

# Technical and Vocational Education and Training in Ethiopia

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## **Technical and Vocational Education and Training in Ethiopia**

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### **Abstract**

This report presents a background study of the state of Technical and Vocational Education and Training in Ethiopia. We discuss the state of TVET in Ethiopia, as well as the contextual information on education system and economic indicators in Ethiopia as they relate to the TVET implementation and policy. We argue that given the supply-driven nature of the TVET system in Ethiopia, it is important to improve its efficiency, and we propose two ways to doing this: (1) Improve efficiency and equity of the centrally-driven allocation mechanism drawing on the recent advances in matching algorithms and their application to the school choice; (2) Impact evaluation of the final labour market outcomes of the graduates has to be integral part of the TVET system, and we discuss various ways such evaluation could be conducted.

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## **Abbreviations and Acronyms**

CSA	Central Statistical Authority
EDRI	Ethiopian Development Research Institute
GDP	Gross Domestic Product
GER	Gross Enrolment Rate
ICA	Investment Climate Assessment
LSMS	Living Standards Measurement Survey
MOE	Ministry of Education
NEAEA	National Educational Assessment and Examination Agency
NER	Net Enrolment Rate
NGO	Non-Governmental Organization
NLA	National Learning Assessment
SSA	Sub-Saharan Africa
RemSEDA	Regional Medium and Small Enterprise Development Agency
TFP	Total Factor Productivity
TVET	Technical and Vocational Education and Training
VET	Vocational Education and Training

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## **1. Executive Summary**

This report presents a background study of the state of Technical and Vocational Education and Training (TVET) in Ethiopia. The aim of the report is threefold: (1) To summarize the current state of affairs on TVET in Ethiopia in order to present the contextual information for the researchers and the donor community; (2) To inform policymakers in Ethiopia on the best practices related to the impact evaluation of the TVET in terms of the final labour market outcomes of its participants, as well as on best practices on efficient design of school-choice matching mechanisms; (3) To discuss options for designing and conducting TVET impact evaluation in Ethiopia.

The TVET system in Ethiopia is currently rapidly expanding. The government believes that the present low factor productivity is due to the skill gap, and that left to its own, the industry will provide less training than is socially optimal. Therefore, publicly provided vocational education is seen by the government as the means to close this skill gap. The government of Ethiopia looks at the public TVET as the key in improving the productivity of the enterprises and increasing their competitiveness in the global market.

Government involvement goes beyond mere provision of TVET. The Ministry of Education administers the centralized exam at the end of the primary school, and scores on this exam determine if a student continues to the preparatory school or is placed in the TVET track. This national exam also determines which level of the TVET the individual can join. Furthermore, the allocation of the numbers of places for specialization is also centrally determined. In this regard, TVET system in Ethiopia is essentially command driven, even though the government recognizes the importance of ensuring the system is sufficiently flexible and responsive to demands of industry.

Even if the arguments for centrally directed TVET were convincing, ensuring that such a non-market based system improves the outcomes of its beneficiaries is challenging in practice. We take as given the supply-driven nature of the TVET in Ethiopia. We argue that the supply-driven nature to TVET calls for mechanisms that would improve its efficiency and evaluate its effectiveness. We identify two areas for improvement: (1) Making the current student allocation mechanism more efficient, equitable and strategy-proof, guided by recent advances in school choice algorithms. (2) Conducting impact evaluation of the TVET training on the final labour market outcomes of the beneficiaries. Such evaluations should go beyond the tracer studies that look at the outcomes of the graduates of particular institutions, and should attempt to answer questions of the nature: what would be the outcomes of the TVET graduates relative to the counterfactual of no having gone through the TVET. Getting to such counterfactual is challenging, and we will outline a few ways that such studies can be conducted.

The rest of the report is structured as follows: Section 2 presents the contextual information on the TVET systems internationally and in Sub-Saharan Africa (SSA). It also gives the relevant socioeconomic background on Ethiopia. Section 3 describes the TVET in Ethiopia in detail; and Section 4 presents the relevance of the recent literature on the efficient school choice algorithms for improving efficiency and equity in the TVET of Ethiopia. Section 5 discusses the design options for the TVET impact evaluation. Section 6 concludes.

## **2. Introduction and the Contextual Background**

### **2.1. TVET Policy and its Evaluation Practices**

#### **2.1.1. TVET Policy and the Development Community Agenda**

Technical and Vocational Education and Training (TVET) provides trainees with the technical skills applicable for the particular trade. In practice, different types of programmes are included under the umbrella of TVET. Grubb and Ryan (1999) distinguish the following four types of programmes. (1) Pre-employment VET – prepares individuals for the initial entry into the employment. The regular track of the TVET in Ethiopia falls under this category. (2) Upgrade training provides additional training for the employed individuals; (3) Retraining provides the training for individuals that have lost jobs or for those wishing to switch careers; (4) Remedial VET provides training to individuals out of the mainstream labour force.

During the last couple decades, the World Bank's advice to developing countries seems to have been that basic education should be the top priority, and that public expenditure on VET should be reduced (Bennell & Segerstrom, 1998). Such advice is based on the proposition that provision and funding of VET is best left to the individuals, private enterprises and private institutions. This is justified by the fact that the demand-driven training systems have outperformed supply-driven systems. During the last couple decades, the interest in TVET was also low within the donor community, partly as a result of the increased focus towards the sectorial work. By its nature TVET is multi-sectoral and it was relatively neglected as a result.

However, TVET has recently returned to the international development policy agenda. The discourse on TVET has been reinvigorated under the following three themes. (1) During the last decade, the issue of TVET has been linked to the topics such as the Millennium Development Goals. Under-development is often being framed as the consequence of the lack of skills, to which TVET is cast as an obvious solution. (2) As a result of the demographic transition (i.e. decreased infant mortality and increased life expectancy) many developing countries have large share of the population that is young. In these countries, youth unemployment is an economic and social problem and is increasingly feared to create political problems. TVET is cast as a solution to these issues. (3) It was hoped that the technological advances of the last couple decades and globalization would improve opportunities for all. While these hopes have materialized for the large share of population in East Asian countries and China, many other developing countries are concerned not to “miss the boat”. TVET is cast as a tool to increase competitiveness of industries in these countries. TVET has certainly caught the attention of policymakers in Ethiopia who have in turn looked at alternative models of TVET provision across the world and have been persuaded by the German model of training. In what follows, we outline this model and examine how it works in the Ethiopia.

#### **2.1.2. German-Style Apprenticeship-based TVET system**

TVET provision in different countries differs by the amount of time spent in the classroom gaining general skills, versus time spent in the enterprises gaining job-specific skills. In German-style “dual” system the theory is taught in educational institutions and practical skills are acquired through the

apprenticeship in a company. The German system has long been admired internationally. It is typically observed that such a system is correlated with lower rate of youth unemployment. This correlation need not be because of the causal link from the type of system to the employability of the graduates, but it is often interpreted to have such a causal link. Few countries have been able to successfully emulate the German system, notably Switzerland, Austria and Denmark (Piopiunik & Ryan, 2012).

