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Vocational Education Voucher Delivery and Labor Market Returns

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Vocational Education Voucher Delivery and Labor Market Returns: A Randomized Evaluation Among Kenyan Youth

Report for Spanish Impact Evaluation Fund (SIEF) Phase II

Joan Hamory Hicks, Michael Kremer, Isaac Mbiti, and Edward Miguel

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Abstract

This report describes the ongoing Technical and Vocational Vouchers Program (TVVP) in Kenya and provides early results from the intervention. Implementation began in 2008 with the recruitment of approximately 2,160 out-of-school youths (ranging in age from roughly 18 to 30). Study participants were drawn from the Kenya Life Panel Survey, an unusual on-going panel dataset of detailed educational, health, and cognitive information for over 7,000 adolescents in western Kenya. Of the 2,160 youths that applied to the TVVP, a random half were awarded a voucher for vocational training, while the other half served as the control group. Of the voucher winners, a random half were awarded a voucher that could only be used in public (government) institutions, while the other half received a voucher that could be used in either private or public institutions. The project also included a cross-cutting information intervention, which exposed a randomly selected half of all treatment and control individuals to information about the actual returns to vocational education. This report focuses on program take-up, the demand for vocational training and the impacts of the information intervention on institution and course selection, participant attendance, the short-term impacts of training on labor market expectations and outcomes for a representative subset of program participants, and training center characteristics. The report also provides some suggestive evidence on the supply-side impacts of the program.

The vocational training vouchers and impact evaluation activities to date were primarily financed by the World Bank through the Bank-Netherlands Partnership Program (BNPP) and the Spanish Impact Evaluation Fund (SIEF), with additional assistance received for past or future evaluation activities from the World Bank's Gender Action Plan (GAP), the International Growth Centre, the International Initiative for Impact Evaluation (3IE) / Global Development Network, and the National Institutes for Health. We are grateful to Shobhana Sosale for her encouragement, support, and useful comments and suggestions throughout this project. We are also grateful to David Evans, Markus Goldstein, Arianna Legovini and Michael Mills for their support. Lisa Chen, Lauren Falcao, Jonas Hjort, Maryam Janani, Andrew Fischer Lees, Jamie McCasland, Owen Ozier, Adina Rom and Sebastian Stumpner provided exceptional research, managerial, organizational, and implementation assistance. The project was implemented and managed in collaboration with Innovations for Poverty Action-Kenya (IPAK). We are grateful for the superb effort of the field staff led by Blastus Bwire and Benard Onyango, and the management and support staff at IPAK.

Executive Summary

There is a growing consensus that youth unemployment in less developed countries is a major economic and social problem, especially in Sub-Saharan Africa. A recent World Bank report states that youth account for approximately 60% of the unemployed in this region, and that 72% of adolescents in Sub-Saharan Africa live below the "$2 a day" poverty line (World Bank 2009). Vocational education has been identified as a promising avenue through which young adults can acquire marketable skills that will enable them to obtain employment. In conjunction with the World Bank, international aid agencies such as USAID, non-governmental organizations, and several governments - including Kenya (our study country) - have recently implemented large scale youth empowerment programs, many of which feature increased investment in and expansion of the vocational training sector. However, there is little rigorous evidence to date on the factors affecting the demand for vocational education, or the subsequent economic and social impact of vocational training programs.

The Technical and Vocational Vouchers Program (TVVP)[1] was launched in Kenya in 2008 in an attempt to fill these key knowledge gaps. This report provides the first set of results from the ongoing TVVP. The evidence presented covers the major themes and goals highlighted in the Spanish Impact Evaluation Fund (SIEF) Phase II Concept Note previously submitted by the authors. Specifically, this report utilizes information collected in a series of surveys of program participants to generate evidence concerning the factors that affect the demand for vocational training, including price, information, and distance. This report also documents the short-run impacts of the program on labor market expectations, behaviors, and outcomes for a representative subset of program participants. Furthermore, this report uses data collected on characteristics of training institutions to both document the variation in educational experiences and to draw inferences about the mechanisms underlying the observed patterns in the demand for vocational education. The report also provides some suggestive evidence on the supply-side impacts of the program.

The TVVP is a randomized evaluation of a youth vocational education intervention in (primarily western) Kenya. Approximately 2,160 out-of-school youths (roughly 18 to 30 years old) applied for vocational education tuition vouchers, and a randomly selected half were

[1] We refer to the project as the "Technical and Vocational Voucher Program" to reflect the inclusion of both traditional Youth Polytechnics under purview of the Kenyan Ministry of Youth and Technical Training Institutes under the Kenyan Ministry of Education. The program also includes private vocational training institutions.

awarded vouchers. Among voucher winners, a random half (approximately 530 students) were awarded a voucher that could only be utilized in public (government) vocational institutions, while the other half were awarded a voucher that could be used in both private and public schools. Each voucher is worth approximately US$460, an amount sufficient to fully or almost fully cover tuition costs for both government and private vocational programs.

Historically, government education policies have often overlooked the potential of the private sector. Anecdotal and qualitative evidence gathered over the course of this project suggests that private sector vocational training institutions are more dynamic, flexible and offer students the opportunity to gain skills that are more relevant on the job market compared with their public counterparts. This is consistent with the previous findings of Johanson and Adams (2004), who argue that government-run vocational training institutes in less developed countries often fail to adequately provide marketable and relevant skills to students and are typically slow to respond and adapt to rapidly changing labor markets driven by technological advances. The design of this project allows us to explicitly evaluate the additional impact of having access to private sector vocational training on the demand for training, attrition during the training and subsequent economic and social returns such as employment. Although it was not an *ex-ante* goal of this project to do so, we are also able to provide some suggestive evidence on supply side impacts of the voucher program.

Overall, the take-up of the voucher was high with 74% of voucher winners enrolling in a course. However, take-up was significantly higher among students who were awarded an unrestricted (public or private) voucher, compared to those who were awarded a restricted (public-only) voucher. Moreover, retention rates among unrestricted voucher winners were also higher. This could perhaps reflect the greater density of private institutions in the study area, which resulted in lower average transport costs for students. This could also reflect differences in the (observed or unobserved) characteristics of these institutions – for example our data shows that private institutions were more likely to assist their students in the job search process. Finally, this could reflect students' perceptions of the (labor market) returns to private versus public training. Taken together these results demonstrate the potential of engaging the dynamic private vocational training sector in public policies aimed at boosting the demand for vocational training.

Survey evidence obtained prior to the TVVP intervention indicates that program participants were frequently mistaken about the returns to vocational education. Surprisingly,

only a small fraction of respondents knew which trades had the highest average earnings in western Kenya. In addition, data from baseline individual course preferences show that males overwhelmingly preferred traditionally "male-dominated" courses such as motor-vehicle mechanics, while women almost exclusively choose traditionally "female-dominated" courses such as hairdressing. Given these apparent misperceptions about the returns to vocational training and the pervasive occupational segmentation by gender, the provision of additional information and encouragement could have meaningful consequences for individual educational investment choices. There is growing recognition that informational constraints can lead to undesirable economic and social outcomes such as under-investment in schooling. For instance, Jensen (2009) recently demonstrated that low perceived returns to education dampened the demand for schooling in a less developed country context.

In order to estimate the role of better information on labor market returns in determining demand for vocational schooling in Kenya, the TVVP included a baseline information intervention. Half of the participants in the treatment and control groups were provided information on the actual returns to vocational training. Further, the intervention highlighted the increased economic returns in male-dominated trades and used "soft persuasive" methods such as a video of female auto-mechanics in an attempt to encourage females to pursue more traditionally male-dominated trades. While the provision of (better) information did not have a significant impact on enrollment decisions, the intervention did encourage women to take up male-dominated trades. This demonstrates the potential for such encouragement schemes to reduce the level of occupational segregation in the labor market by promoting better gender balance in training.

While this report focuses mainly on the demand side impacts of the program, we also discuss the potential for the program to induce supply-side effects. Education vouchers are often central features of education reform efforts. Proponents of vouchers argue that vouchers can improve educational outcomes by promoting school competition. As our program is concentrated in western Kenya, we will be able to obtain some suggestive evidence on the supply-side effects of increased competition that were induced by the voucher. Previous research in Kenya showed that a large scale training voucher program targeted to workers in the informal sector (also known as the "Jua Kali" sector in Kenya) stimulated the development of training programs tailored to the unique needs of informal sector workers (Johanson and Adams, 2004). While the

research design of the TVVP does not permit the examination of the impact of the voucher program on new entrants into the market, we do find suggestive evidence of supply-side impacts among institutions where voucher recipients could have enrolled at the start of the program. Specifically, we find that institutions that received voucher winners were more likely to expand their course offerings compared to institutions which did not receive any voucher recipients. However, as institutions which receive voucher winners are a non-random subset of the population, this pattern should be interpreted with caution. Nevertheless, as policy-makers debate the merits of scaling-up similarly designed projects, a clearer understanding of both the demand-side and supply-side impacts of a voucher program are critical to the successful design and implementation of a large scale or nation-wide program.

We augment the evidence on the demand for vocational training with an analysis of the short run labor market impacts of the training program. As the majority of voucher winners (approximately 75%) were in school until December 2010, we will not be able to evaluate program impacts on the full sample in this report. Instead, using data on labor market outcomes of both treatment and control group individuals for a representative subset of program participants, we are able to provide suggestive evidence of the short run impacts of the program on the labor market expectations, behaviors, and outcomes such as employment, as well as evidence on the opportunity costs of training. Overall, we find suggestive evidence of large opportunity costs of training, but also large benefits in terms of labor market outcomes. Focusing on the subset of individuals who had completed short training courses, we find suggestive evidence that the returns to training were larger for females who had completed training, compared to their male counterparts. This is consistent with previous findings from a training program in Colombia, where the earnings returns to training for women were significantly larger than the earnings returns for males (Attanasio et al., 2009). We also find that males who had completed short courses generated higher profits from self-employment compared to their female counterparts. Future research, outside the scope of this report, will provide a better estimate of longer-term training impacts.

The evidence presented in this report demonstrates the success of a voucher program in boosting the demand for vocational training, suggesting that current prices of vocational training are prohibitive, perhaps due to credit constraints. The evidence also points to the importance of engaging the private sector in policy formulation, as those students who had access to the private

sector had both increased demand for vocational training and reduced drop-out rates. This suggests that private schools may be superior in quality, or are better able to meet the idiosyncratic needs of their students, or may simply be closer. The evidence also suggests that information can change the education investment decisions of students, perhaps hinting that governments can employ national information campaigns to boost enrollments in vocational education. Future research, beyond scope of the SIEF Phase II work plan, will rigorously examine the impact of the medium-to-long term labor market returns to vocational education. Ultimately, the combined evidence of the factors affecting the demand for education and the medium-to-long term returns to education will provide a comprehensive assessment of the potential of a vocational education voucher scheme to improve the livelihoods of youths in a less developed country context.

1. Introduction

This report describes the ongoing Technical and Vocational Vouchers Program (TVVP) in Kenya and provides the early results of the intervention. This program – the first of its kind in Africa, to our knowledge – aims to understand the mechanisms through which vocational education can address the widespread problem of youth underemployment in Kenya, using a multi-faceted randomized evaluation design together with an innovative panel dataset. In particular, through randomized provision of vocational training vouchers to program applicants, the TVVP will permit an evaluation of the effects of vocational education on formal sector employment and labor market earnings, participation in the informal and agricultural sectors, entrepreneurship decisions, migration (both within Kenya and to neighboring countries), remittances, fertility decisions and other major life outcomes in a sample of over 2,100 Kenyan youth. The design of the program will further allow for an estimation of how these effects vary by type (*e.g.*, public versus private) and quality of institution attended, as well as across individuals with different baseline characteristics. In addition, the use of a novel randomized information intervention will permit estimation of the role that information on labor market returns to vocational training plays in the demand for vocational education in Kenya.

The present analysis focuses on program take up, the demand for vocational education and the impact of the information intervention, voucher recipient institution and course selection, participant attendance, training center characteristics, and very short-term labor market impacts for a representative subset of program participants. Subsequent research will examine the longer-term labor market returns of vocational education in the full sample (and for individuals with different baseline characteristics), as well as the relative effectiveness of public versus private institutions and institutions of varying quality more broadly. Together, the results of these studies will enable the Government of Kenya, the World Bank and other policymakers in the region to more effectively design youth skills training and employment programs in order to promote economic development via human capital formation.

2. Background and Rationale

2.1 The Importance of Vocational Training and Previous Research

Youth unemployment is one of the most pressing social and economic problems facing less developed countries today (World Bank, 2007). Kenya, like many African countries, suffers

from high youth unemployment. According to the 2005 Kenya Integrated Household Budget Survey, approximately 21% of youths aged 15-29 are unemployed, and a further 25% are neither in school nor working. This is a critical problem given that individuals in this age group compose 30% of the country's population. Furthermore, high unemployment can have adverse social and economic consequences: a recent report showed that the majority of violent acts during the 2007 post-election crisis in Kenya were perpetrated by underemployed youth (World Bank, 2008).

Despite the importance of youth unemployment, little is known about how best to smooth the school-to-work transition in less developed countries, or how to boost human capital for those not on the academic schooling track. Vocational education is one promising avenue for addressing the problem. The 2007 World Development Report emphasizes that "second-chance" schooling programs are crucial for countries like Kenya, given high drop-out rates from primary school and limited primary to secondary school transition rates.

The introduction of free primary education in Kenya in 2003 prompted a large influx of pupils previously not enrolled in school. As these students complete their primary schooling, Kenya will face unprecedented numbers of primary school graduates vying for limited seats in academic secondary schools. The Government of Kenya has also recently made efforts to reduce the cost of secondary schooling for those pupils who qualify academically, promising to pay a significant portion of fees for eligible students. This effective reduction in fees will likely further stretch existing capacity in the Kenyan academic secondary school system and make admission increasingly competitive.

Vocational training could play an important role in this rapidly evolving educational environment. Even if the number of academic secondary school spots expands, most Kenyan young adults are still unlikely to attend, due to either mediocre primary school grades or an inability to pay for fees (despite the fee reduction).[2] Many households may not be in the position to make a long term human capital investment in the form of traditional schooling, and so may pressure young adults to drop out and begin contributing toward household earnings. Vocational training can deliver more readily-marketable skills to these youth, and therefore offer an attractive alternative to traditional schooling that could smooth the school-to-work transition for those leaving the traditional schooling track.

[2] Anecdotal evidence from secondary schools in Busia District suggests that secondary school fees are typically much higher than vocational training school fees (especially when the length to degree is factored in).

Another disadvantaged subpopulation could benefit greatly from vocational training: those who never completed primary school. Despite the growing number of primary school graduates, there is still a sizeable contingent of adolescents and young adults who dropped out of the primary system before 2003 – for example, due to pregnancy, parent AIDS-related death, or an inability to pay school fees. While these marginalized individuals are unlikely to rejoin primary schools as they enter young adulthood, they could be well served by "second-chance" vocational training opportunities, where they are treated like adults (insofar as they can select a program according to their own specific career goals) and in which they can start afresh on an equal footing with adult peers.

