0.092)	(0.096)	(0.074)	(0.093)	(0.089)
Constant	-1.465***	-2.007***	-1.064	-0.694	-1.224*	-0.163	0.974
	(0.460)	(0.559)	(0.769)	(0.839)	(0.683)	(0.758)	(0.776)
N	749	682	456	412	724	414	423
R2	0.119	0.139	0.109	0.151	0.088	0.118	0.071
Panel C: TVET vs. all secondary level students							
TVET	-0.146***	-0.117***	-0.084*	-0.046	-0.031	-0.094**	-0.017
	(0.035)	(0.041)	(0.044)	(0.044)	(0.037)	(0.045)	(0.043)
Post	0.014	0.003	0.044	-0.024	-0.054	-0.065	-0.044
	(0.039)	(0.044)	(0.053)	(0.053)	(0.043)	(0.045)	(0.045)
TVET*post	0.016	0.082	0.014	-0.036	-0.010	0.043	-0.053
	(0.048)	(0.062)	(0.065)	(0.071)	(0.055)	(0.070)	(0.068)
Secondary2	-0.166***	-0.178***	-0.110***	-0.109***	-0.087***	-0.102***	-0.038
	(0.021)	(0.023)	(0.037)	(0.037)	(0.028)	(0.034)	(0.031)
Constant	-1.460***	-1.337***	-1.480***	-0.580	-0.262	0.370	0.340
	(0.287)	(0.349)	(0.396)	(0.432)	(0.358)	(0.410)	(0.405)
N	2,291	2,079	1,591	1,454	2,326	1,368	1,481
R2	0.102	0.125	0.112	0.090	0.086	0.085	0.069

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.

Table 19: **Effects of self-employment for men**

Self-employed	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	2009	2010	2011	2012	2013	2014	2015
Panel A: TVET vs. secondary 1 level students							
TVET	-0.080***	-0.103***	-0.070**	-0.099***	-0.127***	-0.117***	-0.036
	(0.018)	(0.025)	(0.029)	(0.034)	(0.030)	(0.044)	(0.052)
Post	0.007	-0.038	-0.009	0.010	-0.058	-0.160***	0.057
	(0.027)	(0.034)	(0.041)	(0.046)	(0.041)	(0.052)	(0.056)
TVET*post	0.038	0.114***	0.005	0.032	0.056	0.089	-0.057
	(0.026)	(0.038)	(0.039)	(0.051)	(0.041)	(0.062)	(0.072)
Constant	-0.460**	-0.362	-0.274	-0.270	0.011	0.929*	-0.537
	(0.200)	(0.276)	(0.335)	(0.382)	(0.356)	(0.496)	(0.514)
N	1,863	1,652	1,394	1,262	1,949	1,149	1,239
R2	0.032	0.049	0.032	0.032	0.047	0.061	0.052
Panel B: TVET vs. secondary 2 level students							
TVET	-0.038	-0.036	-0.062	-0.037	-0.113***	-0.170***	-0.085
	(0.023)	(0.030)	(0.041)	(0.046)	(0.038)	(0.056)	(0.064)
Post	-0.036	0.032	-0.013	-0.017	-0.032	-0.262***	-0.191*
	(0.037)	(0.042)	(0.070)	(0.077)	(0.072)	(0.091)	(0.109)
TVET*post	0.051*	0.069	0.043	0.066	0.041	0.199**	0.035
	(0.029)	(0.042)	(0.054)	(0.065)	(0.055)	(0.077)	(0.090)
Constant	-0.169	-0.707**	-0.556	-0.343	0.065	0.759	0.882
	(0.256)	(0.313)	(0.511)	(0.596)	(0.548)	(0.755)	(0.909)
N	749	682	456	412	724	414	423
R2	0.039	0.025	0.063	0.025	0.080	0.110	0.054
Panel C: TVET vs. all secondary level students							
TVET	-0.083***	-0.099***	-0.073**	-0.101***	-0.127***	-0.124***	-0.042
	(0.018)	(0.024)	(0.029)	(0.033)	(0.030)	(0.043)	(0.052)
Post	-0.000	-0.012	0.009	0.002	-0.065*	-0.176***	0.006
	(0.024)	(0.029)	(0.038)	(0.042)	(0.038)	(0.048)	(0.052)
TVET*post	0.041*	0.103***	0.009	0.036	0.056	0.108*	-0.041
	(0.024)	(0.037)	(0.038)	(0.050)	(0.039)	(0.061)	(0.070)
Secondary2	-0.047***	-0.043***	-0.025	-0.063**	-0.009	0.014	0.020
	(0.013)	(0.015)	(0.025)	(0.027)	(0.024)	(0.033)	(0.034)
Constant	-0.409**	-0.510**	-0.466	-0.241	0.118	0.867*	-0.191
	(0.181)	(0.238)	(0.309)	(0.349)	(0.326)	(0.447)	(0.472)
N	2,291	2,079	1,591	1,454	2,326	1,368	1,481
R2	0.032	0.049	0.038	0.035	0.042	0.062	0.044

Notes: Other control variables are marital status, age, 7 year dummies, and 11 states dummies. The robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Urban Employment and Unemployment Survey in Ethiopia, 2009-2015.