The challenge in implementing the dual system is that a company has to be convinced that participating in the apprenticeship scheme is ultimately to its own benefit. In reality, the firm may resist the apprenticeship arrangement because training is expensive. Trainees need to be supervised and have to operate expensive equipment. In addition, trainees may be poached by other employers after they graduate. This presents a classic coordination problem, where every firm could possibly benefit if the entire labour force is more skilled as a result of the training. However every firm prefers that the training is done by somebody else. Therefore the total amount of training offered is less than socially optimal. Coordination problems of this type are of course at least part of the justification why separate TVET institutions exist, as opposed to the training being done by the employer. Institutional or public provision of TVET attempts to tackle this coordination problem, but cannot entirely escape it if the firm-based training is desired – the coordination problem re-emerges in a different guise.

German-style dual programmes demand very strong participation by employers. In practice, German apprenticeship involves four major sponsoring parties – the employer, the public authority, the trainee and the trade union (Streeck, Hilbert, van Kevelaer, Maier, & Wber, 1987). German apprenticeship system is a descendant of the mediaeval institution of apprenticeship within the merchant guilds. It appears that in Germany the institutions have emerged that are able to solve the coordination problems that are inherent in the cooperative training arrangements. For an in-depth discussion on the economics of the apprenticeship systems, as well as the policy debate on school based versus apprenticeship based training, refer to (Smith & Stromback, 2001).

### **2.1.3. TVET in Sab-Saharan Africa**

The classic essay “The vocational school fallacy in development planning” by Phillip Foster (1965) was based on his work in Ghana. In this essay, he argued that vocational education in Africa was a myth. He argued that small-scale vocational training schemes might be more fruitful if they are divorced from the formal education system. He also argued that the burden of vocational training should be borne by the groups that demand skilled labour. The dilemma on whether to concentrate investment in general education or in vocational training has persisted in many African countries ever since this seminal essay (Oketch, 2007).

In 2007, the African Union drafted the Strategy to Revitalize Technical and Vocational Education and Training in Africa (African Union, 2007). The report states that there is a fresh awareness among many African countries of the critical role that TVET plays in the national development. The objectives of the strategy are to revitalize and modernize TVET in Africa and to transform it into mainstream activity for African Youth. For the discussion on the lessons learned with implementing TVET, with particular focus



on Africa, see Kingombe (2011). Akoojee et al (2005) present a comparative study of the TVET in Southern Africa.

#### **2.1.4. Lessons from TVET Evaluations**

During the last few decades, it has been increasingly common to evaluate projects and interventions both run by the government or NGOs. Evaluation is seen as a vehicle to ensure better accountability, as well as a tool to improve efficiency and quantify the actual impact. VET programmes, especially the active labour market programmes in the US were path-breaking in this increased reliance on evaluations in general, as well as in terms of the analytical tools that were developed for this purpose.

Decades of evaluations of the public training programmes in the United States, the United Kingdom, and other developed countries have shown that the returns to such programmes are very low. For the survey of the impact evaluation of such programmes, see for instance (Carneiro & Heckman, 2003). By their nature, typical public training programmes in the US were remedial, and were targeted to individuals especially disadvantaged in the labour market, such as long-term welfare recipients. Therefore these findings do not necessarily extend to the typical pre-employment training schemes, such as institutional TVET in Ethiopia. Still, these evaluations are informative in terms of the tools employed and the evaluation issues to be overcome. The discussion in the section 5 draws on the lessons learned from these evaluations.

Evaluation studies in developing countries have thrown up mixed results. (Betcherman, Olivas, & Dar, 2004) Summarize impact evaluations of 69 training programmes, and find that training impact in Latin America are on average higher than impact in the programmes in the United States and Europe. However, most studies show that programmes the impact of these programmes on employability is limited. Below we summarize some studies that look at the return to the remedial VET training in the developing countries.

- Attanasio et al evaluate vocational training in Colombia through a randomized intervention. The vocational training consisted of three months of in class training, followed by three months of on-the-job training of young people between ages 18 and 25 in the two lowest socioeconomic strata in the population. The training was provided by the private institution that had to participate in the bidding process. The study found that the returns to vocational education were positive for women. Salaried earnings increased by 20% for women. The earnings increased both because of increased productivity and because of increased employment. For men, the only discernible effect of the program was shifting from the informal to formal sector (Attanasio, Kugler, & Meghir, 2011).
- Chong and Galdo study the effect of the quality of training in Peru. The program provided training to the disadvantaged young individuals aged 16 to 25, and was similar in design and implementation to the one in Columbia. The evaluation was not randomized. Therefore the comparison group was chosen to be the “nearest-neighbour” households located in the same neighbourhood as the participants included in the sample. The evaluation was able to compare

the individuals six, 12 and 18 months after the program. As a measure of quality, the study uses proxies such as class size, expenditure per trainee and variables related to the course structure and teacher characteristics. The study showed that individuals attending high-quality courses had labour earnings 20 percentage points higher than those attending lower quality courses. The earnings gap from attending high and low quality training was higher in the medium term than the short term (Chong & Galdo, 2006).

- Card et al demonstrated that a similar program in the Dominican Republic had positive but moderate impact on the trainee's hourly wages. They found that the returns to training were heterogeneous, and varied by the levels of prior educational achievement and age (Card, Ibarrran, Regalia, Rosas-Shady, & Soares, 2011).
- Hicks et al (2011) study the Technical and Vocational Voucher Program in Kenya. The program recruited out of school youths ranging in age from 18 to 30. The participants were drawn from the Kenya Life Panel Survey. Out of the individuals that applied, the random half were awarded a voucher for the vocational training, while the other half served as a control. Out of the voucher group, half of the participants received vouchers for the private institutions, while the other half received unrestricted vouchers to be used at either private or public institutions. In addition, random half of the participants received the information on the actual returns to the training. The study is on-going, and the information on the final outcomes is not yet available (Hicks, Mbiti, & Miguel, 2011).

Rigorous economic evaluations of the institutional TVET which provides pre-employment training as an alternative to the higher education are rarer than evaluations of the active labour market programmes that provide short-term training. The study by Malamud and Pop-Eleches (2006) is an exception and it exploits the policy reform conducted in Romania in 1973:

- The Malamud and Pop-Eleches study exploits an educational reform from 1973 in Romania, which shifted large proportion of students from vocational training to general education. It looks at the employment outcomes of the affected individuals through the 1992 Census and the 1995-2000 LSMS. The study finds that the men affected by the policy were significantly less likely to work in manual occupations but did not show the difference in unemployment, family income or wages. Also, men affected by the policy were more likely to marry (Malamud & Pop-Eleches, 2006).