There is growing recognition within Kenya of the importance of the vocational education sector. Technical, Industrial, and Vocational Education and Training (TIVET) is one of the 23 investment programs under the ongoing World Bank Kenya Education Sector Support Project (KESSP). A policy dialogue is currently ongoing with the Ministry of Higher Education, Science and Technology (MOHEST) on the topic of TIVET as well as youth labor market skills development more broadly. These policies need to be designed based on rigorous impact evaluation evidence and labor market studies, and the randomized evaluation described in this paper can, we hope, play a useful role in informing policymakers.

While there is some existing evidence of the benefits of vocational education (*e.g.*, Nishimura and Orodho, 1999), policymakers need additional rigorous studies on its economic returns and how best to deliver such programs in Africa. The few existing rigorous studies of vocational training in developing countries evaluate Latin American programs. In a pair of papers, Angrist *et al*. examine Colombia's program of providing vouchers to allow students to attend private secondary schools and find that it was very cost effective. A recent paper by Bettinger, Kremer, and Saavedra (2007) finds that the greatest impact was in the private vocational sector. Although this evidence is intriguing and Bettinger *et al*. argue that it may be due to private vocational schools being more successful at producing employable graduates than public schools, especially for jobs in Colombia's rapidly growing service sector, it is not possible to attribute the effect of the program solely to private versus public vocational education since different sets of people apply to (or are accepted to) different types of programs. In our project, we instead explicitly evaluate the impact of public and private vocational education courses using randomized evaluation methods.

Card *et al*. (2007) show that a Dominican Republic job-training program had a significant positive impact on individuals' hourly wages and on the probability of health insurance coverage (conditional on employment), although overall effects were moderate. Card *et al*. find heterogeneous returns to vocational training for those with different levels of educational achievement, across urban and rural areas, and age. Attanasio *et al*. (2009) also evaluate the returns to vocational training in Colombia through a randomized intervention. They find returns to vocational education on the order of 8–18% in earnings. The returns appear to be especially high for girls, an intriguing possibility that we intend to investigate further in future research.

Yet no rigorous impact evaluation study of vocational education has been conducted (to our knowledge) in Africa, the world's poorest region and one where the youth unemployment problem is particularly severe. Better evidence on what works in vocational education delivery will be critical for good public policy in the education sector, and will inform the decisions of governments and NGOs throughout the region, including in our study country of Kenya, as they consider expanding programs to improve youth labor market skills. This BNPP and SIEF funded project seeks to illuminate the factors that drive the demand for vocational education in Kenya using an innovative randomized voucher delivery mechanism and information campaign. In addition, the project also seeks to provide suggestive evidence of impact of the voucher scheme on the supply-side. With several less developed countries currently expanding and investing in their vocational education sectors, the results of this intervention will provide timely and comprehensive evidence to policy-makers seeking to increase the demand for vocational education. In addition, the project will provide policy makers with a clearer understanding of the potential supply-side effects of a voucher scheme.

2.2 Vocational Education in Kenya

There are many vocational training institutions already in existence in Kenya. A formal youth polytechnic system was established in the 1960s, and continues to be subsidized under the purview of the Ministry of Youth and Sports (MOYAS; King and Martin, 2002). These training institutions range from relatively basic village polytechnics offering traditional trades in skilled construction (*e.g*., masonry, carpentry, plumbing), automotive mechanics and tailoring, to larger polytechnics in towns offering a wider array of courses and complementary skills training in entrepreneurship education (*e.g*., accounting). Parallel to the youth polytechnic system, the

Ministry of Education (MOE) also operates a system of technical training institutes, prestigious institutions offering both industrial education and commercial courses in business, computers and secretarial skills. These public institutions typically provide two-year training courses, with total course tuition ranging from US$300-500 (with a mean of approximately US$350 among institutions in our primary study area in rural western Kenya).

An alternative to the public model is present in the dynamic but understudied private vocational training sector, which could also play an important role in building youth skills in Kenya (as well as in other low income countries). Kenya's private vocational sector has grown markedly in recent years. Ministry of Education statistics show that the number of private institutions grew by 16% between 2004 and 2007 (while public institutions grew by 6%). Under the umbrella of private institutions are a wide variety of institutional structures, including private technical colleges, small centers specializing in a single skill (*e.g.* hairdressing), and small businesses in which training resembles apprenticeships. Within the primary region of focus for the present research (western Kenya), private institutions offer courses ranging from a few months to two years. Course offerings at these institutions are usually narrower in scope than their public-sector counterparts, but allow students to specialize in specific skills – for example, a particular computer software package. The price of a course varies significantly, but typically is between US$150-500 (with a mean of less than US$300 among institutions in our study area). Thus, private institutions offer a substantially different training experience than public training centers. Allowing individuals the opportunity to select the course that best fits their needs, whether public or private, may further boost the effectiveness of vocational training by leading to more efficient student-course matches – a possibility we will continue to study in future research.

One of the primary goals of the TVVP is to rigorously document the labor market returns to vocational education in western Kenya. Simple calculations using cross-sectional data collected by the authors in recent years suggests that, among a sample of primarily rural Kenyan youth, the returns to vocational education may be very high (on the order of 37%). However, this finding is likely subject to bias, at the very least since higher ability individuals are both more likely to obtain additional schooling (including vocational training) and more likely to earn higher wages. In order to rigorously determine the returns to vocational training, the TVVP provided vouchers for vocational training to a randomly chosen subset of individuals interested in obtaining such training. Furthermore, given the differences between public and private

training facilities outlined above, the design of the TVVP will allow for estimation of returns separately by type and characteristics of institution attended.

2.3 Status of SIEF Phase II Concept Note Objectives

The major activity outlined in the SIEF Phase II Concept Note was the design, implementation and analysis of the first follow-up survey. This survey, collected for all treatment and control group individuals, contains information on vocational training take-up decisions, educational expenses, course selection, course progression, and attrition. In addition the project collected information on participating training institutions, including facilities available, hours per week spent in the classroom versus doing practical training, job placement services, student participation in off-site internships. We also collected GPS data for each individual and each participating school.

The following table summarizes the status of each of the goals of outlined in the SIEF Phase II Concept Note.

Goal/ Activity	Purpose	Outcome	Comments
Confirm enrollment status of treatment and control individuals .	To estimate the vocational training take-up decisions of both treatment and control groups	Complete. Data collected for treatment group and over 90% of the control group. Data processed and cleaned.	Contains information on educational expenses, course selection, course progression and attrition.
Perform unannounced attendance verification checks.	To monitor and audit student progress and payment information.	Complete. Data collected for treatment group only. Data processed and cleaned.	Provides enrollment and retention figures by term.
Collect information on characteristics of training centers (from school administrators).	To examine details of vocational education program.	Collected data for schools where individuals enrolled. Data processed and cleaned. ±	Details of vocational education program, including the hours per week spent in the classroom versus doing practical training, and job placement services.

Collect information on characteristics of training centers (from teachers).	To examine details of vocational education program.	Collected data for schools where individuals enrolled (from 241 teachers). Data processed and cleaned.±	Further details of vocational education program, including teacher characteristics.
Collect GPS information from institutions.	To provide information on the impact of transportation costs on demand for vocational training.	Collected data for schools where individuals enrolled. Data processed and cleaned. ±	
Collect short-term follow-up survey data from a subset of students.	To provide data on labor market expectations, outcomes, course completion, course satisfaction. Also, to inform design of longer-term follow-up.	Completed. Data Cleaned and processed. Survey targeted 432 respondents and interviewed 319 (74%) of target.	Collected data from a random sample of over 300 subjects both in treatment and control group. This approach was taken as it allowed us to gain evidence on short –term outcomes as a result of the intervention.

± No data collected from 14 schools which were included in the program but did not receive any students.

3. Description of the Intervention

3.1 Intervention Design

The TVVP is a randomized evaluation of a youth vocational education intervention in (primarily western) Kenya. Approximately 2,150 out-of-school Kenyan youths (18 to 30 years old) were invited to apply for vocational education tuition vouchers, and a randomly selected half were awarded vouchers. The vouchers are worth approximately US$460, an amount sufficient to fully (or almost fully) cover the tuition costs for most private vocational education programs and government-run rural village polytechnics or technical training institutes.

These youth were drawn from a pool of individuals participating in a unique and high-quality longitudinal (panel) dataset the authors have been collecting in this region, the Kenyan Life Panel Survey (KLPS). The KLPS sample was chosen as a representative subset of individuals who attended primary school in the former Busia District, a region of rural western Kenya. These schools participated in one of two development programs – either a primary school

deworming program launched in 1998 (the Primary School Deworming Program or PSDP; Miguel and Kremer, 2004), or a girls' merit scholarship program that began in 2001 (the Girls' Scholarship Program or GSP; Kremer *et al*., 2009). The KLPS data contains detailed educational, health, nutritional, labor market, demographic and cognitive information for thousands of Kenyan adolescents from 1998 to 2009. The existence of detailed information on these and other life outcomes (such as cognitive ability and orphan status) in the KLPS data will strengthen the ultimate evaluation of vocational education and enhance the external value of the evidence generated by allowing us to estimate heterogeneous program impacts for different types of individuals and training centers.

The entire KLPS sample of 10,767 individuals was invited to an informational session on the TVVP in late 2008.[3] Participants were recruited from the KLPS sample through local leaders. A total of 2,705 individuals attended one of the 70 preliminary information meetings held in sub-locations where the original deworming and scholarship programs took place as well as in the cities of Nairobi, Mombasa and Kisumu where many of them had since moved.[4] During this first informational meeting, short surveys were administered to all applicants to collect information on their beliefs about expected earnings with and without vocational education, for both the respondent individually and for "other people in his/her community". Students were then given a detailed list (compiled by TVVP staff) of local vocational training centers and selected participating vocational training centers in urban areas outside of western Kenya, including in large cities such as Nairobi, Kisumu, and Mombasa.[5] Each training center description detailed the location, contact information of the manager or principal, courses offered, academic requirements (if any), and course duration. Meeting participants were also informed that they could apply to a training center not found on this list, so long as the center met program participation requirements.

[3] In many cases we cannot confirm whether an individual received our invitation, but an attempt was made to invite the entire KLPS sample.

[4] Sub-locations are local administrative units that vary in size, but generally contain a handful of primary schools and can usually be traversed on foot in a few hours (thus, meetings were within walking distance of most participants).

[5] This list was compiled in two parts. First, names of public institutions were sought from local government offices. We included all public institutions (affiliated with either the MOYAS or the MOE) located in the heart of our study area (the current districts of Busia, Bunyala and Samia). In addition, we included many public institutions in the nearby districts of Bungoma East, Bungoma South, Kakamega North, Mumias, and Siaya, as well as a handful of institutions in the cities of Kisumu, Mombasa and Nairobi. Second, we utilized data from the most recent round of the KLPS in addition to surveys at local market centers to identify a range of private vocational training institutions. This process is described in further detail in section 3.3.

Students were instructed to return to a second program meeting at the same location two weeks later with a valid letter of support from a local authority (e.g., chief) or training center, and be prepared to state their preferred schools and courses should they be awarded an unrestricted (public or private institution) voucher or a public-only voucher (these interventions are described below). Students who attended the second meeting, brought a letter of support and had valid preferences for both unrestricted and public-only voucher types were included in the final sample of 2,163 individuals.[6] This application procedure was designed to ensure a genuine interest in vocational education among applicants, making them a highly policy relevant sample: those Kenyan youths likely to enroll in vocational education should further training subsidies become available.

Voucher winners were then randomly selected from this final pool of applicants using a computer random number generator (in the STATA statistical program). Among the voucher winners, a random half received vouchers that can be used only in government supported public vocational training institutes, while the other half received unrestricted vouchers that could be used in either public centers or in the growing private training sector. Of the final sample of 2,163, 526 individuals were assigned unrestricted vouchers and 529 were randomly assigned vouchers only for use at government institutions. The remaining 1,108 serve as the control group.

The voucher winners were informed which type of voucher they were eligible for and were subsequently provided the opportunity to apply to the vocational education institution of their choosing. The allocation of vouchers was made among those applying to the same institution; in other words, if 20 sample individuals applied to a certain vocational training center, five were randomly chosen to receive the public voucher, five were randomly chosen to receive the unrestricted voucher, and the remaining ten were allocated to the control group. This stratification was made to ensure balance across the treatment and control groups in important applicant characteristics, and to improve the precision of treatment effect estimates. In principle, this research design will also help us study which precise institutional characteristics have the greatest impact on future labor market returns. Randomization for the voucher treatment

[6] Individuals who missed the first informational meeting but wanted to participate in the program were allowed to do so by attending the second meeting in another sub-location or in Nairobi or Mombasa, or by visiting the implementing agency's offices in Busia Town. Project staff attempted to retain the information intervention (described below) treatment assignment of individuals by giving a short individual information presentation to those individuals who were originally assigned to a treatment sub-location.

assignment was also stratified by gender, assignment to the information intervention (described below), participation in one of the two original NGO primary school programs from which the sample is drawn, and their preferred course (which was aggregated into broad occupation groups by course type), thereby ensuring balance across the treatment and control groups along those categories, as well. The randomization process is summarized in Figure 1, while Figure 2 summarizes the voucher design.

Further, the project included an information intervention, implemented with a cross-cutting factorial design, such that a random subset of both the voucher and control groups received the intervention. This intervention will allow us to estimate the role that *information* on labor market returns plays in demand for vocational schooling in Kenya, complementing the voucher analysis which will deliver the *price* elasticity of demand. During the first meeting, a randomly selected half of all program enrollment meetings held at the sub-location level were exposed to information about the estimated Mincerian returns to vocational education, based on a standard cross-sectional analysis using existing KLPS data.[7] The information was presented and explained in detail by project field officers. Figure 3 presents the handouts and posters used in these information sessions.[8] One noteworthy component of the intervention highlighted the large discrepancy between expected earnings for graduates of traditionally male-dominated trades (*e.g.*, electrician) versus traditionally female-dominated trades (*e.g.*, seamstress) and used this information, as well as more subjective methods – including presentation of a video about successful female car mechanics in Kenya – to encourage young women to enroll in more lucrative male-dominated trades. Analysis of how this intervention affected individual decisions is presented in Section 4.3 below.

The randomized design in both voucher allocation and information intervention addresses leading concerns about selection bias in estimating the demand for, and the returns to, schooling.

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[7] For program enrollment meetings in the original KLPS sub-locations of Busia and surrounding districts, information treatment group assignment was performed at the sub-location level after first stratifying by division (an administrative unit containing 5-15 sub-locations). Out of 70 meetings, 35 were randomly selected to receive the information treatment. This information was most economically presented at a meeting-level (as opposed to thousands of one-on-one explanations of the information); so, the sub-location meeting was the relevant unit in our randomization. For the meetings held in Nairobi and Mombasa, randomization into information treatment and control groups was done at the individual level (and no information intervention was performed for the meetings held in Kisumu). All the analysis presented below clusters regression disturbance terms at the sub-location level.

[8] Presenters also attempted to describe the issue of possible selection bias in this cross-section analysis with the following phrase: "*You should be aware that the information displayed is from people who were able to pay for their own vocational schooling. In that sense these people may be different from you and they may have benefitted more (or less) from their training program than you would*."

For instance, the classic concern in estimating returns to schooling is that higher ability individuals are more likely to obtain additional schooling, leading researchers to overstate returns to schooling. Randomizing voucher offers across individuals, and randomization information across TVVP recruitment meetings, eliminates most relevant selection bias concerns. We will thus more confidently attribute statistically significant differences in demand for education and labor market gains to the project interventions.

3.2 Characteristics of Participating Individuals

Table 1 summarizes the descriptive statistics of the sample. The first thing to note from this table is that the voucher randomization procedure was successful at creating similar treatment and control groups. The treatment and control groups were well balanced along most observable dimensions (among all observables presented, only two show differences statistically significant at the 10% or higher level). This will allow us to confidently interpret the differences between treatment and control outcomes as the causal effect of the vocational training voucher program.

Column (1) of Table 1 provides a description of the overall sample – a valuable depiction of individuals interested in receiving vocational training. Of the 2,163 individuals included in the TVVP, 63% are female. The sample consists of more girls than boys mainly because one of the two school-based NGO programs from which the KLPS sample was originally drawn (the Girls' Scholarship Program) targeted only girls.[9] Because of the relative size difference between these two different programs, 70% of TVVP applicants were previously involved in the PSDP, while only 30% were previously involved in the GSP (results not shown). The mean age at recruitment in 2008 was 22 years and sampled students ranged in age from 18 to 30.

At the time of project recruitment meetings, most participants lived in Busia District (the main study district of the PSDP and GSP projects in rural western Kenya), with roughly 30% living outside of the district and 6% in large cities. This distribution makes sense, especially given that invitations to recruitment meetings were spread with the assistance of local area leaders throughout Busia District.

[9]As noted previously, the KLPS sample was drawn from the pupil samples for the Primary School Deworming Project (PSDP), a school-based deworming program carried out from 1998-2002 and the Girls Scholarship Program (GSP), a merit-based cash award program for the top performing female grade 6 students carried out in 2001-2002. The programs did not have overlapping samples, as the PSDP was carried out in Budalangi and Funyula divisions of the former Busia District and GSP was carried out in Township, Matayos, Butula and Nambale divisions.

Average academic schooling attainment of individuals in the sample prior to the start of the program was 8.8 years, but there is a wide range in attainment: 27% of the sample dropped out before grade 8, 38% terminated schooling upon graduating from primary school, 11% of individuals attended some secondary school, and 24% completed secondary school. It is telling that nearly two-thirds of individuals seeking vocational training had received up to a primary school education. Fewer than 3% were in school at the time of program launch. On average, program participants had been out of school for nearly 4 years at the launch of the TVVP.

Approximately 13% of the sample had previously been employed. Of these, 30% were already working in a field in which the project affiliate training centers offer skills training, such as tailoring, hairdressing, skilled construction or computer services. Other common jobs include fishing (about 18% of those working) and informal hawking/sales (about 8% of those working). The mean monthly salary for respondents who were employed was roughly 1,700 Kenyan Shillings, or just over US$20.

The vocational training voucher program was designed to be open to students who had already received some vocational training but wanted to further their skills. Nearly 22% of the sample had already received some training, primarily through apprenticeships and other informal training at small private enterprises rather than at the larger public centers.[10]

3.3 A Note on Participating Training Centers

One remarkable facet of this project is the variety of course and institution types available to respondents. The program targeted all the major government Village Polytechnics and Technical Training Institutes in the home study area of Busia District, as well as a large cross-section of available private institutions in the area. In general private institutions were eligible to be included in our sample if they currently had one or more trainees at the time of program recruitment or had offered courses in the prior year and if their fee structure feel within our voucher limits. Due to the large number and wide range of institutional types in the private vocational schooling sector, the list of potential participating vocational training centers was necessarily far from exhaustive. The most comprehensive list of potential participating

[10] Our data shows that the baseline proportion with some previous training was balanced across the voucher and control groups. Participation in the program enables these youth to gain official certificates from recognized examination bodies in Kenya (whereas they might not already have these certificates, which are expensive to obtain), and thus could plausibly have labor market returns.

institutions was in the primary target area and original home of all of our participants (Busia, Bunyala and Samia Districts). In these areas all formalized private vocational training centers were included. These include for-profit computer training schools and church or NGO-run training centers. Further a variety of privately run for-profit businesses who regularly take a few students for six month to two year "apprentice-style" training programs were included. These were vetted for legitimacy and formality – shops where space, tools, work and theoretical training were clearly available and where students had been taken many times before were included while those perhaps less equipped to handle a semi-formal training program were excluded. In the rest of western Kenya as well as the cities of Kisumu, Nairobi and Mombasa where some of our sample now reside, the program focused primarily on institutions of relatively greater sophistication that more closely resembled public institutions.

Finally, all private institutions were vetted for fit with the TVVP. Institutions with costs, program lengths and course types that were largely outside the program plans or far different from similar public options were excluded. In some cases students inquired about the possibility of enrolling in a particular institution. If the institution met our criteria then we included it in program. In some cases, institutions were not willing to work with us so we couldn't include them in the program. Figure 4a shows the geographic distribution of participating institutions across the country, and Figure 4b shows participating institutions in Busia and surrounding districts.

Government training institutions under the purview of the Ministry of Youth and Sports range from relatively basic village polytechnics, offering traditional self-employment focused industrial trades in skilled construction (masonry, carpentry, plumbing, etc.), automotive mechanics and tailoring, to larger polytechnics in town offering a wider array of courses and complementary skills training in entrepreneurship education (e.g., accounting) and even mathematics. Also included in the partner government institutions are Technical Training Institutes under the Ministry of Education, which offer both industrial education and certain commercial courses in business, computers and secretarial skills.

As evidence of the diversity and versatility of the private vocational training sector in Kenya, the type, length and structure of the private institutions and courses in our sample also vary widely. Some institutions run by private entrepreneurs, NGOs or church groups mirror the industrial training structure of the government-run polytechnic system. Others offer short

training courses in a particular skill-set like computers or driving. Still others function as businesses and training centers in one, teaching hairdressing, tailoring or some other trade through something akin to an apprenticeship. The private vocational training sector is arguably more adept at accommodating the needs of a larger variety of students, with courses as short as one month well-suited to those already in the work force or supporting their families, to the longer service-based courses desirable to secondary school leavers.

Like the institution and course types, the fees vary widely across the courses available to participants in this program. For courses included in the original list distributed at recruitment meetings, the TVVP covers all mandatory fees including uniform and registration fees. To accommodate the training needs of secondary school leavers and at the request of some voucher winners, the program also allowed students to enroll in more academic technical training diploma courses (*e.g.*, in computer training) and to cover fees up to the level of the average two year industrial course, or 35,000 Kenyan Shillings (about US$460). Section 4.6 below contains more detailed information on characteristics of institutions participating in the TVVP.

4. Technical and Vocational Vouchers Program Results

4.1 Program Take-up

Program take-up rates illustrate the strong participant interest in the TVVP. Of the 1,055 individuals offered a voucher, 781 youth (74%) attended a training program for at least one term since program launch in early 2009. Perhaps surprisingly, there are no statistically significant differences in take-up across gender, age group (above and at/below median age), years since last in school (above or at/below median), or previous vocational training, although voucher winners who reported being employed at the time of the TVVP informational meetings were less likely to use their voucher (by 4.5 percentage points, s.e. 2.6; results not shown).

There are, however, statistically significant differences in the take-up rate between individuals who were awarded the restricted (government only) vouchers and those who were awarded unrestricted vouchers. Specifically, 79% of unrestricted voucher recipients attended vocational training at some point after January 2009 while only 69% of public-only recipients attended for at least one term. Furthermore, the finding that individuals employed at the start of the TVVP were less likely to take-up is driven by those who received restricted vouchers (results

not shown). This is sensible since any expansion in training options should be associated with higher take-up, by leading to the possibility of better trainee-institution matches.

Data from the short-term follow-up survey shows that among voucher winners, out-of-school costs not covered by the voucher such as transport and room and board were often cited as an impediment to enrollment. Maternity, pregnancy and childcare issues were also often cited as a constraint to enrolling by survey respondents. This suggests that integrating childcare programs and further reducing the financial constraints could have large impacts on the demand for vocational training.

The project received an official decline of interest from 46 treatment students (4% of those awarded a voucher). Of those who gave a specific reason, 23% had enrolled in academic colleges (including teachers' colleges, academic technical colleges, and private diploma courses), 17% enrolled in a four-year university, 15% enrolled in secondary or advanced-level secondary school in Kenya or Uganda, and 3% returned to primary school. Aside from academic schooling options, 12% cited family care needs, 9% distance to available training centers, and 9% work responsibilities. Only 6% expressed dissatisfaction with the courses on offer, as expected since this is a sample of individuals that had shown genuine initial interest in vocational education by attending TVVP recruitment meetings in the first place.

Through mid-2010, the project was also able to obtain basic follow-up information for 91% of the control (non-voucher winner) sample. Fewer than 4% of this sample, or 41 individuals, were reported to have enrolled in some type of vocational schooling. Of these, just over one-third were enrolled in institutions participating in the TVVP, while the remaining individuals were enrolled in apprenticeship-type training with smaller private enterprises. Approximately 2% of the control group were attending a secondary school or other academic institution, 19% were working and the remaining 67% for whom we have data were "farming" or "just at home".

4.2 Baseline School and Course Preferences

In TVVP recruitment meetings (after the information intervention but prior to the voucher lottery), surveys were undertaken to elicit information on the preferences of each participant under the two voucher treatment scenarios (*i.e.*, if he/she were to receive an unrestricted voucher or a public-only voucher). We collected information on preferred training center and course, as

well as the reasons for choosing this combination. Overall, applicants showed a moderate preference for public training centers (56% preferred public, 44% preferred private) as their first choice. Such preferences did not vary at statistically significant levels across gender, level of education completed, or by previous vocational training. However, individuals at or below median age (21 years old) were more likely to prefer public institutions than their older peers (59% versus 53%), and those who have been out of school 3 years or less were more likely to prefer public institutions than those who have been out of school longer (58% versus 54%). Previous participants of the GSP were much more likely than those of the PSDP to prefer public institutions (66% to 52%). Individuals living in or near Busia District (thus, primarily in rural areas) at the time of program meetings were substantially more likely to prefer a public training institution than those living outside of Busia (56% to 47%, respectively). Furthermore, those living in a city were much more likely to prefer a private institution (56% of city dwellers preferred private, versus only 43% of non-city dwellers).

In terms of industry of the course preferred, the largest number of participants hoped to attend training for either tailoring/dressmaking (33%) or driving/mechanic (25%). Other popular broad occupation groups include hairdressing (13%), skilled construction (12%) and computer/secretarial work (10%). Table 2 summarizes the breakdown of broad occupation of interest for various subgroups of TVVP participants. The demand for tailoring/dressmaking, beauty and computer/secretarial courses is driven primarily by females, while the demand for vehicle-related and skilled construction courses is driven by males.[11] The distribution of course preferences is fairly similar across individuals aged above and below the median, and across location of residence. In terms of education level attained, preferences are similar for those who attained less than a secondary degree, while those with a secondary degree are much more likely to apply for a program in computer/secretarial services. There do not appear to be substantial differences in terms of years since last in school, whether the individual has previously attended any vocational training, or whether or not they are currently working.

Along with preferred training center and course, we also recorded the stated reasons for the choice (Table 3). The most commonly cited reason is that the individuals "find the work

[11] There also appear to be some differences in the distribution of preferences between individuals previously participating in the PSDP and individuals previously participating in the GSP, though this is likely due to the gender component of the scholarship intervention (and indeed, preferences of former GSP participants closely mirror those of women in the sample as a whole; results not shown).

interesting/have a passion for the work" (69%), followed by proximity to home (48%), future expected earnings (44%), and their ability to find accommodation nearby to training center (32%). The distribution of responses is fairly similar by gender, although women were significantly more likely than men to cite proximity as a determining factor (50% and 43%, respectively), suggesting that female participants are more geographically constrained than their male peers.[12] For younger individuals and those living in a city already, expected earnings was a much more popular response than proximity to household. Furthermore, recent school finishers and those with a secondary degree cared more about expected earnings and availability of accommodation nearby than proximity to home. Many of these findings may be related to marital and other family decisions. To better understand the drivers of vocational demand suggested by these intriguing results, the long-term individual follow-up survey (to be conducted starting in 2011 once all vocational training is complete) will include an extended section on these demographic and family issues.

4.3 The Information Intervention and the Demand for Vocational Training

As described above, females and males in the sample listed quite disparate course preferences, conforming to traditional gender patterns in Kenya (Table 4, Panel A). Men expressed their preference for male-dominated courses such as motor vehicle mechanics or driving, while women expressed their preference for traditionally female-dominated courses such as tailoring or hairdressing. Only 9% of women preferred a male-dominated course while 3% of men preferred a female-dominated course (mainly tailoring).

Panel B of Table 4 shows the large information gaps that existed in the sample at the start of the program. On average both men and women appear to have had somewhat optimistic perceptions about the returns to vocational training: they believed that the average returns were 61% compared to an estimated Mincerian return (using the KLPS data) of 37%.[13] Sample individuals were also mistaken about the highest earning trades. Given these apparent baseline misperceptions about returns to vocational training, the provision of additional information could potentially have had meaningful consequences on individual educational choices.

[12] This is likely at least partly attributable to the gender differences in marriage patterns. Authors' calculations from the KLPS Round 2 data suggest that women in this area marry at the age of 19 on average, and men at 21.

[13] One important caveat is that the Mincerian returns estimated from the KLPS data likely suffer from some selection bias, and thus are not always a reliable benchmark, as discussed in section 3.1 above.

According to Table 5, the information intervention did not significantly affect individual decisions to apply to the TVVP (Column 1), nor did it affect enrollment for voucher winners (Column 2). However, the intervention did have a significant impact on females preferring and enrolling in male-dominated courses (Column 1, Tables 6 and 7). In fact, females exposed to the information intervention were almost 9 percentage points more likely to express a preference for a male-dominated course, and 5 percentage points more likely to actually enroll in one. Younger and more educated females were especially likely to prefer for male-dominated fields.

The information treatment also made respondents more likely to express a preference for a government (public) training institution, perhaps in part because these institutions' industrial trade and construction courses are traditionally male-dominated. Males and younger individuals also preferred government institutions, probably due to the increased availability of courses such as motor vehicle mechanics in government schools relative to private schools.

4.4 Distance and the Demand for Vocational Education

Distance to school is often cited as a major barrier to educational enrollment and attainment. This notion has been corroborated by research such as Duflo (2001) which showed that reducing the distance to school through school construction led to increased schooling attainment in Indonesia. On average approximately 23% of individuals were within three kilometers of either a public or private vocational institution at baseline, while only 6% were within one kilometer of a vocational school. We exploit the baseline variation in individual distance to vocational centers to examine the interaction of distance, vouchers (or price) and information on the demand for vocational training. This exercise will provide policy-makers with a clearer understanding of the role of distance in facilitating or impeding the demand for vocational training.