The findings from evaluating the remedial employment programmes do not necessarily extend to the typical pre-employment training schemes, such as institutional TVET in Ethiopia. Individuals participating in the remedial programmes may be more disadvantaged than the typical student in the institutional TVET. Returns for the disadvantaged individual may be higher, if the marginal returns to the skills are higher for low skills levels. However, the returns to the disadvantaged individuals may also be lower, if these disadvantaged individuals have lower ability. Still, these evaluations are informative in terms of the tools employed and the evaluation issues to overcome. Discussion in the section 5 draws on the lessons learned from these evaluations.

## 2.2.Ethiopia: The Socio-Economic Context

### 2.2.1. Economic Indicators in Ethiopia

With GDP per capita at \$330, Ethiopia is one of the poorest countries in Arica. However, its GDP has been growing at almost double digits since 2003/2004 - its growth rate has been one of the fastest in the continent. Agriculture represents the largest sector of the economy in Ethiopia, comprising nearly 50% of GDP in 2010. Services (consisting primarily of financial intermediating, public administration and retail activities) are the second largest sector of the economy, representing 38% of GDP in 2010 (Table 2-1). In 2005, 80% of the labour force in Ethiopia was employed in agriculture, 13% in services, and only 7% in industry (CSA, 2005). The private sector is small, largely informal, and is concentrated in the services sector. The World Bank investment Climate Assessment finds that four out of five employed youths work in the informal sector, defined as enterprises with less than five employees (World Bank, 2009).

Table 2-1 Sectors of Ethiopian Economy, 1989 – 2010, Percentage of GDP

	1989	1999	2008	2009	2010
Agriculture	53	50	44	51	48
Industry	12	13	13	11	14
Of which Manufacturing	5	6	5	5	5
Services	34	38	43	38	38

Source: WDI

Recently the government of Ethiopia has launched a new five year plan for 2010/11 – 2014/2015, titled the “Growth and Transformation Plan” (Ethiopia 2010). The plan aims to achieve the Millennium Development Goals and to make Ethiopia a middle-income country by 2020-2023. The plan envisions achieving these targets through commercialization of agriculture combined with increased industrialization, especially in the sugar, textile and leather industries. Reaching the GDP of a middle-income country by 2023 is an ambitious goal, as it implies achieving the GDP per capita of over \$1000 in 2010 dollars (from the current level of \$330). Achieving this target would require the annual growth rate of 11.2% for the next 14 years (Joshi & Verspoor, 2013).

The Plan for Accelerated and Sustained Development to End Poverty (PASDEP), Ethiopia’s second poverty reduction strategy paper, states that in order to achieve the development targets, TVET will need to provide “relevant and demand-driven education and training that corresponds to the needs of economic and social sectors for employment and self-employment”. In 2008 the government of Ethiopia published the National Technical and Vocational Education and Training Strategy (MOE, 2008). The strategy outlines how the TVET program will achieve the development goals.

The emphasis of TVET for achieving the development goals is motivated by the fact that the labour productivity in Ethiopia is very low, even as the domestic wages are about one third of the average wage in Sub-Saharan Africa. The World Bank Investment Climate Assessment (ICA) found that measured in terms of annual sales per worker, average labour productivity in Ethiopia in industries of significant presence is less than half of the average for the SSA Countries, and even smaller fraction of that of the low income country group. Part of the reason for the low productivity is the fact that the enterprises (i.e. factories) are not as well equipped. As a reference, the value of equipment and machinery per worker in Ethiopia in 2006, was 30% lower than the low income country average, and 50% lower than the SSA average. However, the ICA finds that the labour productivity in Ethiopia would still be lower than the comparison countries, even if its industries were equally capital intensive. The reasons for this are lower workforce skills and higher technical inefficiencies at the enterprise level. (World Bank, 2009).

Skills in Ethiopia command a higher wage premium than most developing countries. The average wage differential between skilled and unskilled labour is 81% in Ethiopia, compared to 14% in China. On average, labour efficiency in medium and large firms in Ethiopia is about 50% of that in similar sized firms in China. In small and micro enterprises, labour productivity is less than 20% of the Chinese level (Dinh, Palmade, Chandra, & Cossar, 2012).

In 2006/2007, the Ethiopian Development Research Institute (EDRI) with the technical assistance of the World Bank conducted the Productivity and Investment Climate Survey. The survey included 600 firms based in urban areas (124 firms in trade and services, 360 manufacturing enterprises and 126 micro-enterprises). The World Bank Ethiopia Investment Climate Assessment based on this survey found that the large proportion of medium and large firms state that worker skills are a severe or very severe constraint on business (Table 2-2) (World Bank, 2009). We now proceed to summarizing the state of the education system in Ethiopia to help shed light on the origins of the skill deficit.

Table 2-2 Ethiopian Firms that Find Worker Skills a Severe or Very Severe Constraint on Business

	Services	Manufacturing
Ethiopia as a Whole	15	26
Type of Firm		
Small	10	19
Medium	40	33
Large	100	43
Domestic	16	26
With Foreign Investment	0	24
Non-exporting	15	25
Exporting	25	32

Source: (World Bank, 2009)

### 2.2.2. Education System in Ethiopia

Through most of the twentieth century, Ethiopia was one of the most disadvantaged countries in terms of access to education. As a legacy, in 2008, the literacy rate in Ethiopia was estimated to be 36%, and the average educational attainment of the population 15 years or older was an astonishing 1.5 years (EdStats). School enrolment has expanding rapidly in recent decades. By 2010, there was near universal access to the first cycle of the primary education, but only half of the relevant group was enrolled in the second cycle (Table 2-3) (Joshi & Verspoor, 2013).

Table 2-3 Participation Rates in Education by Grade Level, 2010/11

Grades	GER			NER		
	Male	Female	All	Male	Female	All
1-4	128.8	119.1	124.0	94.0	89.4	91.8
5-8	67.4	64.8	66.1	46.6	47.9	47.3
1-8	99.5	93.2	96.4	87.0	83.5	85.3
9-10	41.8	34.9	38.4	16.4	16.2	16.4
11-12	9.6	7.1	8.4	NA	NA	NA
Higher Education	8.4	3.6	6.3	NA	NA	NA

Source: Education Statistics Annual Abstract, 2010/11 (MOE, 2010)

Note: GER = Gross Enrolment Rate, NER = Net Enrolment rate, NA = Not Available

The structure of the education system in Ethiopia is as follows. Primary education (grades 1-8) aims to provide the basic literacy and numeracy skills. General secondary education (grades 9-10) aims to enable students to identify areas of interest for further education and training. The preparatory level (grades 11 and 12) prepares the student for the higher education or careers. National examinations are administered at the end of grade 10 and 12. According to the officials of the MOE, approximately 30% of students that reach 10<sup>th</sup> grade will continue to higher education. The rest of the students will either enrol in TVET, or leave the formal education system.

Technical and vocational education (TVET) is institutionally separate from the rest of the education system, and forms a parallel track. Students entering TVET stream after completing grade 10, have three options open to them, depending on the score received in the national exam: (1) one year training (10+1); 2 year training (10+2), or three year training (10+3). Students who complete three years of training after grade 10 are considered to have completed first year of college level education and can join universities to complete their undergraduate degree. The students that attain level 4 in TVET can continue to higher education, hence, level 4 TVET is considered by some as the alternative route to get to the university.

### 3. TVET in Ethiopia

The TVET program in Ethiopia is primarily supply driven. Even though TVET strategy stresses the importance of ensuring that TVET is flexible enough to accommodate the demand for, the allocation of students to TVET institutions, as well as the curriculum and the specialization offered are determined by government. This is in contrast to market-driven TVET systems, where the demand for particular specialization, as well as the fields of study is governed by the “invisible hand”. In the literature the appropriateness of the first versus the second approach has not been consistently settled, and the best approach may indeed depend on the particular contextual and institutional setting.

This section presents key details on the TVET in Ethiopia. Section 3.1 presents the key statistics on TVET, Section 3.2 gives; Section 3.3 describes how the students are allocated by the TVET field of specialization; Section 3.4 discusses the apprenticeship aspect of TVET in Ethiopia; Section 3.5 discusses the skill competency assessment in TVET. Finally, the section 3.6 describes how the future TVET instructors are identified and trained.

#### 3.1. TVET System in Ethiopia: Statistics

In recent years, there has been considerable expansion in TVET institutions in Ethiopia, both in terms of public spending and increased provision by private institutions. Number of TVET institutions in Ethiopia is also provided by non-governmental organizations (NGOs). During the years 2004 – 2009, average annual increase in enrolment in TVET was 30.5% (MOE, 2008). In the year 2008/09 (2001 E.C), there were total of 458 TVET institutions in Ethiopia. These institutions enrolled total of 308,501 students in regular, evening, summer and distance programmes (Table 3-1). In 2007, Ethiopia was the second in Africa in terms of number of training institutions.

Table 3-1 TVET Enrolment by Gender, 2004 - 2009

Sex	2004-05 (1997 E.C.)	2005-06 (1998 E.C.)	2006-07 (1999 E.C.)	2007-08 (2000 E.C.)	2008-09 (2001 E.C.)	Average Annual Growth Rate
Male	51,940	61,415	107,327	119,123	165,910	33.70%
Female	54,396	62,142	83,824	110,129	142,591	27.20%
Total	106,336	123,557	191,151	229,252	308,501	30.50%
% Male	48.8	49.7	56.1	52	53.8	
% Female	51.2	50.3	43.9	48	46.2	

Source: Education Statistics Annual Abstract, 2010/11 (MOE, 2010)

Government sources estimate that private TVET providers currently provide approximately 30% of all TVET in Ethiopia, while private TVET providers estimate their share of the market to be around 50%. Tables Table 3-2 and Table 3-3 present the graduates from the government and non-government TVET

institutions in 2010 – 2011. According to these tables, roughly half of the graduates were enrolled in public institutions in the academic year 2010-2011.

Table 3-2 TVET Government Graduates by Region and Level

Region	Level										Total		
	1		2		3		4		5		M	F	Total
	M	F	M	F	M	F	M	F	M	F			
Tigray	2	19	34	87	569	504	1280	1556	2	17	1887	2183	4070
Afar	0	0	11	5	82	162	42	19	88	38	223	224	447
Amhara	97	149	979	1096									
Oromoya	242	292	1148	935	5152	3073	7751	4973	26	6	14319	9279	23598
Somali	0	0	43	10	174	53	14	10	0	0	231	73	304
Benishangul-Gumiz	0	0	0	0	0	0	0	0	0	0	0	0	0
SNNP	161	234	593	465	1971	1890	362	117	0	0	3087	2706	5793
Gambella													
Harari	0	0	0	0	0	0	132	147	0	0	132	147	279
Addis Ababa	150	232	472	830	1921	1302	800	981	523	268	3866	3613	7479
Dire Dawa	0	0	0	0	121	58	381	361	0	0	502	419	921
Total	651	907	3282	3437	15000	14016	11322	8489	647	312	30872	27161	58033

Source: Education Statistics Annual Abstract, 2010/11 (MOE, 2010)

Table 3-3 TVET Non-Government Graduates by Region and Level

Region	Level										Total		
	1		2		3		4		5		M	F	Total
	M	F	M	F	M	F	M	F	M	F			
Tigray	0	0	0	0	476	95	945	1224	13	38	1434	1357	2791
Afar	0	0	0	0	0	0	0	0	0	0	0	0	0
Amhara	51	104	326	590	1925	3301	3923	5100	27	21	6252	9116	15368
Oromoya	24	60	65	156	2512	1335	7462	6588	0	0	10063	8139	18202
Somali	0	0	0	0	0	0	60	27	0	0	60	27	87
Benishangul-Gumiz	0	0	0	0	65	58	141	137	0	0	206	195	401
SNNP	84	24	87	57	4509	3013	2903	1662	0	0	7583	4756	12339
Gambella													
Harari	0	0	0	0	39	10	355	203	0	0	394	213	607
Addis Ababa	535	1108	308	543	508	1044	2559	2159	111	112	4021	4966	8987
Dire Dawa	0	0	0	0	62	2	386	306	0	0	448	308	756
Total	694	1296	786	1346	9620	8763	17789	16182	138	133	29027	27720	56747

Source: Education Statistics Annual Abstract, 2010/11 (MOE, 2010)