Our data shows that the median distance to nearest public school was approximately 5 kilometers, which was statistically indistinguishable from the median distance to the nearest private school. While these distances were similar, those individuals with unrestricted vouchers had access to both private and public schools, thereby increasing the schooling options (or accessibility). Figure 2 shows that unrestricted voucher winners could attend approximately six schools within a 10 kilometer radius compared to only two schools for public voucher winners. This increased accessibility could partly explain the gap in take-up rates between vouchers types.

We formally explore the role of distance in demand for vocational training in Table 8. Overall the results show that voucher winners who were closer to private schools were more likely to take up training compared to winners who were further away. As Column (4) shows, this effect was mainly driven by the increased enrollment of unrestricted voucher winners who were closer to private schools. These unrestricted vouchers winners individuals who were within 3 kilometers of a private school were 14 percentage points more likely to attend vocational training compared to individuals who were further away. This effect is approximately one-fifth the size of the estimated impact of an unrestricted voucher on enrollment. We do not observe other statistically significant interactions between distance and vouchers or distance and information. Overall these results suggest that physical and financial access to private schools have strong and significant impacts on the enrollment decisions of individuals in the program. This could partly reflect the increased course availability and flexibility available to those with unrestricted vouchers (Figure 2), or a reflection of a better idiosyncratic match between students and private schools.

4.5 Analysis of Institution and Course Choices

Table 9a describes the institutional choices of voucher winners. In accordance with the strong preference for public institutions reported by TVVP participants prior to the voucher lottery, more than 75% of voucher winners chose to attend a public vocational training institution over a private one (Columns 1 and 2). This holds across gender, age group, education level and whether the individual had attended vocational training prior to the TVVP. However, individuals living in a city at the launch of the program were much more likely than those living in rural areas to choose to attend a private institution.

To some extent, the result that most voucher winners enroll in public institutions is an artifact of the voucher randomization: half of voucher winners (the "restricted voucher" group) were required to attend public institutions in order to use their voucher. Table 9b contains statistics for the unrestricted voucher winner sample only, where winners were allowed to enroll in either public or private institutions. Among this group, the split between public and private institutions is much more even. Men are still more likely to enroll in public institutions, but there is little difference in enrollment in public and private institution among women. Also among this

group, individuals living in a city at the start of the TVVP were substantially more likely to attend a private vocational training school than a public one.

Columns 3 and 4 of Table 9a breakdown the type of private institution chosen, among those who enrolled in private vocational training schools. As described previously, private vocational institutions range widely in terms of "formality" of the course offered. These statistics suggest that individuals attending private institutions tend to enroll in more formal programs, such as those run by a non-governmental organization rather than those linked to a small enterprise. This is especially true of women and individuals with lower academic school attainment.

Finally, columns 5 and 6 of Table 9a describe enrollment in institutions in rural and urban locations, respectively. As expected given that the TVVP sample contains individuals primarily living in rural areas, 83% of voucher winners enrolled in training institutions located in rural areas. Men were slightly more likely than women to attend a school in the city, as were those who were already living in a city at the time of the TVVP launch, which seems sensible. One particularly interesting result in this table is that individuals with a secondary school degree were nearly evenly split between enrollment in rural and urban areas. Findings are similar across the two voucher treatment groups (restricted and unrestricted vouchers).

Within their institutions of choice, individuals enrolled in a range of different courses. The majority (78%) of voucher winners chose courses that lasted 2 years or more (at least 6 school terms), while roughly 20% of voucher winners chose courses that lasted at most 1 year. Table 9c shows the overall course selection by voucher winners. The most popular courses by enrollment among voucher winners are Tailoring (39%), Motor Vehicle Mechanic (20%), Hairdressing and Beauty (9%), Driving (7%) and Masonry (7%). The most popular courses for male voucher winners are Motor Vehicle Mechanic (40%), Driving (17%) and Masonry (16%), while the most popular courses for females are Tailoring (59%), Hairdressing and Beauty (14%) and Secretarial and Computing (5%).

4.6 Assessing Institutional Quality

Little is known about the institutional characteristics that determine effective vocational education in Kenya and other African countries. Given the extensive variation in the characteristics of existing vocational education programs (especially across public and private

alternatives), rigorous evidence on the institution-level characteristics that generate significant labor market returns could be an important tool for policymakers.

To begin to address this issue, we administered a survey in 2010 to vocational training institution administrators and teachers to collect detailed information on potentially important institution-level characteristics. In particular, this survey gathered information on school equipment and facilities, classrooms, and teacher characteristics, as well as course curricula. We found that most, but not all, schools offer (mandatory) entrepreneurship programs, others offer mandatory remedial subjects such as Mathematics and English, and others encourage their trainees to sit in on some training in closely related fields (e.g., encouraging plumbers to learn basic welding skills). This novel survey will enable us to better understand the future labor market returns to various school quality measures, such as teacher quality and classroom facilities, as well as of entrepreneurship training.

Tables 10a and 10b display the characteristics of teachers in our sample of vocational training schools. As Columns 2 and 3 demonstrate, there are a few key differences in the educational and labor market characteristics of teachers in public and private institutions. Teachers at public institutions are more likely to have taken the secondary school exam, and to have completed college. Also, public school instructors have approximately 50% more years of teaching experience than private school instructors. We do not observe any significant differences in the practical experience of teachers in public versus private schools. It should be noted, however, that a potential weakness of this is survey data is that it does not capture differences in the timing of the teacher experience in great detail. With rapid technological change, recent practical experience in industry may be a particularly salient dimension of teacher quality, and one which may enhance the labor market relevance of the training program. Future data collection and analysis will explore this possibility in greater detail.

Columns 5 and 6 of Tables 10a and 10b show that the characteristics of teachers in urban and rural locations also display some key differences, especially with regard to education level and labor market experience. There were few significant differences between the teacher characteristics of private formal institutions and informal institutions (Columns 8 and 9). However, we do observe that teachers in formal private institutions were much more likely to have completed university compared to teachers in informal institutions.

We further examine differences in infrastructure and instructional equipment across different types of institutions in Table 11a and Table 11b. Overall, we find that private institutions, urban institutions and formal private institutions were more likely to have flush toilets than their public, rural and informal counterparts. Moreover we find that urban and formal private institutions were more likely to have electricity compared to their rural and informal counterparts.

Lack of sufficient investment in instructional equipment such as sewing machines for tailors and live engines and tools for mechanics could hinder learning outcomes among students as they would have fewer opportunities to practice with these tools and machines. The data in Table 11b show that the instructional capital per student at private schools is higher compared to public schools, however this difference is not statistically significant and is probably driven by a small number of highly capital intensive private institutions, such as driving schools. These capital intensive private schools often have assets in excess of 100,000 shillings (e.g., a vehicle) and a relatively small number of students.

Table 12 examines the differences in pedagogy between different institutions. Surprisingly, teachers in public schools devote a greater share of classroom time to practical work, while teachers in private schools focus relatively more on theory. Perhaps due to the greater share of private schools in rural areas in our sample, we find that teachers in urban schools devote a greater percentage of classroom time to theory rather than practical work. Consistent with our priors, we find that formal private institutions spend relatively more time on theory than their informal counterparts.

Practical experience is extremely important in enabling students to acquire relevant and employable skills. Overall we do not find any differences in the propensity of vocational training institutions to organize attachments in Table 13. Both private and public schools were equally likely to organize attachments, as were rural schools compared to urban schools and formal private institutions compared to informal institutions. However, we do see that public institution courses are more likely to require an internship or attachment as part of the coursework compared to private schools. Similarly, formal private institutions were more likely to offer courses that required internships. This finding probably reflects the differences in course offerings across the different types of institutions, rather than a systematic difference in policy across them. However, we do find that private, urban schools and formal private institutions

were significantly more likely to assist students with job placement compared to their public, rural and informal counterparts. This placement assistance could have significant implications for successful employment outcomes, however the efficacy of such programs is currently unknown. In future research, we plan to examine whether students with access to these job placement program have better labor market outcomes.

4.7 Course Retention

School fees are often cited as the primary factor causing students to dropout of educational institutions in Kenya (KIHBS, 2005). This factor is not relevant for the majority of voucher winners in our sample, for whom the voucher award pays for all fees, allowing us to understand other important determinants of dropout choices beyond fees.

Despite recruiting individuals who claimed to be highly interested in vocational training, and paying for all (or nearly all) of their fees, we still observe moderate dropout rates among the participants. Of the individuals that enrolled, the retention rate through mid-2010 for males was close to 65%, while the rate for females was slightly below 60%, although these differences are not statistically different. This retention rate is lower than the rate found in Kenyan secondary schools, although it should be noted that the secondary rate is probably higher due to the positive selection caused by the low primary to secondary school transition rate (World Bank 2004). For those individuals who did dropout, we observe a fairly sizeable degree of variation in the timing of dropout. The average dropout completes over a third of their course before dropping out. This equates to approximately two terms, or roughly two thirds of a year of vocational education.

We explore the determinants of dropout and the characteristics that determine the difference in the timing of dropout behavior in Table 14. Columns 1 and 2 show that individuals who were awarded restricted (public institution only) vouchers were approximately 16 percentage points more likely to drop out compared to those who were awarded unrestricted vouchers. This makes sense, since the restricted choice set of institutions should lead to lower quality individual-institution "matches" than in the unrestricted voucher case. Contrary to our prior expectations, the results do not show any significant gender differentials in dropout rates. Moreover, female dropout behavior did not differ for the different types of vouchers. Despite some evidence on the impact of information on training course selection, we do not find that the provision of information had any impact on retention. However, we do find that individuals with

lower education were less likely to dropout. Specifically, individuals who had not completed secondary school but had completed primary school were less likely to dropout. This suggests that vocational training can serve as an alternative path or a second chance program for promoting human capital formation. Presumably these individuals with less education stand to gain more from vocational education than others, and this may explain part of their higher retention rates.

The simple retention analysis in Columns 1 and 2 can mask differences in the timing of dropout behavior. We use the years of education completed and the percentage of course completed as measures of student progression and retention. In addition to providing information on the timing of dropout, this measure provides a clear metric on human capital acquisition of program participants. Since there is some variance in course length, we examine the percentage of course completed in Columns 3 and 4. This analysis shows that individuals with restricted (public institution only) vouchers completed 12 percentage points less of their course than unrestricted voucher winners. As before, we do observe that individuals with lower schooling attainment at baseline did complete more coursework than more educated individuals. Taken together, these results also suggest that students placed considerable valuation on the greater choice provided by the unrestricted voucher, and this led them to complete more training, most likely because greater flexibility in the institution and course choice led to higher quality individual-institution matches.

4.8 Short-Run Labor Market Impacts

The majority of voucher winners who enrolled in a training institution were still in school through December 2010 (approximately 75%, in fact), and hence we will not be able to examine longer-term impacts of the voucher program in this report. However, we undertook a survey of a representative subset of TVVP participants in mid-2010 in order to provide suggestive evidence of the short-term impacts of voucher provision. We use that survey here to examine the impacts of the vocational training program on labor market expectations, behaviors and outcomes.

Anecdotal evidence gathered during our monitoring visits to all participating vocational training institutions suggested that students in vocational training institutes were able to obtain part-time jobs as a consequence of their enrollment. For example, masonry students were often recruited to work on building sites part time. Hence, we document the concurrent labor market

outcomes of vocational training students and compare these to the control group. We also gather data on individual labor market behavior such as job search strategies and expectations of future labor market outcomes. The availability of labor market information for both treatment and control groups enables us to identify the impact of (access to) vocational training on the labor market. Moreover, the comprehensive data collected on the control group, while a significant portion of the treatment group is still undergoing training, allows us to document the opportunity costs of attending vocational training. Better evidence concerning the opportunity costs borne by trainees is important as it enables us to better understand the vocational education investment decisions of individuals.

Somewhat surprisingly Table 15 shows that the future earnings expectations of voucher winners were lower compared to those in the control group, although these differences were not statistically significant. Voucher winners were also slightly less likely to expect to be self-employed in the future. This effect was driven by female voucher winners who were 7 percentage points less likely to believe they would be self-employed compared to the control group. There were no statistically significant differences among men. Finally, voucher winners were more likely to expect the attainment of a trade certificate compared to the control group. Again this belief was driven by female voucher winners who were almost 15 percentage points more likely to believe they would obtain a trade certificate compared to the control group, while there were no significant differences among men. In terms of constraints on starting their own business, voucher winners, especially women, were less likely to cite the lack of skills as a constraint on entrepreneurship (results not shown).

Table 16 and 17 examine more short-term labor market impacts of the program on a random subset of both treatment and control individuals. Table 16 shows that voucher winners were significantly less likely to be employed compared to control group individuals, by approximately 7 percentage points on average. This represents a 37% reduction in employment relative to the control group. Similarly, voucher winners worked fewer hours compared to the control group. In the week prior to the survey, voucher winners worked 10 hours less than their control group counterparts. This equates to roughly a 25% reduction in hours worked. Similar patterns are observed when we examine the hours worked in self-employment. Overall, as most of the voucher winners were in school, these patterns mostly reflect the significant opportunity costs of schooling investments. These results most likely provide a lower bound on these

opportunity costs as vocational training may boost the employment probability of current trainees leading to underestimates of the opportunity costs of training.

Voucher winners spent significantly less time on job search compared to their control group counterparts. Voucher winners spent almost 30 hours less on job search compared to the control group, where this gap was especially pronounced among men. While both groups mostly employed similar job search strategies, men in the control group were significantly more likely to approach employers directly compared to men in the voucher treatment group.

Despite the lower labor supply and lower intensity of job search, the reported remuneration of voucher winners was slightly higher than the control group, although the differences were not statistically significant. Consistent with prior findings such as Attanasio *et al*. (2009), the patterns also reveal that these earnings differences were the largest for women. We also observe that reported self-employment profits were slightly higher among voucher winners, however this effect was not statistically significant but was driven by men and not by women.

Table 17 examines the same labor market outcomes, this time for treatment individuals who were out of school at the time of the survey. As discussed earlier, approximately 20% of participants chose courses that lasted a year or less, while close to 78% chose courses that were at least two years. Compared to the control group, we find very similar patterns to those described above in Table 16. While the impact of the program on employment probabilities was similar for early completers (Table 17) compared to the overall treatment sample (Table 16), we do see that among early completers, the pecuniary returns to training for women were even larger and the impact of training on profits was also larger among this group. While none of these results are statistically significant, these results do provide us with some confidence that future research focusing on the medium-to-longer term outcomes may reveal some positive and significant economic impacts of vocational training.