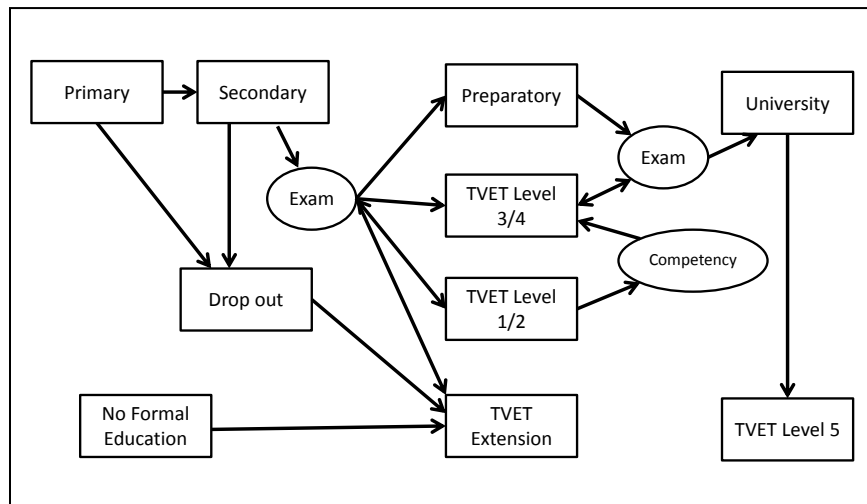
Students that cannot go to the government TVET institutions can choose a private institution. In theory even the students eligible to attend the government TVET could choose to go to the private institutions instead. However, qualitative interviews suggest that this does not happen in practice. Government TVET is free of charge, while the private institutions charge a fee. Moreover, it appears that most private

institutions are of lower quality, and they cater to students with lower educational outcomes (MOE, 2008). Meanwhile, the NGO-run TVET generally have the reputation for higher quality, and their fees and financial arrangement vary. Both private and NGOs have to be TVET certified by the government.

In addition to the day programmes, the government TVET institutions provide courses on the extension bases (evening program), where the students are charged a fee. The evening program is aimed at students who have day-time jobs. Regular evening programmes costs about 25/35 birr a month and the students can pay their tuition fees on a loan basis. Extension services also provide short term training programmes of about a month’s duration. These programmes admit everybody, even those without any secondary education.

According to anecdotal evidence, the graduates of private TVET institutions typically have lower labour market outcomes. However, given that these centres cater to students of lower ability / lower academic performance, it is not clear a priori how the private institutions increase the outcomes compared to the counterfactual.

Figure 2.1. Structure of Education and TVET System in Ethiopia



### 3.2. National Exam Determining Access to the TVET Track

In Ethiopia, students in grades 10 and 12 take a centrally-organized examination, conducted by the National Education Assessment and Examination Agency (NEAEA). The tests consist of the multiple choice questions and are marked electronically. Failure rates in these tests are very high. One third of all students and half of all the girls fail the exam (Joshi & Verspoor, 2013). The students that pass the exam in grade 10 can continue to preparatory school (grades 11 and 12), while the remainder are expected to pursue TVET or join the labour force.



The (MOE) determines score cut points for the examination. These cut points are such that number of students corresponding to a cut point that is eligible for TVET is equal to the capacity that the government TVET colleges can accommodate. Similarly, numbers of students allowed to continue to the higher education corresponds to the number of places that universities can accommodate. As numbers of TVET institutions, as well as numbers of places by specialization change yearly, the corresponding cut-off points also change yearly.

There is another stream of individuals that can go to TVET – those who could not get sufficiently high scores to go to university during the national exam at the end of grade 12. In addition, students can go to TVET from the universities, in which case they can go to level 5.

The use of the cut-off scores that allow students to go to vocational training or not, open the possibility of impact evaluation through a regression discontinuity design. There are two cut-off scores that are relevant for this purpose – the score that separates the students who have to drop out from formal education completely and those that can continue to technical education, and also the cut-off score that separates those who can continue their studies to the upper secondary versus those who have to continue to TVET (Table 3-4).

Table 3-4 Cut-off Scores for the Grade 10 National Exam Determining Acceptance to TVET and Preparatory Schools, Ethiopia 2009 - 2012

Year	Preparatory			TVET							
	Male (1)	Female (2)	Emerging areas(areas need special supports and pastoralist areas) (3)	Level 1&2				Level 3&4			
				(1)	(2)	(3)	Entrance (Grade.12)	(1)	(2)	(3)	Entrance (Grade.12)
2012	2.57	2.14	2.29(male)	<2.43	<2	<2	249	≥2.43	≥2	≥2	276
2011	2.43	2.14	2.29(male)	<2*			-	≥2			-
2010	2.43		2.29(male) 2.14(female)	<2*			-	≥2			-
2009	2.29	2	2.14(male)	<2*			-	≥2			-

\* According the guidelines set by the MOE, the minimum score was not announced. However, the actual allocation of students was subject to available seats and market demand for given field of study.

### 3.3. TVET Fields of Study

Students who cannot continue to preparatory school, but are eligible to go to TVET, submit the preferences on colleges as well as specialties. However, the actual matching is done through the matching system at the regional level, and it allocates the applicants to colleges and specialties. The number of places allocated to the different specializations is based on what the government predicts the demand by industry to be, and how many places TVET can accommodate. TVET strategy aims to develop TVET Management system (TMIS) that would help guide such an allocation.

Meanwhile, the TVET system depends on the labour market analysis and forecast that is done within the Ministry of Labour and Social Affairs, National Statistical Agency and Regional Medium and Small Enterprise Development Agency (RemSEDA). The labour market assessment performed by these agencies is not duplicated. Rather, it is analysed within the TVET system to extract relevant information (MOE, 2008).

From qualitative interviews with TVET graduates, it may be the case that an applicant preferred to go to college A and study construction, but he is instead allocated to college B to study sewing. Since the allocation of students to specialization is not entirely market driven, it is likely to be the case that the returns to the TVET education are heterogeneous, and is the function of the number of students allocated to the particular field of specialization, as well as the market demand of students of that particular specialization. Incidentally, a similar match takes place in higher education, and it is accompanied by a secondary market, where students matched to majors and universities attempt to trade their spots.

Such an allocation scheme is a consequence of the fact that TVET in Ethiopia is command driven. Three main arguments can be raised in the defence of such a centrally-driven allocation scheme. (1) Such schemes go some way to minimize the opportunities for graft that could have been available if the system was decentralized. (2) Furthermore, the existence of such a scheme may be based on the notion that the government is better able to solve asymmetric information problems<sup>2</sup> than the students. (3) Finally, the centrally coordinated scheme might aim to strategically allocate students to the specializations, because the government believes that by doing this they may develop key industries. In reality, it is not clear if any of the above three main arguments in terms of market failure justify such government intervention in as much as this intervention is likely to be inefficient.

This particularity about the matching system, combined with the possibility of the trades in the spots on the secondary market has to be taken into the account when designing a proper evaluation strategy for TVET.

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<sup>2</sup> Asymmetric information refers to the situation when one party has better information than the other. In relation to TVET, this may imply that the firms know what skills they demand, but potential TVET applicants do not have this information, or are not able to process it fully. Therefore, left to their own they would make bad choices for their careers.

### **3.4.Apprenticeship/Job Training**

The TVET system in Ethiopia aims to emulate German apprenticeship-based system. TVET students in Ethiopia have to apprentice 70% of the time spent in the program. TVET colleges are tasked by the government to identify potential employers who can provide apprenticeship experience for the TVET students.

While identifying and engaging employers in certain industries (especially government owned) has been successful, it appears that other companies resist this practice and see TVET apprentices as burden. labour Officials at the Ministry of Education stated that engaging of the private sector is envisioned through “increased awareness”, even though they do currently experience some resistance. In qualitative interviews, the select private sector employers stated that they did not feel coerced to take up the TVET apprentices, and feel free to refuse them if they find it necessary. As TVET student numbers expand ensuring sufficient training spots in firms is of concern.

During the qualitative interviews conducted with the managers of a major public enterprise, they expressed satisfaction with the TVET system and the quality of its graduates. They stated that they have signed a partnership with certain TVET institutions and participate in apprenticeship training with them. Meanwhile, a large private enterprise manager stated that he would not participate in the apprenticeship, even though he did hire from the TVET. However, he also stated that while hiring a new employee, there is a trade-off to be made between hiring a TVET and non-TVET graduate. The major concern was that having been TVET graduate makes the employees more mobile, and more prone to being “poached”. Because of this reason, non-TVET graduates are sometimes preferred, because they earn less and are less mobile.

### **3.5.Skill Competency Assessment**

The Ethiopia TVET strategy (MOE, 2008) maintains that TVET quality and relevance should be enhanced through making the system outcome based. By “outcome based” the strategy implies that the training received in TVET should be measurable according to the skill assessment based on the occupation standards. This “outcome-based” measure is not to be confused with the measures of the final labour-market outcomes of the graduates, such as wages and employment.

Occupational standards are the competencies needed to be considered qualified for a certain field. The government of Ethiopia plans to develop occupational standards for all occupational fields. Occupational standards are developed at the national level. The federal TVET agency is responsible for organizing, facilitating and endorsing the occupational standards. In order to develop these standards, the Federal TVET agency is tasked to form expert panels for standard setting and to consult the international occupational standards. Identifying the clustering of occupations is conducted through cooperation with the Ministry of Labour and Social Affairs and the Civil Service Agency. Occupational assessment takes place in designating or accredited public or private centres (MOE, 2008).

At the end of the study, the TVET graduates have the option to go through official assessment of their skills. Currently the assessment is done for key competencies only. It appears that most graduates currently do not get assessed. Of the graduates in Addis Ababa, about 10% were found competent in the core skills (Table 3-5). Having been assessed increases job prospects for the graduates and also improves the opportunities of job-to-job transition.

Table 3-5 Assessment of TVET graduates in Addis Ababa, 2012

	Number of Colleges	Total Number of Graduates	Number of Graduates Assessed	% Assessed	Number Found Competent	% of the Assessed Found Competent	% of the Graduates Found Competent
Group A (>80% of graduates assessed)	9	718	688	96%	129	19%	18%
Group B (40%-60% graduates assessed)	10	3012	1526	51%	549	36%	18%
Group B (<40% graduates assessed)	19	6358	1290	20%	339	26%	5%
Total	38	10,085	3,504	35%	1017	29%	10%

Source: Addis Ababa City TVET Agency

### 3.6. Qualifying TVET Instructors

TVET strategy documents acknowledge that the shortage of teachers/instructors is one of the obstacles in TVET expansion in Ethiopia. Because of the low reputation of this profession, the quality of the TVET instructor pool suffers (MOE, 2008). The constraint on the supply of TVET instructors is particularly severe at the higher levels of TVET.

Currently identifying and training TVET instructors is done through the following system. The students that complete TVET Level 4 and have their assessed have an option of receiving additional pedagogic training. After receiving this training, they are qualified to teach TVET levels 1 and 2. Such instructors are called C level instructors. After having been qualified as a level C instructor, an individual can go on to the special teacher training institutes for 3 to 4 years to become B level instructor. The highest Instructor level is A, and these instructors are qualified to teach at any level. Clearly, examining the constraints here must be part of the overall strategy in improving TVET education in Ethiopia.

## 4. Lessons from the Efficient Mechanism Design Literature

The allocation scheme described earlier in allocating secondary students to TVET places and specialisms is a consequence of the fact that TVET in Ethiopia is command driven. Even though cut-off scores are

aimed to match the number of students that can go to TVET with the number of spots that TVET can accommodate, in practice this presents a formidable challenge, since the cut-off scores are determined at the national level, while availability of TVET, as well as demand for TVET spots varies by region. Financial constraints are likely to prevent some willing TVET students from attending TVET outside their town or region. Therefore, some TVETs are oversubscribed, while others are undersubscribed. For instance, TVET in Tigray had to turn down many willing applicants recently.

The centrally-driven allocation of students to TVET institutions and majors is bound to be inefficient. The indirect evidence for this inefficiency is presented in the Appendix. The photos show the secondary market those results for the allocation at the universities. After students are placed in universities and majors, the individuals dissatisfied with their match attempt to trade the spots. Such a market for trading allocations is visible in the streets of Addis Ababa. This secondary market may go some way in rectifying the inefficiency inherent in the original match, but such trades are themselves very inefficient. It is likely that the allocation of the TVET spots suffers from similar inefficiencies. In a qualitative interview at a major garment manufacturing plant, we found that the graduates were allocated to the sewing department in TVET, even though their specialization of choice was engineering survey.

The issue therefore is whether more efficient systems of allocation might be found that do better. It might be argued that a more demand-driven system might do better but given the current state of the institution such a radical change is unlikely. A potential option is designing an efficient matching algorithm that might replace the central allocation mechanism.

In the last decade, mechanism design has gained ground in economics and the research on the design of efficient matching algorithms with the aim to improve efficiency or equity of the markets is relevant here. Mechanism design involves using economics and game theory to design market institutions. The aim is to create a match that is strategy-proof and efficient. Strategy-proof algorithm “levels the playing field” by diminishing the harm to individuals that do not strategize or do not strategize well (BPS Strategic Planning Team, 2005), (Pathak & Sonmez, 2008). An interesting application of these methods was in redesigning the public schools placement in New York and Boston, as well the design of the national medical match, where the medical students are matched with the hospitals in the United States.

The mechanism used by schools in Boston is the most widespread mechanism used for school choice. From the qualitative interviews at the Ministry of Ethiopia, as well as TVET institutions and agencies, it appears that Ethiopia TVET allocation is similar to the Boston mechanism. The Boston mechanism assigns as many students as possible to the school of their first choice. After all such assignments are completed, the students are considered at the school of their second choice. Therefore, if the student is not admitted to the school of their first choice, her first choice would have been filled by somebody that placed that school as their first choice. This characteristic of the Boston algorithm is inefficient; there exists alternative hypothetical set of matching allocations that are superior (in the sense that they improve total utility). It is also inequitable, since some individuals may strategize by misrepresenting their choices to improve their expected match, and this is detrimental to the less sophisticated applicants who do not strategize.