5. Discussion

5.1 The Case for Vouchers

A key education debate in many countries is the relative effectiveness of private versus public schooling, and it often runs in tandem to the debate about the role of school choice and

competition in the educational system (Hoxby, 2002). Reforms designed to promote school choice often turn to school vouchers, since they are transparent, easily understood and relatively easy to implement. Voucher proponents argue that vouchers can lead to better educational outcomes by promoting competition among schools and by providing students with increased access to private sector options, which may lead to a better match between student and school (Ladd, 2002). The competitive pressure could arise in a demand driven approach if it allows students to "vote with their feet", rewarding high performing schools and punishing those that fall behind. Since the voucher funds are tied to students, vouchers have the potential to unleash market forces in the education sector, thereby increasing the sector's productivity (Friedman, 1962). In this perspective, vouchers will be most effective when they allow students the greatest possible freedom of choice. Thus vouchers that can only be used in public sector institutions would increase competition among public schools, but the beneficial competitive pressures would be even greater with the inclusion of private schools.

The prospective research design of the current project will provide novel evidence on the impact of public-only versus unrestricted vouchers on the educational investment choices and later labor market outcomes of youth in Kenya. Moreover, since we find that the majority of program participants chose to stay in western Kenya, the longitudinal survey data on institutional and teacher characteristics that we have collected will provide suggestive evidence on the introduction of vouchers on the supply side of vocational education in a geographically localized setting.

Supply-driven approaches, such as increased school construction, have been found to be effective in increasing access to schooling (Duflo, 2001). However, such measures, in isolation, may have only limited impacts on educational productivity as they do not fundamentally alter the incentives of schools, teachers, parents or students within the educational system. Thus, other incentive bearing schemes often have to be introduced along with these approaches. While this project will not be able provide quantitative evidence on the comparative effects of demand-side versus supply-side approaches, it will provide better evidence on the impacts of a demand-side approach, which is generally under-utilized in Sub-Saharan Africa.

The evidence shown in this report suggests that vouchers are an effective way of encouraging investment in vocational education among Kenyan youth. The results show that individuals who were awarded an unrestricted voucher had higher take up rates, and crucially,

higher retention rates, compared to those awarded a restricted (public institution only) voucher. There are several possible explanations for this result. First, private institutions may provide more flexible and relevant training. Anecdotal evidence shows that in occupations and trades such as auto vehicle mechanics, public institutions were often using outdated engines no longer found on the road, while private institutions were using current car models. Public institutions' tailoring courses dutifully covered the standard course curriculum, which may or may not reflect current market trends or tastes in clothing. In contrast, many private sector tailoring courses used an "apprenticeship" style model where students interact regularly with clients and work on real projects, potentially providing them a better understanding of current market demand. While the current student survey is unable to examine the labor market returns to private versus public training, future data collection and analysis, outside the scope of this report, will examine this in more detail.

There are a number of further explanations for these differences. Private schools also differ in certain dimensions of the availability of resources (and school quality), which has been shown in other studies to reduce student dropout rates (Hanushek *et al*., 2008). While teachers in public institutions tended to have more years of education and teaching experience, private institutions had better facilities such as flush toilets compared to public schools. Finally, the quality of the (unobserved) idiosyncratic match between the student and the private institution may be greater. Theoretically, greater match quality implies a longer retention period in the program (Jovanovic, 1979). The voucher characteristics in Figure 2 show that unrestricted voucher recipients had a greater variety of schools and courses to choose from. Thus, the greater retention displayed by unrestricted voucher recipients suggests that greater choice promotes better matches between students and schools, which could lead to more learning and better educational outcomes. While we are currently unable to distinguish between these various hypotheses for the differences between public and private institutions, future data collection and analysis will attempt to disentangle the key mechanisms underlying these patterns.

While our results suggest that vouchers, especially the unrestricted vouchers, are a promising policy tool to increase educational access and promote school choice, it should be noted that the impacts of large scale or nation-wide voucher programs could potentially lead to some less desirable outcomes. The greatest concern with large scale voucher programs is that they may lead greater stratification and sorting, where the higher ability (or higher income)

students benefit at the expense of lower ability students (Epple and Romano, 1998 and Bettinger *et al*., 2008). Other practical concerns include ensuring individuals have enough information to make informed decisions about which institution and course to choose. As our research design shows, the provision of information can greatly alter individual decision making in the context of educational investments decisions. Using data from China, Lai *et al*. (2008) show that parental errors in the school choice process often resulted in undesirable outcomes for students including attending lower quality schools and obtaining lower test scores. They argue that school choice programs must provide parents and students with clear and pertinent information for them to capitalize on the increased options. They further argue that the provision of information is especially important for households that are poorer, less educated and more vulnerable. Subsequent data collection and analysis will examine the role information played in driving the demand for vocational education in more detail.

In his review of voucher programs across developing and developed countries, West (1997) identifies fraud as a frequently cited potential challenge faced by governments keen on introducing voucher programs. While the potential for voucher fraud exists, West argues that it is hard for parents to sell these on the "black market" as it would be difficult to transfer or sell the rights to education (especially in a nationwide program). In addition, he argues that there is no reason to think that vouchers would lead to more fraudulent behavior compared to regular public school financing systems. While these arguments may well hold for nationwide programs, smaller scale projects could suffer from fraud in the absence of strong monitoring. To prevent fraudulent transfer of vouchers from one student to another, we took pictures of voucher winners and used these (in addition to other background information) to confirm the identity of voucher winners during attendance checks in the vocational education institutions. We also performed regular (unannounced) attendance checks and audits to ensure that voucher winners were actually attending the institutions before we remitted payments. Thus the experience of this project suggests that widely available technology coupled with traditional audit methods can virtually eliminate the prospect of fraudulent practices by voucher winners and institution administrators at relatively low cost.

West (1997) also identifies the vetting of private schools as an additional voucher implementation challenge. This proved to be a tremendous challenge in this project, given the large variance in the size and scope of private institutions in Kenya. A national voucher scheme

would need to set minimum standards and requirements for private schools to adhere to. These can range from simple enrollment and attrition thresholds, such as those used in programs in Bangladesh, up to complete inspection and supervision under the purview of the Ministry of Education, such as those used in the UK and Sweden (West, 1997). While there is no theoretical or empirical consensus on the best way to vet private schools, it is clear that the regulations need to balance the need to ensure education standards versus the autonomy of private schools. As West (1997) argues, if these regulations and standards are too far reaching, the private schools may not accept voucher payments, limiting the choices of voucher recipients and thus undoing one of the central benefits of vouchers. The current project vetted private vocational training schools mainly on the basis of their formality. Schools were included in the project if they possessed adequate space, tools, work and could provide theoretical training in the course of study. As vouchers allow students to move from one school to another, we will explore such outcomes in order to attempt to examine any characteristics that may predict student transfers. This analysis may provide insights that may be useful in refining the vetting criteria for private vocational schools.

5.2 Supply-side Impacts of vouchers

As discussed above, large scale voucher programs have the potential to induce supply-side effects. As voucher funds are tied to the student, it allows students to "vote with their feet", where they can choose their preferred provider of training. This can boost the productivity of current providers by encouraging competition, but it can also encourage new highly-productive entrants into the market. The World Bank financed "Jua Kali" training project provided vouchers to augment the skills of informal sector (or Jua Kali) workers (Adams, 2001). The project aimed to boost the productivity and quality of training for informal sector workers by harnessing the increase in competition induced by vouchers and by encouraging new-entrants into the industry. Some evidence of this supply response was observed in this program, where new "Jua Kali relevant" training providers, in the form of informal sector master craftsmen, emerged as a result of the voucher scheme (Adams, 2001).

While the TVVP project is not designed to examine these issues explicitly, we are able to generate some suggestive evidence on the supply-side impacts of the program as it is concentrated in western Kenya. Table 18 shows suggestive evidence of the impact of the

program on schools in participating in the project. The data show the observable changes between schools that received students from the vouchers program and a set of schools that did not. While there are no statistically significant differences in enrollment or capital investments between these schools, we do observe that schools that received vouchers students were significantly more likely to expand their course offerings. This could potentially reflect the supply-side impacts of the voucher, where the competitive effects of the voucher promote schools to invest in expanded courses in order to attract and keep students. However, as the differences between the schools that received students and those that did not are not random, these results could merely reflect students selecting schools that were more dynamic or growing. Therefore, these results should be not be interpreted as conclusive evidence of supply-side impacts of the program. Moreover, as the TVVP is temporary and relatively small-scale compared to the multi-year $20 million Jua Kali project (Adams, 2001), it is unclear whether the current voucher scheme has sufficient duration and size to generate meaningful supply-side impacts.

6. External Validity and Replicability

Existing rigorous impact evaluations of vocational training in poor countries have focused on mostly urban settings in Latin America. Our evaluation is the first (that we know of) to focus on vocational education in an African setting, in the largely rural and peri-urban setting of Busia District, Kenya, and with some individuals attending courses in the large urban centers of Nairobi, Mombasa and Kisumu, thus providing novel evidence to policymakers from a substantially different setting.

A key issue in assessing external validity is the representativeness of our sample compared to other African settings. According to recent Kenyan government survey and census data, Busia District is close to the national mean along a variety of economic and social measures, and is not an apparent outlier. This provides some confidence that results from Busia are relevant in other rural and peri-urban Kenyan and African settings. Moreover, over 15% of voucher participants enrolled in institutions outside of Busia and its surrounding districts, adding to the regional diversity of the sample and potentially strengthening the external validity.

The diversity in the types of vocational training institutes represented in our study, as well as the nature of our data and the research design, will allow us to estimate heterogeneous

vocational education impacts along a variety of dimensions including differences across regional and rural/urban classifications. This will hopefully boost the utility of the evaluation for policy-makers: the detailed information available in the KLPS and the diversity of the subjects and institutes will greatly enhance the external value of the evidence generated because we will be able to address directly how different types of vocational education impact different types of individuals. The evaluation will allow us to estimate: heterogeneous impacts by individual age, gender, cognitive ability, orphan status, and family socioeconomic background; impacts of public versus private sector vocational training institutions; and impacts across training institutes with different characteristics and approaches. With these results in hand, policy-makers working in settings where trainees or institutes have a particular set of characteristics will be able to pick out the most relevant treatment effect estimates from our results.

Though valued by many out-of-school youths, as demonstrated by the demand for vouchers in the current program, many vocational schools in Kenya and other African countries often have substantial free capacity because of high fees, limited government subsidies, and credit constraints facing potential beneficiaries. Expanding post-primary educational and training opportunities is a leading policy priority in many African countries, and policies supporting the dynamic private vocational education sector (for instance, through a voucher program like ours) are largely untested. While Kenya has been a leader in its use of private vocational education in Africa, similar programs are now expanding rapidly in other African countries, and there thus appears to be substantial potential for widely scaling-up vocational education in Africa. The results of the current study, and future research flowing from this work, seek to address to these increasingly important public policy issues.

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Randomization Process for Vocational Education Project in Kenya

10,767

young adults, who had either participated in the PSDP in 1998 or GSP in 2001, received invitations to attend an informational meeting.

2,705

attended one of the **70** introductory meetings in sub-locations.

Project introduced, survey of expected earnings beliefs w/ and w/o VocEd conducted, and list of public and private VocEd institutions distributed.

35 of the 70 meetings were randomly given the information treatment.

2,163

individuals attended the second meeting.

Each brought a letter of support and preferences for both voucher types.

Individuals Stratified into 36 Groups

Gender → PSDP or GSP → Information Treatment Group → Preferred Industry

1. M * PSDP * Info * Construction
2. M * PSDP * Info * Textiles
3. M * PSDP * Info * Mechanics
4. M * PSDP * Info * Beauty
5. M * PSDP * Info * Computers
6. M * PSDP * Info * Other
7. M * PSDP * No Info * Construction
8. M * PSDP * No Info * Textiles
9. M * PSDP * No Info * Mechanics
10. M * PSDP * No Info * Beauty
11. M * PSDP * No Info * Computers
12. M * PSDP * No Info * Other
13. F * PSDP * Info * Construction
14. F * PSDP * Info * Textiles
15. F * PSDP * Info * Mechanics
16. F * PSDP * Info * Beauty
17. F * PSDP * Info * Computers
18. F * PSDP * Info * Other
19. F * PSDP * No Info * Construction
20. F * PSDP * No Info * Textiles
21. F * PSDP * No Info * Mechanics
22. F * PSDP * No Info * Beauty
23. F * PSDP * No Info * Computers
24. F * PSDP * No Info * Other
25. F * GSP * Info * Construction
26. F * GSP * Info * Textiles
27. F * GSP * Info * Mechanics
28. F * GSP * Info * Beauty
29. F * GSP * Info * Computers
30. F * GSP * Info * Other
31. F * GSP * No Info * Construction
32. F * GSP * No Info * Textiles
33. F * GSP * No Info * Mechanics
34. F * GSP * No Info * Beauty
35. F * GSP * No Info * Computers
36. F * GSP * No Info * Other

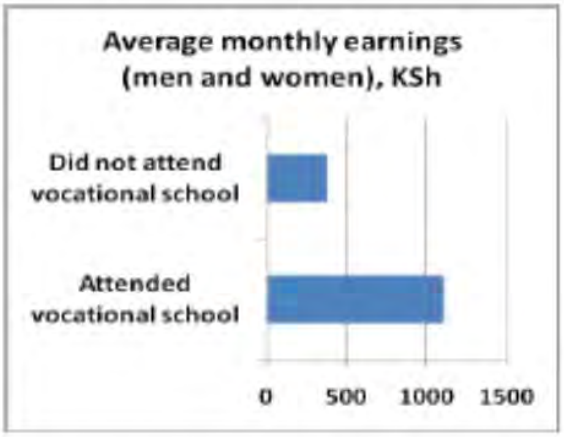
Randomization Occurred Within Each Group

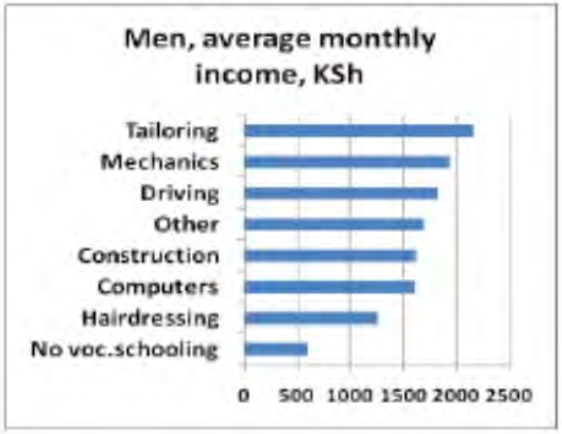
- 25% or 526 individuals received unrestricted vouchers
- 25% or 529 individuals received vouchers valid only for public institutions
- 50% or 1,108 individuals did not receive vouchers

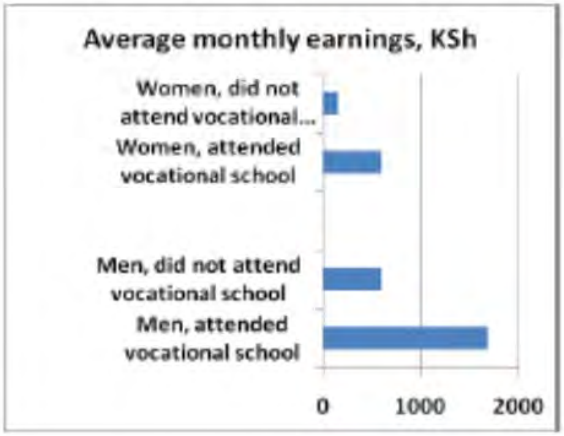
Figure 2. Summary of Voucher Design

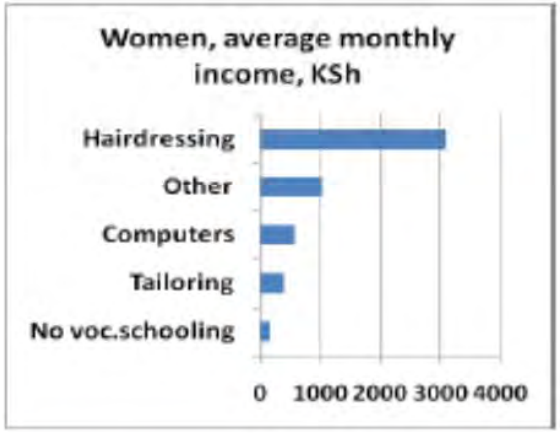
Voucher Type	Public-Only	Unrestricted
Expenses Covered	Tuition, Materials, Uniform, Trade Test Fees	Tuition, Materials, Uniform, Trade Test Fees
Expenses Not Covered	Board, Lunch, Transport	Board, Lunch, Transport
Voucher Amount (Mean) in Kshs	21,297	19,814
Vocher Amount (Median) in Kshs	21,200	18,000
Out-of-Pocket Costs (Mean) in Kshs	3,054	2,414
Out-of-Pocket Costs (Median) in Kshs	0	0
Voucher Percent of Total (Mean)	87.5%	89.1%
Voucher Percent of Total Cost (Median)	100%	100%
Course Duration (3 Month Terms)	5.96	4.59
10-km Institution Density (Mean)	2.1	6.1
10-km Institution Density (Median)	2	6
10-km Unique Course Offerings (Mean)	9.2	14.8
10-km Unique Course Offerings (Median)	11	13

Figure 3. Information Intervention Handouts/Posters









The above charts are based on information obtained from people of your age from Busia district that took part in the ICS/IPA de-worming program. The information in the charts suggests that the benefits of undertaking a vocational schooling program for some people of your age are quite high – and the impact on earnings are higher on average for certain training programs than others.