Following recommendations by Dr. Thomas Payzant, the superintendent of the Boston Public Schools (BPS), the Boston School Mechanism was replaced by a new mechanism in the 2005-2006 school year. The mechanism was replaced by student-optimal stable mechanism (Gale & Shapley, 1962). The new algorithm uses a deferred-acceptance algorithm (Roth, 2007). This algorithm relies on the priorities of the children at each school, and removes incentives to game the system that handicapped the Boston mechanism (Pathak & Sonmez, 2008). The remarkable properties of the student-optimal stable mechanism are that it is strategy-proof: truth telling is the dominant strategy for each student and therefore they have an incentive to reveal their true preferences.

Both TVET and higher education systems in Ethiopia may benefit from the advances made in the mechanism design literature. More sophisticated algorithm will be required, since the match is done by the institution as well as specialization, while the example of Boston mechanism was allocating students by location only. However, more sophisticated algorithms can be design for this purpose. Such algorithms are currently employed in the Medical residency match in the United States. An algorithm that is efficient will be able perhaps to rectify the unfortunate situation such as depicted in the Appendix, where the students trade the spots on a secondary market.

## **5. TVET Impact Policy Evaluation**

This section discusses the existing datasets that are useful for evaluating the labour market outcomes of the TVET graduates. It also discusses how a hypothetical impact evaluation might be conducted.

### **5.1.Existing Data and Tracer Studies**

While there is no large-scale assessment of the outcomes of TVET graduates in Ethiopia, there are small tracer studies done by the training institutions themselves. These tracer studies typically report short-term outcomes for the small sample of beneficiaries. The questionnaire of such tracer studies is not standardized. Therefore, the findings of different TVET tracer studies are not comparable. Currently they are used only internally within institutions.

Currently there is no central agency that keeps the data on the trainees, either on how they proceed to TVET colleges from the schools, or on their labour market outcomes. The Management Information System envisioned in the TVET strategy (TMIS) is meant to keep such information, but it is not currently implemented. Currently the relevant data that exists is in different agencies and is not centralized. It is not certain if these data can be linked. Below we list some of the relevant sources of the data.

- The Bureau of Social Affairs keeps the administrative data on the unemployed.
- Secondary schools have databases of their students, including the information on the outcomes of the grade 10 exam. The schools have data on which students precede to the preparatory schools, and which students precede to TVET. However such databases are not centralized. Also, there is no follow-up information on these students.
- Some TVET institutions have data based on the tracer studies of their graduates.

- Urban Panel data is collected for the Labour Force Survey by Addis Ababa University in collaboration with Goteborg University in Ethiopia's seven largest urban areas. These data have been collected for 1994, 1995, 1997, 2000, and 2004 (World Bank, 2009).

## 5.2. Evaluation Problem: Looking for the Counterfactual

Currently the tracer studies done by the TVET institutions look at the labour market outcomes of their graduates. However looking at the outcome of the graduates only does not help to answer the question on how the outcomes of the graduates were affected by the program. One may never know exactly what the outcome of given graduates would have been if they did not go to TVET, as each individual is only observed once (each individual either went through TVET, or did not). Since one cannot observe individuals in two different states of nature, the next best strategy is to find the relevant comparable group – the group of students that are identical (or similar in all the relevant observable and unobservable characteristics) to the students that went to TVET, except for the fact that the comparison group did not go through TVET.

Different econometric tools can be used to construct the relevant comparable group.

- (1) **With randomized assignment** the group that received the program is by design similar to the group that does not receive the program.
- (2) **The regression discontinuity design** exploits the feature of the program where the receipt of the programme is determined by a threshold, such a score, age or geographic boundary.

These two design mechanisms could be used for purpose of evaluating the impact of the TVET on the labour market outcomes. Next we summarize how such research might be conducted.

## 5.3. Designing the Impact Evaluation Study

### 5.3.1. Impact Evaluation Design Options

*Design A: Exploiting Existing Randomization and oversubscription in Tigray*

The discussion and interviews with the officials at the MOE, suggests that in recent years demand for the places in Tigray exceeded the supply, and that qualified applicants had to be turned down. This fact could be exploited to design a meaningful evaluation. Of particular interest, is the question of how the allocations were determined in the face of over-subscription? In particular, it may be that the allocation of the qualified individuals was actually random. If this was indeed the case, than the group that was qualified to go to TVET, wanted to go, but was randomized out –could be compared to the group that graduated from TVET.

According to the Table 3-2, there were 4,070 government TVET graduates in Tigray in 2011. If indeed there was randomized assignment of TVET spots in Tigray, this can be exploited as follows. One would need access to the data of the graduates from the schools that had sufficient scores to proceed to TVET,

and wanted to go to TVET (applied to go). For the students that were chosen to go to TVET, we would need in addition administrative data from the TVET institutions that they attended. Additional data would have to be gathered on the labour market indicators, both of the graduates that completed TVET and the ones that did not get to the TVET because of (possible) randomization. In order to collect such data, it should be possible to track these individuals. If one is interested in the effect of the level 1 training, which lasts for a year, than gathering such data would take place around 2 years after the individuals completed the primary school. In that case, the TVET students would have completed one year of TVET, and one year would have passed since their graduation from TVET.

*Design B: Exploiting Regression Discontinuity Design and oversubscription in Tigray*

In case the allocation of the students in Tigray was not done randomly, but was done instead on stricter cut-off score rule than the federal guideline, this information could be exploited through the discontinuity design. In such case, one would need the data on the students that applied to Tigray and were just above and just below the actual score that was used for the allocating decision. Such individuals need to be traced to collect the data on the labour market outcomes. The timeframe for doing this study would be similar to the design A.

*Design C: Exploiting Regression Discontinuity Design of Exam Cut-off Scores (TVET/Preparatory)*

If the program in Tigray was not allocated through randomization, than one might exploit the regression discontinuity design in terms of the administratively set cut-off scores. Table 3-4 presents the cut-off scores during the last four years. For instance, in 2009, boys with the score of 2.29 and higher could go to the preparatory, while the rest could go to TVET. To exploit this information, one would need the primary school data, as well as examination data on the individuals that scored around 2.29. For instance, the data might include those that had scores 2.2 through 2.5. It should be possible to trace these individuals – both those that did and did not go to TVET.

Since not everybody that receives the sufficient score wants to go to TVET, one may in addition employ matching techniques to match individuals above the cut-off score that went to TVET, with the individuals similar in terms of observable but that had the score just above the threshold. If the data was available on the primary school graduates of about 4 year ago (2009), then in 2003 the preparatory track students would have finished the preparatory 2 years ago, while TVET track students would have finished Level 2 TVET 2 years ago. Ideally that would allow one to compare returns of spending 2 years in technical training versus the full-time academic program. However, most preparatory graduates would be heading to the universities and would not yet be in the labour force. Therefore we conclude that meaningful study exploiting TVET/preparatory score cut-off would require the follow-up of five years or more.