But you should be aware that the information displayed in the above charts is from people who were able to pay for their own vocational schooling. In that sense these people may be different from you and they may have benefitted more (or less) from their training program than you would.

Figure 4a. Spatial Distribution of Vocational Education Training Centers, Nationwide Distribution

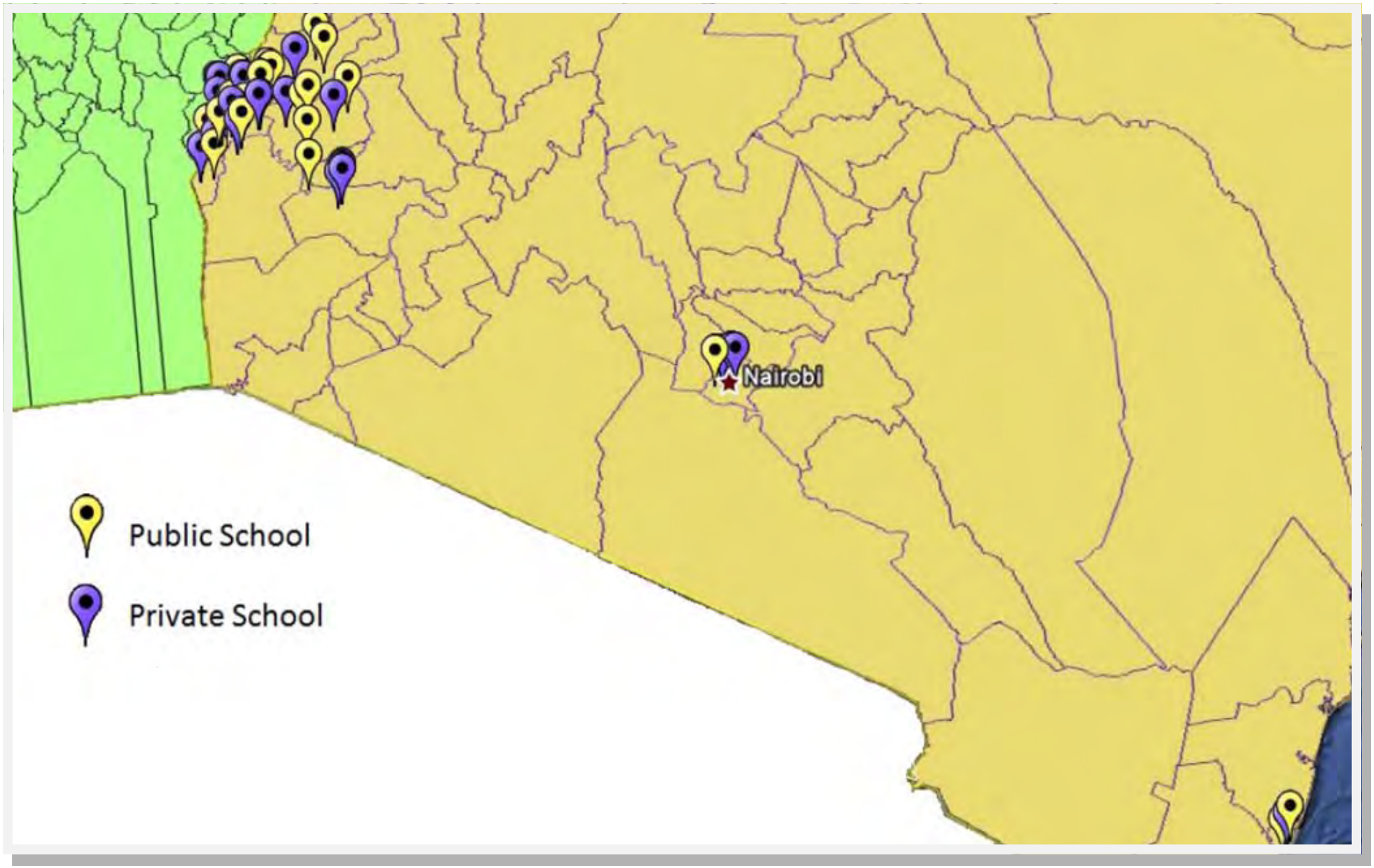


Figure 4b. Spatial Distribution of Vocational Education Training Centers, Distribution Across Western Kenya

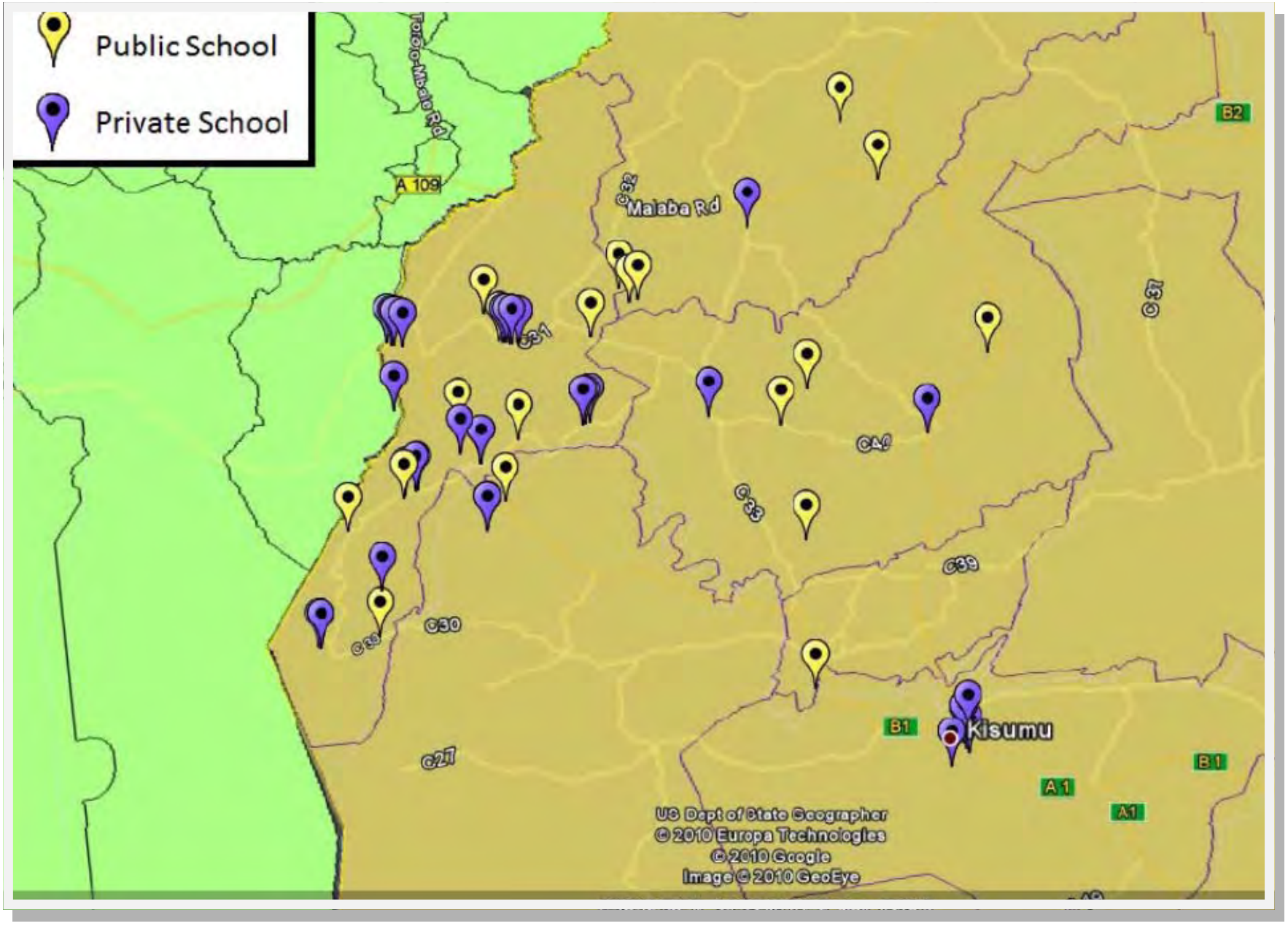


Table 1. Pre-intervention Participant Characteristics[1], Overall and by Treatment Group

	Full Sample	Treatment			Control	Treatment – Control
		All Treatment	Unrestricted Voucher	Public-Only Voucher		
Female	0.628	0.627	0.622	0.633	0.629	-0.002
Age	21.8	21.7	21.7	21.7	21.9	-0.205**
Location of Current Residence						
Busia District[2]	0.705	0.722	0.722	0.722	0.689	0.033*
District Neighboring Busia[3]	0.229	0.215	0.207	0.223	0.243	-0.028
City[4]	0.056	0.052	0.056	0.048	0.06	-0.008
Highest Level of Education Completed						
Some Primary	0.265	0.262	0.255	0.269	0.268	-0.007
Primary	0.377	0.384	0.406	0.361	0.371	0.012
Some Secondary	0.109	0.11	0.113	0.107	0.108	0.003
Secondary	0.235	0.229	0.209	0.25	0.241	-0.012
Other Education Characteristics						
Total Years of Schooling Completed	8.8	8.8	8.8	8.9	8.8	0.025
Number of Years Since Last in School	3.8	3.8	3.8	3.7	3.9	-0.068
In School	0.026	0.029	0.034	0.023	0.023	0.006
Ever Attended Vocational Training	0.217	0.217	0.231	0.203	0.217	0
Employed	0.128	0.133	0.136	0.13	0.123	0.01
In Agriculture or Fishing	0.247	0.26	0.215	0.31	0.234	0.026
In Retail	0.247	0.22	0.2	0.241	0.274	-0.055
In an Unskilled Trade[5]	0.081	0.073	0.062	0.086	0.089	-0.016
In a Skilled Trade	0.247	0.252	0.338	0.155	0.242	0.01
As a Professional	0.065	0.081	0.077	0.086	0.048	0.033
Current Monthly Income (Ksh, Conditional on Income > 0)	1,698	1,600	1,649	1,551	1,796	-196
Observations	2,163	1,055	526	529	1,108	2,163

Note:

[1] Data presented in this table was collected during the TVVP informational recruitment meetings, before vouchers were awarded. The first five columns present sample means, while the final column displays the average difference between treatment (overall) and control groups. * denotes significance at the 10% level, and ** denotes significance at the 5% level.

[2] Busia District is defined here to also include Samia and Bunyala Districts, which were just recently defined as distinct administrative districts by the Kenyan government.

[3] Districts neighboring Busia include Siaya District, Busia (Uganda), Bugiri (Uganda), and other districts in Kenya's Western Province.

[4] Kenya's five largest cities are Nairobi, Mombasa, Kisumu, Nakuru and Eldoret.

[5] Unskilled work includes occupations of domestic worker, hotel/restaurant/tourism worker, vehicle or bicycle taxi operator, and unskilled construction laborer.

Table 2. TVVP Participant Course Preferences

	Tailoring	Vehicle Related	Computers / Secretarial	Beauty	Business Skills	Other	Observations
Overall	0.325	0.247	0.104	0.129	0.043	0.152	2,063
Gender							
Male	0.12	0.486	0.055	0.026	0.038	0.276	769
Female	0.447	0.105	0.134	0.19	0.046	0.078	1,294
Age							
At or Below Median	0.347	0.193	0.14	0.146	0.041	0.135	1,044
Above Median	0.304	0.302	0.068	0.112	0.044	0.17	1,016
Location of Residence							
Busia District	0.336	0.219	0.122	0.136	0.038	0.15	1,437
District Surrounding Busia	0.324	0.311	0.053	0.107	0.045	0.16	469
City	0.191	0.348	0.078	0.139	0.078	0.166	115
Education Level							
Some Primary	0.411	0.228	0.042	0.142	0.02	0.156	543
Primary Degree	0.37	0.247	0.073	0.142	0.017	0.151	766
Some Secondary	0.317	0.304	0.085	0.147	0.031	0.116	224
Secondary Degree	0.181	0.242	0.227	0.085	0.102	0.162	480
Years Since School							
At or Below Median	0.287	0.227	0.147	0.119	0.06	0.161	1,020
Above Median	0.363	0.267	0.061	0.141	0.026	0.144	1,018
Attended Vocational Training							
No	0.319	0.248	0.106	0.13	0.044	0.154	1,582
Yes	0.361	0.242	0.097	0.122	0.036	0.142	443
Working							
No	0.339	0.224	0.109	0.138	0.043	0.148	1,770
Yes	0.25	0.396	0.065	0.073	0.042	0.173	260

Table 3. TVVP Participant Preferences, List of Selected Reasons

	Interest / Passion for Work	Nearby to Home	Expected Earnings	Accommodation Available	Observations
Overall	0.694	0.476	0.441	0.32	2,089
Gender					
Male	0.671	0.428	0.408	0.331	773
Female	0.707	0.504	0.461	0.313	1,316
Age					
At or Below Median	0.718	0.425	0.485	0.362	1,068
Above Median	0.669	0.529	0.397	0.276	1,018
Location of Residence					
Busia District	0.679	0.451	0.444	0.35	1,460
District Surrounding Busia	0.718	0.528	0.368	0.272	468
City	0.771	0.585	0.703	0.178	118
Education Level					
Some Primary	0.669	0.659	0.386	0.203	546
Primary Degree	0.708	0.522	0.443	0.3	776
Some Secondary	0.731	0.454	0.458	0.39	227
Secondary Degree	0.689	0.215	0.504	0.455	488
Years Since School					
At or Below Median	0.702	0.365	0.465	0.401	1,035
Above Median	0.687	0.586	0.421	0.243	1,027
Attended Vocational Training					
No	0.704	0.478	0.448	0.335	1,599
Yes	0.668	0.481	0.421	0.273	449
Working					
No	0.695	0.477	0.446	0.327	1,791
Yes	0.696	0.475	0.422	0.277	263

Table 4. Baseline (Pre-Voucher Assignment) Preferences, Beliefs & Expectations

Panel A: Vocational Training Preferences	
Most popular courses for men	Motor vehicle mechanics, Driving, Masonry
Most popular courses for women	Tailoring, Hairdressing, Computer packages
% women who prefer a “male-dominated” course	9%
% men who prefer a “female-dominated” course	3%
Panel B: Expectations and Beliefs about Vocational Training	
Expected income per month upon completing vocational education, USD	113
Expected returns to vocational education (conditional on employment)	61%
Actual return to vocational education in KLPS data (conditional on employment)	37%
Belief about vocational trade with highest earnings for women, USD	Tailoring
Actual vocational trade with highest earnings for women in KLPS data	Hairdressing
Belief about vocational trade with highest earnings for men, USD	Motor vehicle mechanics
Actual vocational trade with highest earnings for men in KLPS data	Tailoring

Note: Pre-voucher assignment refers to the voucher intervention. The data shown were collected after the information treatment but before vouchers were awarded.