*Design D: Exploiting the regression discontinuity design of Exam Cut—off scores (TVET/end formal education)*

According to the Table 3-4, the cut off score that determined the access to TVET levels 1 and 2 was not announced, but was determined to be such that the number of the accepted student equalled the places available. It appears that in addition to the cut-off score that separated Level  $\frac{1}{2}$  TVET and level  $\frac{3}{4}$  TVET, there was a minimum cut-off score that would allow access to TVET 1. If this was indeed the case, then the design similar to the Design C could exploit discontinuity in terms of that threshold. In that case, the comparison would be between the students that went to TVET, versus the students that left the formal education. The advantage of such research design is that the follow-up survey need not follow with a long lag. For instance, if the information on the secondary school graduates were available for 2010, the follow-up data could be collected in 2013. In this case, the Level 1 TVET students would have graduate from TVET two years ago, while the level 2 TVET students would have graduated 3 years ago. The comparison group would have been out of the formal education during the last 3 years.

*Taking Stock of the Design Options*

Out of the four design options discussed above, options A and B get us closest to the question that is the most interesting to the policy makers “What is the impact of TVET on the typical TVET applicant”. The actual allocation rule involved would determine which of these two design options can be implemented in practice. If the allocation is in reality randomized, then this would imply the option A. If the allocation is through the cut-off score, it would imply Option B.

From the remaining two option, design D is easiest to implement and would involve the comparison of the TVET graduates with the ones that have no post-secondary formal training. Meanwhile, design C involves a much longer time-frame and would involve comparing that went to TVET with students that went through preparatory and possibly university. Such a comparison group might be less of the interest for the policy-makers in practice.

### **5.3.2. Labour Market Indicators of Interest**

The typical impact evaluation looks at the labour market outcomes of the beneficiaries. Below we list some of the indicators that would need to be collected as part of the follow-up data.

- Employment. Employment indicators, such as unemployment and labour force participation are the key information to be collected in follow-up data.
- Wages. Impact evaluations typically aim to investigate if the program affected the wages of the participants. A caveat is in order here. The actual wages that the graduates earn may not be equal to their marginal productivity. The actual wages maybe the result of the bargaining power of the workers versus that of the employers. If the firms have the high bargaining power, than at least some of the increase in the worker productivity will accrue to the firm in terms of higher profits. Wage data is often considered noisy, as it is easy to misreport.

- Consumption. Often while conducting the surveys in eth developing countries, detailed consumption data is more reliable than the wages. However, collecting detailed consumption data is costly and time consuming. It is unlikely to be necessary for this study.
- Asset Ownership. Durable asset ownership information is interesting as a proxy for the permanent income. Durable assets may include own dwelling and the household appliances.
- Productivity. Typically evaluations of vocational education training emphasize the outcomes of the individuals involved in training. However, training may improve the productivity of the individuals, but the increased productivity may not translate into higher wages, either because of the increased supply of the trained employees, or because of the bargaining power of the employer. In this case, the benefits accrue to the employer. Unfortunately the productivity in most occupations is hard to measure. However, in certain occupations it may be possible to measure it, in the case of piece rates, for instance shirt per worker per day in the garment factory. It might also be possible to obtain qualitative assessments of productivity which might be a useful proxy.
- Sector of Employment. Sector of employment is an indicator if the TVET graduates are using the skills that they were trained fore. Other than looking at whether the individual works in the occupation trained for, other indicators might include whether in the private or public sector, and or in formal or informal activity. In addition, the follow-up data would need information on the self-employed.
- Family Characteristics. The family characteristics to be collected in the follow-up data are the demographic information and family background and wealth.

The indicators listed above can be collected using the questionnaire similar to that of the standard Labour Force Survey or a tailored version of the Living Standard Measurement Survey.

## **5.4.Evaluation Issues**

This section discusses the potential issues with the proposed research design. As with most impact evaluation studies of the labour market interventions, the potential issues are the potential General Equilibrium effect and the displacement effects.

### **5.4.1. General Equilibrium Effects**

General equilibrium effects may be a problem if the increased supply of the trained employees changes the equilibrium wages in the economy. For instance, as a result of the TVET programme, there might be an increased supply of masons. However, this increased supply may lower the wage of masons. This will also affect the wages of the non-TVET graduates. General equilibrium effects of training programmes are hard to estimate, and normally require data on some aggregate. For the program the size of TVET in Ethiopia the general equilibrium effect may be of concern.

#### **5.4.2. Displacement Effects**

Displacement effects refer to the phenomenon when the training participants take the job that would otherwise have been taken by somebody else. According to standard human capital theory such effects are trivial, and this effect is ignored by most evaluations (Grubb & Ryan, 1999). It is assumed that ex-participants would not displace the workers, and the training simply affects the marginal wage rates. However, because labour markets are characterized by imperfect competition, involuntary unemployment and perhaps segmented pay-structures, displacement can be an important concern, especially if the participants are recycled into the labour market, where non-participants are the close substitutes (Grubb & Ryan, 1999). However, if the training program takes the participants from surplus to the deficient markets, then displacement is typically lower. Estimates of displacement in the markets where the program is large enough to affect the labour market can be done by macroeconomic models (Eyssartier and Gauti, 1996). To deal with such effects the study might need to be conducted at some higher level of aggregation, such as plant, employer or the sector. (Steedman & Wagner, 1989). Whether or not the displacement effect is important would depend on the sector of employment.

## **6. Summary**

This paper presents the background study of the TVET system in Ethiopia. It aims to inform the policy-makers in Ethiopia on the international experience with impact evaluation of the vocational education. The report also aims to inform the researchers and development practitioners both inside and outside Ethiopia on the state of TVET in Ethiopia.

The report finds that given the supply-driven nature of the TVET system in Ethiopia, it is particularly important to increase efficiency and equity of the centrally-driven allocation mechanism, as well as to evaluate the TVET program in terms of the value added to the final labour market outcomes for its beneficiaries.

1. With respect to the former (improved matching efficiency); we believe that much can be learned from the recent research of the efficient matching algorithms. The centralized allocation system to allocate students to subject and programme in TVET (as for university) could be improved.

2. With respect to (the evaluation of the outcomes, we believe that impact evaluation has to be integral part of the TVET system, and discuss various ways such evaluation could be conducted. The value added of TVET is best examined through a proper evaluation based on a regression discontinuity design. This would involve tracking graduates of junior secondary education (those who made the cut-off in their year and those who did not. Currently there is no evidence available that would inform the policymaker about the returns to TVET.

Policymakers would like to know whether TVET adds value and ought to be expanded. We do not know – but we offer a relatively inexpensive and swift way to discover the answers. We also suggest possible improvements to the allocation system in play.

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# Appendix