Table 5. Impact of the Information Intervention on Application and Enrollment Rates

	Completed a Valid Preference Sheet and Entered Eligible-to-Win Sample [1]	Of Voucher Winners, Confirmed Enrollment [2]
Received Information Treatment	-0.0195	-0.0075
	(0.0153)	(0.0278)
Restricted (Public Only) Voucher	--	-0.092***
	--	(0.0280)
Female	0.0141	-0.0451
	(0.0192)	(0.0342)
PSDP Sample	-0.0682***	-0.0367
	(0.0196)	(0.0360)
Years of Schooling	0.0208***	0.0139
	(0.0068)	(0.0123)
Completed Secondary School	-0.109***	-0.212***
	(0.0342)	(0.0628)
Already Has Vocational Education	0.00756	0.0461
	(0.0188)	(0.0327)
Age	-0.00313	-0.00663
	(0.0037)	(0.0067)
Constant	0.767***	0.878***
	(0.1010)	(0.1890)
Observations	2647	1043
Adjusted R2	0.013	0.03

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Though the dependent variables here and in the following tables are binary, we present OLS (linear probability model) results for simplicity. The results are similar in probit specifications (not shown).*

Table 6. Impact of Information Intervention on Application Preferences

	Female Choosing a Male Dominated Course as Top Preference [1]	Chose a Public Institution as Top Preference [2]
Received Information Treatment	0.0851***	0.0640***
	(0.0159)	(0.0211)
PSDP Sample	0.012	-0.183***
	(0.0169)	(0.0275)
Years of Schooling	0.0189**	0.0143
	(0.0078)	(0.0090)
Completed Secondary school	-0.0608	-0.199***
	(0.0396)	(0.0461)
Already Has Vocational Education	0.0267	0.00755
	(0.0197)	(0.0259)
Age	-0.00768**	-0.00863*
	(0.0038)	(0.0051)
Female	--	-0.124***
	--	(0.0260)
Constant	0.0499	0.851***
	(0.1060)	(0.1390)
Observations	1342	2134
Adjusted R2	0.032	0.039

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 7: Impact of Information Intervention on Enrollment Patterns

	[1] Female Enrolling in a Male Dominated Course	[2] Unrestricted Voucher Winner Enrolling in a Public Institution
Received Information Treatment	0.0511**	0.0871*
	(0.0246)	(0.0501)
Restricted (Public Only) Voucher	0.0238	--
	(0.0237)	--
PSDP Sample	-0.0127	-0.182***
	(0.0257)	(0.0632)
Years of Schooling	0.0134	0.00623
	(0.0121)	(0.0207)
Completed Secondary School	-0.00441	-0.200*
	(0.0644)	(0.1080)
Already Has Vocational Education	0.0207	-0.00158
	(0.0292)	(0.0588)
Age	0.000356	-0.0144
	(0.0055)	(0.0118)
Female	--	-0.140**
	--	(0.0601)
Constant	-0.0844	0.990***
	(0.1550)	(0.3280)
Observations	463	397
Adjusted R2	0.008	0.036

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 8. Impact of Distance on Enrollment in Vocational Education

	[1]	[2]	[3]	[4]	[5]
Any Voucher		0.658***	0.656***	0.664***	0.663***
		(0.0361)	(0.0361)	(0.0389)	(0.0388)
Restricted Voucher		-0.159***	-0.153***	-0.171***	-0.170***
		(0.0441)	(0.0440)	(0.0552)	(0.0550)
Information Treatment		-0.262***	-0.283***	-0.262***	-0.284***
		(0.0857)	(0.0867)	(0.0847)	(0.0855)
Female	-0.0486	-0.0650*	-0.0644*	-0.0661*	-0.0655*
	(0.0489)	(0.0354)	(0.0356)	(0.0354)	(0.0356)
Nearest Public School is Within 3km	0.105**	0.025	-0.0364	0.0245	-0.0398
	(0.0518)	(0.0421)	(0.0522)	(0.0421)	(0.0519)
Nearest Private School is Within 3km	0.0169	-0.0131	-0.0341	-0.0137	-0.036
	(0.0487)	(0.0359)	(0.0445)	(0.0359)	(0.0444)
Nearest Public School is Within 3km * Any Voucher		0.036	0.0425	-0.00549	-0.00486
		(0.0674)	(0.0674)	(0.0800)	(0.0803)
Nearest Private School is Within 3km * Any Voucher		0.120*	0.120*	0.141*	0.140*
		(0.0625)	(0.0625)	(0.0719)	(0.0722)
Nearest Public School is Within 3km * Restricted Voucher				0.0874	0.101
				(0.1010)	(0.1010)
Nearest Private School is Within 3km * Restricted Voucher				-0.0482	-0.0457
				(0.1050)	(0.1050)
Nearest Public School is Within 3km * Information Treatment			0.113		0.119
			(0.0728)		(0.0722)
Nearest Private School is Within 3km * Information Treatment			0.0454		0.0479
			(0.0698)		(0.0701)
Constant	0.207	0.0513	0.0727	0.0517	0.074
	(0.2130)	(0.1810)	(0.1820)	(0.1810)	(0.1820)
Observations	902	902	902	902	902
R-squared	0.144	0.529	0.531	0.53	0.532

*Note: Additional controls include education, age dummies, and sublocation dummies. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 9a. Institution Choice by Voucher Winners

	Public	Private			Rural	Urban
		Total	Juakali	Formal		
Overall	0.753	0.247	0.684	0.316	0.827	0.173
Gender						
Male	0.784	0.216	0.578	0.422	0.770	0.233
Female	0.734	0.266	0.736	0.264	0.864	0.136
Age						
At or Below Median	0.767	0.233	0.755	0.245	0.812	0.188
Above Median	0.737	0.264	0.624	0.376	0.847	0.153
Location of Residence						
Busia District	0.769	0.231	0.729	0.271	0.843	0.157
District Surrounding Busia	0.747	0.253	0.561	0.439	0.914	0.086
City	0.550	0.450	0.778	0.222	0.275	0.725
Education Level						
Some Primary	0.770	0.230	0.761	0.239	0.935	0.065
Primary Degree	0.759	0.241	0.764	0.236	0.923	0.077
Some Secondary	0.770	0.230	0.650	0.350	0.851	0.149
Secondary Degree	0.720	0.280	0.551	0.449	0.554	0.446
Years Since School						
At or Below Median	0.774	0.226	0.705	0.296	0.746	0.255
Above Median	0.730	0.270	0.677	0.324	0.913	0.087
Attended Vocational Training						
No	0.758	0.243	0.690	0.310	0.828	0.172
Yes	0.739	0.261	0.694	0.302	0.830	0.170
Working						
No	0.763	0.237	0.694	0.306	0.825	0.175
Yes	0.677	0.323	0.700	0.300	0.850	0.151

Table 9b. Institution Choice by Treatment Individuals, Unrestricted Voucher Winners

		Private				
	Public	Total	Juakali	Formal	Rural	Urban
Overall	0.536	0.464	0.688	0.313	0.807	0.193
Gender						
Male	0.582	0.418	0.578	0.422	0.739	0.261
Female	0.510	0.490	0.742	0.258	0.847	0.153
Age						
At or Below Median	0.557	0.443	0.763	0.237	0.804	0.196
Above Median	0.516	0.484	0.624	0.376	0.818	0.182
Location of Residence						
Busia District	0.579	0.421	0.734	0.266	0.842	0.158
District Surrounding Busia	0.467	0.533	0.561	0.439	0.896	0.104
City	0.217	0.783	0.778	0.222	0.130	0.870
Education Level						
Some Primary	0.558	0.442	0.761	0.239	0.894	0.106
Primary Degree	0.572	0.428	0.775	0.225	0.916	0.084
Some Secondary	0.565	0.435	0.650	0.350	0.804	0.196
Secondary Degree	0.449	0.551	0.551	0.449	0.551	0.449
Years Since School						
At or Below Median	0.560	0.440	0.705	0.296	0.735	0.265
Above Median	0.517	0.483	0.683	0.317	0.885	0.115
Attended Vocational Training						
No	0.534	0.466	0.694	0.306	0.812	0.188
Yes	0.557	0.443	0.698	0.302	0.804	0.196
Working						
No	0.552	0.448	0.698	0.302	0.806	0.194
Yes	0.455	0.546	0.700	0.300	0.836	0.164

Table 9c: Distribution of Courses Chosen, among voucher winners who attended training

	Number of Students	% of Students
Construction		
Carpentry	19	2.43
Masonry	54	6.91
Metal Work	5	0.64
Mechanical/Mechanical Engineering	10	1.28
Welding and Plumbing	10	1.28
Electrical Engineering/Electrical Installation	33	4.23
Textile		
Tailoring/Dressmaking/Textile	304	38.87
Embroidery	11	1.41
Vehicle Related		
Driving	56	7.17
Motor Vehicle Mechanics	153	19.57
Hairdressing and Beauty	71	9.09
Computers/Secretarial		
Computer Packages	25	3.2
Secretarial	30	3.84
Copy Typist/Clerk	2	0.26
IT (Secretarial and Computer)	28	3.59
Computer Systems and Applications	3	0.38
Computer Engineering	2	0.26
Business Skills		
Business Administration	24	3.07
Business Management	2	0.26
Sales and Marketing	4	0.51
Human Resources	3	0.38
Food/Tourism		
Hotel and Catering / Hospitality	3	0.38
Travel and Tourism	5	0.64
Other		
Craftsmaking	1	0.13
Electronics	6	0.77
Other	5	0.64

Table 10a. Mean Education and Experience Characteristics of Educators at Vocational Education Institutions

		Public vs. Private			Urban vs. Rural			Private Formal vs. Private Informal		
Education or Experience Characteristic	**Mean Full Sample**	**Public**	**Private**	**Difference**	**Urban**	**Rural**	**Difference**	**Private Formal**	**Private Informal**	**Difference**
Some or Completed Primary School	0.0800	0.0300	0.1800	-0.15***	0.0300	0.1100	-0.08**	0.1000	0.2400	-0.1400
	(0.0186)	(0.0133)	(0.0480)	(0.0500)	(0.0192)	(0.0281)	(0.0300)	(0.0576)	(0.0707)	(0.0900)
Completed Secondary School	0.1200	0.1200	0.1200	0.0000	0.1400	0.1100	0.0300	0.0300	0.1900	-0.16**
	(0.0221)	(0.0267)	(0.0406)	(0.0500)	(0.0373)	(0.0281)	(0.0500)	(0.0353)	(0.0658)	(0.0700)
Completed Polytechnical School	0.1700	0.1700	0.1800	-0.0100	0.1100	0.2100	-0.1**	0.1700	0.1900	-0.0200
	(0.0262)	(0.0308)	(0.0480)	(0.0600)	(0.0341)	(0.0371)	(0.0500)	(0.0706)	(0.0658)	(0.1000)
Completed College	0.5700	0.6400	0.4200	0.22***	0.6500	0.5200	0.13*	0.5200	0.3500	0.1700
	(0.0345)	(0.0400)	(0.0615)	(0.0700)	(0.0512)	(0.0453)	(0.0700)	(0.0947)	(0.0789)	(0.1200)
Completed University	0.0600	0.0500	0.0800	-0.0300	0.0600	0.0600	0.0000	0.1700	0.0000	0.17**
	(0.0159)	(0.0183)	(0.0332)	(0.0400)	(0.0245)	(0.0208)	(0.0300)	(0.0706)	(0.0000)	(0.0700)
Secondary School Exam Completed	0.8400	0.9200	0.6800	0.24***	0.9500	0.7600	0.19***	0.9000	0.5100	0.39***
	(0.0248)	(0.0233)	(0.0579)	(0.0600)	(0.0224)	(0.0389)	(0.0400)	(0.0576)	(0.0838)	(0.1000)
Owned a Shop Before Teaching	0.2200	0.2200	0.2400	-0.0200	0.1900	0.2500	-0.0600	0.2100	0.2700	-0.0600
	(0.0290)	(0.0342)	(0.0529)	(0.0600)	(0.0426)	(0.0389)	(0.0600)	(0.0761)	(0.0740)	(0.1100)
Employed in Trade Before Teaching	0.5100	0.4900	0.5600	-0.0700	0.5800	0.4600	0.12*	0.5200	0.5900	-0.0700
	(0.0345)	(0.0417)	(0.0615)	(0.0700)	(0.0533)	(0.0453)	(0.0700)	(0.0947)	(0.0822)	(0.1200)
Owned a Shop and Employed in Trade Before Teaching	0.0200	0.0300	0.0200	0.0100	0.0000	0.0400	-0.04**	0.0300	0.0000	0.0300
	(0.0104)	(0.0133)	(0.0148)	(0.0200)	(0.0000)	(0.0181)	(0.0200)	(0.0353)	(0.0000)	(0.0300)
Observations	210	144	66	--	88	122	--	29	37	--

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 10b. Mean Characteristics of Educators at Vocational Education Institutions

Education or Experience Characteristic	Mean Full Sample	Public vs. Private			Urban vs. Rural			Private Formal vs. Private Informal		
		Public	Private	Difference	Urban	Rural	Difference	Private Formal	Private Informal	Difference
Number of Years Owned a Shop or Employed in Trade Before Teaching	4.0300	4.1600	3.7600	0.4000	3.4200	4.4600	-1.04*	4.8200	3.1400	1.6800
	(0.3039)	(0.3739)	(0.5264)	(0.6500)	(0.2995)	(0.4697)	(0.5600)	(0.9629)	(0.5979)	(1.1300)
Number of Years of Teaching Experience	10.7200	11.8700	8.0500	3.82***	9.7500	11.4200	-1.6700	8.6700	7.4000	1.2700
	(0.6568)	(0.8115)	(0.9964)	(1.2800)	(0.9431)	(0.9012)	(1.3000)	(1.6126)	(1.1695)	(1.9900)
Percent Correct on Raven Test	0.7500	0.7400	0.7700	-0.0300	0.7500	0.7400	0.0100	0.8000	0.7400	0.0600
	(0.0134)	(0.0152)	(0.0243)	(0.0300)	(0.0189)	(0.0183)	(0.0300)	(0.0400)	(0.0300)	(0.0500)
Observations	201	140	61	--	81	120	--	25	36	--

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 11a. Infrastructure at Vocational Education Institutions

		Public vs. Private			Urban vs. Rural			Private Formal vs. Private Informal		
Infrastructure	**Mean Full Sample**	**Public**	**Private**	**Difference**	**Urban**	**Rural**	**Difference**	**Private Formal**	**Private Informal**	**Difference**
Flush Toilet	0.2900	0.1200	0.3800	-0.26***	0.5800	0.0000	0.58***	0.6700	0.3100	0.36*
	(0.0538)	(0.0660)	(0.0707)	(0.1000)	(0.0833)	(0.0000)	(0.0800)	(0.1667)	(0.0753)	(0.1800)
KPLC Electricity	0.8500	0.8400	0.8500	-0.0100	0.9400	0.7600	0.18**	1.0000	0.8200	0.18***
	(0.0421)	(0.0740)	(0.0520)	(0.0900)	(0.0383)	(0.0707)	(0.0800)	(0.0000)	(0.0624)	(0.0600)
Observations	73	25	48	--	36	37	--	9	39	--

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 11b. Instructional Capital at Vocational Education Institutions

Infrastructure	Mean Full Sample	Public vs. Private			Urban vs. Rural		
		Public	Private	Difference	Urban	Rural	Difference
Instructional Capital per Capita Using Price at Purchase	16,995	11,808	20,508	-8,700	18,375	15,901	2,474
	(3,315)	(4,761)	(4,481)	(6,538)	(5,759)	(3,889)	(6,949)
Instructional Capital per Capita Using Today's Market Value	11,435	7,936	13,805	-5,869	12,013	10,976	1,037
	(2,525)	(2,893)	(3,733)	(4,723)	(4,498)	(2,863)	(5,332)
Observations	52	21	31	--	23	29	--

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 12. Theory vs. Practice Work at Vocational Education Institutions

		Public vs. Private			Urban vs. Rural			Private Formal vs. Private Informal		
Statistic	**Mean Full Sample**	**Public**	**Private**	**Difference**	**Urban**	**Rural**	**Difference**	**Private Formal**	**Private Informal**	**Difference**
Number of Hours: Theory Taught	1.9500	1.8700	2.0900	-0.2200	2.2700	1.7100	0.56***	2.7600	1.5300	1.23***
	(0.0860)	(0.0874)	(0.1822)	(0.2000)	(0.1480)	(0.0974)	(0.1800)	(0.2612)	(0.2236)	(0.3400)
Number of Hours: Practical Work Led by Teacher	2.3900	2.5500	2.1000	0.45*	2.0000	2.6900	-0.69***	2.0300	2.1600	-0.1300
	(0.1123)	(0.1369)	(0.1943)	(0.2400)	(0.1590)	(0.1526)	(0.2200)	(0.2725)	(0.2773)	(0.3900)
Number of Hours: Independent Practical Work	1.5800	1.6600	1.4300	0.2300	1.6200	1.5400	0.0800	1.3800	1.4700	-0.0900
	(0.0888)	(0.1076)	(0.1581)	(0.1900)	(0.1410)	(0.1162)	(0.1800)	(0.2158)	(0.2311)	(0.3200)
Percentage of Class Time: Theory Taught	0.3500	0.3300	0.4000	-0.07**	0.4100	0.3100	0.1***	0.4900	0.3300	0.16**
	(0.0165)	(0.0166)	(0.0344)	(0.0400)	(0.0280)	(0.0186)	(0.0300)	(0.0487)	(0.0457)	(0.0700)
Percentage of Class Time: Practical Work	0.6500	0.6700	0.6000	0.07**	0.5900	0.6900	-0.1***	0.5100	0.6700	-0.16**
	(0.0165)	(0.0166)	(0.0344)	(0.0400)	(0.0280)	(0.0186)	(0.0300)	(0.0487)	(0.0457)	(0.0700)
Observations	232	147	83	--	100	130	--	38	45	--

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 13. Characteristics of Vocational Education Institutions

Education or Experience Characteristic	Mean Full Sample	Public vs. Private			Urban vs. Rural			Private Formal vs. Private Informal		
		Public	Private	Difference	Urban	Rural	Difference	Private Formal	Private Informal	Difference
Curriculum Require Attachment	0.7200	0.7600	0.6400	0.12*	0.7400	0.7000	0.0400	0.8400	0.4800	0.36***
	(0.0295)	(0.0356)	(0.0524)	(0.0600)	(0.0438)	(0.0405)	(0.0600)	(0.0600)	(0.0752)	(0.1000)
School Organizes Attachment	0.5100	0.5400	0.4600	0.0800	0.5700	0.4700	0.1000	0.6800	0.2100	0.47***
	(0.0346)	(0.0430)	(0.0589)	(0.0700)	(0.0524)	(0.0464)	(0.0700)	(0.0762)	(0.0703)	(0.1000)
Curriculum/Materials in Finding Employment	0.9000	0.8800	0.9400	-0.06*	0.9200	0.8800	0.0400	1.0000	0.8900	0.11**
	(0.0197)	(0.0273)	(0.0263)	(0.0400)	(0.0270)	(0.0282)	(0.0400)	(0.0000)	(0.0457)	(0.0500)
Provide Assistance in Finding Work	0.5000	0.4400	0.6000	-0.16**	0.5800	0.4400	0.14**	0.7300	0.5000	0.23**
	(0.0330)	(0.0417)	(0.0538)	(0.0700)	(0.0500)	(0.0444)	(0.0700)	(0.0740)	(0.0752)	(0.1100)
Observations	232	146	84	--	101	129	--	38	46	--

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 14. Impact of Vouchers on Retention and Percentage of Vocational Education Course Completed

Independent Variables	Did Not Drop Out [1]	Did Not Drop Out [2]	Percentage of VocEd Course Completed [3]	Percentage of VocEd Course Completed [4]
Restricted	-0.158***	-0.166***	-0.128***	-0.122***
	(0.0351)	(0.0563)	(0.0197)	(0.0308)
Female*Restricted Voucher		0.0169		-0.00777
		(0.0722)		(0.0401)
Information Intervention	0.0108	-0.0279	-0.011	-0.0109
	(0.0349)	(0.0558)	(0.0197)	(0.0300)
Female*Information		0.0582		-0.00266
		(0.0716)		(0.0396)
Female	-0.0513	0.15	-0.0371*	0.0869
	(0.0375)	(0.3860)	(0.0208)	(0.2250)
Age	-0.00139	0.00144	-0.0023	-0.00109
	(0.0077)	(0.0105)	(0.0044)	(0.0059)
Female*Age		-0.00616		-0.00284
		(0.0153)		(0.0088)
Completed Primary School	0.107**	0.170**	0.0617**	0.0944**
	(0.0453)	(0.0756)	(0.0265)	(0.0450)
Female*Completed Primary School		-0.0969		-0.0509
		(0.0946)		(0.0558)
Completed Some Secondary School	0.0826	0.237**	0.0576	0.147***
	(0.0631)	(0.0968)	(0.0353)	(0.0536)
Female*Completed Some Secondary School		-0.243*		-0.141**
		(0.1270)		(0.0706)
Completed Secondary School	0.0572	0.125	0.0667**	0.107**
	(0.0514)	(0.0806)	(0.0303)	(0.0461)
Female*Completed Secondary School		-0.106		-0.066
		(0.1050)		(0.0617)
Constant	0.673***	0.568**	0.779***	0.713***
	(0.2010)	(0.2750)	(0.1170)	(0.1580)
Observations	766	766	766	766
R-squared	0.037	0.042	0.067	0.072

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 15. Labor Market Expectations

Statistic	All			Male			Female		
	Treatment	Control	Difference	Treatment	Control	Difference	Treatment	Control	Difference
Earnings Expectation	10160.00	12034.00	-1874.00	13166.00	15356.00	-2190.00	8446.00	9832.00	-1386.00
(2-year Forecast, Monthly)	(904.32)	(1518.03)	(1766.98)	(1760.00)	(2992.86)	(3472.01)	(968.51)	(1533.52)	(1813.75)
Self-Employed	0.8900	0.9260	-0.0360	0.8360	0.8330	0.0030	0.9220	0.9900	-0.068**
((2-year Forecast)	(0.0261)	(0.0205)	(0.0332)	(0.0503)	(0.0463)	(0.0683)	(0.0284)	(0.0104)	(0.0302)
Certificate	0.6190	0.5180	0.101*	0.4750	0.4550	0.0200	0.7080	0.5610	0.147**
	(0.0391)	(0.0391)	(0.0553)	(0.0656)	(0.0618)	(0.0901)	(0.0466)	(0.0504)	(0.0687)
Observations	155	164	--	59	66	--	96	98	--

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 16. Labor Market Outcomes

Outcomes	All			Male			Female		
	Treatment	Control	Difference	Treatment	Control	Difference	Treatment	Control	Difference
Employed	0.135	0.213	-0.078*	0.262	0.338	-0.076	0.053	0.131	-0.078*
			(0.042)			(0.082)			(0.041)
Employed/Volunteering (incl attachments)	0.206	0.262	-0.056	0.361	0.400	-0.039	0.106	0.172	-0.065
			(0.047)			(0.087)			(0.050)
Self-Employed	0.161	0.171	-0.009	0.180	0.215	-0.035	0.149	0.141	0.008
			(0.042)			(0.071)			(0.051)
Total Months Worked, among employed	15.2	13.3	1.9	17.1	12.1	5.0	11.3	15.1	-3.8
	(22.5)	(18.0)	(4.8)	(25.1)	(15.0)	(6.1)	(16.5)	(22.3)	(7.3)
Hours Worked (Last 7 Days), among employed	33.5	43.5	-9.95*	37.0	43.8	-6.7	26.5	43.0	-16.5
	(26.1)	(20.3)	(5.5)	(25.0)	(19.6)	(6.6)	(27.9)	(21.9)	(9.9)
Hours Worked (Last 7 Days), among self-employed	23.9	36.1	-12.2**	24.8	36.3	-11.5	23.1	35.9	-12.8
	(21.0)	(21.8)	(5.9)	(16.8)	(24.4)	(8.3)	(24.3)	(19.8)	(8.4)
Job Search Length (Weeks), among employed	17.7	46.1	-28.4***	22.0	58.2	-36.2**	9.3	27.6	-18.3
	(36.4)	(53.4)	(10.3)	(43.1)	(54.3)	(14.1)	(15.3)	(47.7)	(12.5)
Total Salary, among employed	3536	3279	257	3345	3469	-124	3918	2988	930
	(4464)	(2847)	(889)	(3407)	(2948)	(928)	(6259)	(2747)	(1984)
Profit From Self-Employment (Last Month)	2572	1600	972	4491	1900	2591	1064	1321	-256
	(4626)	(1327)	(956)	(6448)	(1434)	(1971)	(1400)	(1198)	(485)
Observations	155	164	--	59	66	--	96	98	--

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 17. Labor Market Outcomes - Treatment (school completers) vs. Control

Outcomes	All			Male			Female		
	Treatment	Control	Difference	Treatment	Control	Difference	Treatment	Control	Difference
Employed	0.171	0.213	-0.042	0.296	0.338	-0.042	0.093	0.131	-0.038
			(0.055)			(0.107)			(0.056)
Employed/Volunteering (incl attachments)	0.229	0.262	-0.034	0.407	0.400	0.007	0.116	0.172	-0.055
			(0.061)			(0.114)			(0.062)
Self-Employed	0.229	0.171	0.058	0.259	0.215	0.044	0.209	0.141	0.068
			(0.058)			(0.100)			(0.072)
Total Months Worked, among employed	11.1	13.3	-2.2	11.2	12.1	-0.9	11.0	15.1	-4.1
	(19.4)	(18.0)	(5.4)	(21.1)	(15.0)	(6.9)	(17.9)	(22.3)	(8.9)
Hours Worked (Last 7 Days), among employed	32.4	43.5	-11.1	33.5	43.8	-10.3	30.3	43.0	-12.7
	(25.2)	(20.3)	(6.8)	(24.5)	(19.6)	(8.2)	(28.7)	(21.9)	(12.4)
Hours Worked (Last 7 Days), among self-employed	25.4	36.1	-10.7	25.4	36.3	-10.9	25.4	35.9	-10.5
	(21.5)	(21.8)	(6.7)	(18.2)	(24.4)	9.4	(24.8)	(19.8)	(9.8)
Job Search Length (Weeks), among employed	13.0	46.1	-33.1***	12.7	58.2	-45.5***	13.5	27.6	-14.1
	(28.0)	(53.4)	(10.6)	(32.8)	(54.3)	(14.5)	(19.0)	(47.7)	(13.9)
Total Salary, among employed	4329	3279	1050	2873	3469	-596	7000	2988	4012
	(4997)	(2847)	(1273)	(2597)	(2948)	(964)	(7294)	(2747)	(2924)
Profit From Self-Employment (Last Month)	3256	1600	1656	6143	1900	4243	1011	1321	-310
	(5571)	(1327)	(1401)	(7690)	(1434)	(2856)	(929)	(1198)	(436)
Observations	70	164	--	27	65	--	43	99	--

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 18: Changes Across Vocational Training Institutions Over Time

	Participating Institution	Non-Participating Institution	Difference
Change in Enrollment	3.51	-7.91	11.42
(Spring 2010 compared to average prior to 2009)	(84.78)	(19.59)	(12.17)
	1.51	-5.36	6.87
Males Only	(52.77)	(12.58)	(7.63)
	2.00	-2.55	4.55
Females Only	(42.53)	(7.71)	(5.84)
			-0.036
Had a construction project in 2008	0.328	0.364	(0.159)
			0.061
Had a construction project in 2009	0.361	0.300	(0.160)
			0.208
Planning a construction project in Early 2010	0.390	0.182	(0.134)
			-0.033
Purchased Tools/Machines in 2008	0.603	0.636	(0.161)
			0.287
Purchased Tools/Machines in 2009	0.732	0.444	(0.183)
			-0.201
Planning to Purchase Tools/Machines in 2010	0.526	0.727	(0.152)
			0.270***
Started a New Course in 2009 or 2010	0.270	0.000	(0.57)
Number of Observations	63	11	--

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